THE EFFECTS OF NORM-VIOLATIONS IN DRIVING SCENARIOS ON SELF-CONSTRUED COURTEOUS DRIVERS

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THE EFFECTS OF NORM-VIOLATIONS IN DRIVING SCENARIOS ON SELF-CONSTRUED COURTEOUS DRIVERS

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Dissertation

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ABSTRACT

This study examined possible psychological processes involved in risky and aggressive driving (RAD). Extensive research had focused on anger as a primary antecedent to RAD, but this research was problematic because: there was too much focus on “trait” driving anger, the measures used had questionable validity, and it was often simply descriptive in nature. The present study contributed to this literature by creating two new scales and examining the role of self-construals as an alternative antecedent of anger-induced RAD. Specifically, self-construal for courteous driving was hypothesized to interact with the driving context such that other drivers’ norm violations would cause elevated state anger due to more stringent standards of proper driving behavior. Elevated state anger, in turn, was expected to lead to more RAD as a means of expressing the negative evaluation of the norm violation.

Subjects read various driving scenarios depicting either a provocative norm violation from another driver (e.g., following too closely) or a provocative situation lacking a norm violation (e.g., road construction) and reported their expected level of state anger and behavioral reaction (i.e., RAD). Contrary to expectations, hierarchical multiple regression analyses revealed that self-construal for courteous driving was not predictive of state anger and was negatively related to RAD for both types of scenarios. Still, self-construal for courteous driving did show potential as a selection device for jobs that require driving.
Gender differences were found such that women reported more anger in reaction to the scenarios than men did, but women were not higher than men on RAD. Also, no meaningful differences were found between an urban and a rural sample, which supports previous conclusions that population density and exposure do not affect driving anger or behavior. Theoretical and practical implications are discussed along with suggestions for future research.
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CHAPTER I
INTRODUCTION AND HYPOTHESES

Motor vehicle accidents are costly, both in human and economic terms. Driving behavior that may be characterized as either risky or aggressive (RAD for risky and aggressive driving) represents a key, preventable factor in many of these accidents. RAD entails actions taken by drivers such as speeding, passing where it is prohibited, and cutting in front of another driver. A variety of individual difference factors contributing to this type of dangerous driving have been examined (Dahlen, Martin, Ragan, & Kuhlman, 2005; Dahlen & White, 2006; Donovan, Umlauf, & Salzberg, 1988), but research in this area has predominantly focused on “trait” driving anger (Nesbit, Conger, & Conger, 2007). Although anger is clearly a factor in RAD, this emphasis on trait driving anger may be misplaced as more recent research has called into question the validity of trait driving anger (Nesbit, Conger, & Conger, 2007; Van Rooy, Rotton, & Burns, 2006). In addition, the research on trait driving anger fails to consider drivers with average-to-low general trait anger who, nevertheless, experience acute state anger in response to certain traffic situations (Deffenbacher, Richards, & Lynch, 2004).

The present study sought to examine the role of internal factors beyond general trait anger in RAD. Specifically, it is proposed that one’s self-construal may contribute to state anger and RAD, at least in certain situations. That is, individuals who self-identify as highly courteous drivers may have a tendency to experience acute anger in
response to perceived norm violations of other drivers, even if those same individuals lack high trait anger.

Driving norm violations entail discretionary actions that endanger, inconvenience, or take advantage of the focal driver. For example, if driver A is a self-construed courteous driver and witnesses driver B speeding in light traffic, this may not constitute a norm violation in the mind of driver A, because the only person being affected or endangered is driver B. Conversely, if driver B pulls right out into traffic and forces driver A to slam on his or her brakes, this would constitute a norm violation in the mind of driver A, due to the endangerment and inconvenience being incurred.

Situations where one driver involuntarily inconveniences another driver would not meet the current conception of a driving norm violation. For example, if driver A is waiting for a gap in oncoming traffic so as to turn left, this may inconvenience driver B who is forced to wait behind driver A, but driver A is adhering to customary driving practices and is not endangering driver B. Assuming there is no dedicated left-turn lane, driver A clearly has no choice in the matter; there is no other way to make a left turn in two-way traffic.

The premise of courteous drivers reacting angrily to perceived norm violations is based on research that indicates evaluations of others in domains that are meaningful and self-relevant are likely to be more critical (Engle & Lord, 1997; Sheeran, Abrams, Abraham, & Spears, 1993). By extension, the degree to which a person self-construes as a courteous driver may predict how harshly he or she would judge others’ perceived violations of implicit rules of the road. A critical evaluation in this case would be expected to manifest in an elevated angry reaction to the other driver’s transgression.
These processes are in contrast to less contextually-bound reactions of drivers with high general trait anger. Specifically, whereas drivers with high general trait anger show an elevated anger response to essentially all driving provocations, those who consider themselves highly courteous drivers (and lack high trait anger) would only be expected to react with elevated anger in response to perceived norm violations of other drivers. By definition, this elevated anger is not conducive to safe driving, regardless of source. Finally, an individual who does not self-construe as a courteous driver and does not have high trait anger would be expected to react with relatively less anger across all types of potentially-provocative driving situations.

In statistical analyses, evidence supporting the above relationships would be expected to follow a particular pattern. That is, a self-construal for courteous driving would be expected to explain unique variance above and beyond general trait anger in multiple regression analyses predicting angry reactions to other drivers’ norm violations. Further, angry reactions to others’ norm violations would be expected to mediate the effects of a self-construal regarding courteous driving on the behavioral outcome of RAD.

Considering the range and number of jobs that require driving on public roadways to some degree (e.g., police officer, utility meter reader, delivery driver), employee selection is an important area where such findings could be practically applied. Certainly, most employers would not seek to employ hot-headed, road-rage-prone people for positions that require a significant amount of driving. But supportive results in this study would suggest that courteous, otherwise calm drivers may also be predisposed to anger-induced RAD under certain circumstances. Thus, if selection programs for
professional drivers are intentionally or unintentionally selecting for self-construed courteous drivers, then adopting training programs to address this potential problem may be warranted.

The High Costs of Risky and Aggressive Driving

Here in the U.S. we have a love affair with our cars. Whether we are going to work, the grocery store, or out for the evening, we typically turn to our vehicles to get us there and back. All of this driving comes with a heavy cost, however. The National Highway Traffic Safety Administration (NHTSA, 2006) stated that police-reported automotive accidents occur approximately once every five seconds, on average. It seems that automotive mishaps are nearly as ubiquitous as driving itself. Indeed, motor vehicle accidents are a serious problem in this country. In 2004, police responded to over six million motor vehicle crashes (NHTSA, 2006). In addition, there were in excess of forty-two thousand fatalities as a result of these crashes (NHTSA, 2006).

In addition to loss of life, accidents cause economic losses in the form of property damage, personal injury, liability lawsuits, judgments, fines, incarcerations, and lost wages and productivity. These losses impact not only private individuals, but also organizations whose workers drive as a function of their jobs. Overall, these losses can be staggering. The NHTSA (2006) estimates the total economic impact of vehicle accidents in 2000 was $230.6 billion. Of that figure, the estimated amount due to speeding, a central component of RAD, was $40.4 billion. Although it is unknown exactly how many crashes are caused by RAD, the NHTSA believes the number to be substantial based on the violations committed by the drivers of the vehicles involved in the crashes and reported by law enforcement agencies as contributing factors.
The danger of RAD is that it puts the driver in a situation where he or she is driving beyond a reasonable ability to avoid an accident, such as when following too closely or speeding. For example, the NHTSA has stated, “Speeding reduces a driver’s ability to steer safely around curves or objects in the roadway, extends the distance necessary to stop a vehicle, and increases the distance a vehicle travels while the driver reacts to a dangerous situation” (Traffic Safety Facts 2004 Data: Speeding, p. 1).

Definitions of Risky and Aggressive Driving

For the purposes of this study, RAD is defined as a broad range of behaviors that, intentionally or unintentionally, increase the likelihood of an automotive accident and run contrary to commonly held standards of safe driving. However, what constitutes a risky driving behavior is qualitatively different from what constitutes an aggressive driving behavior. Specifically, risky driving behaviors encapsulate unsafe forms of operating a vehicle such as going 10 mph over the posted limit, running a stop sign, and passing in areas prohibited by law. This conceptualization does not include relatively minor oversights (e.g., failure to use a turning signal) that could, arguably, cause accidents.

Alternatively, aggressive driving behaviors represent the unsafe use of a vehicle to intimidate or threaten others. Often, this reflects a retaliatory intent that expresses displeasure with another driver. Examples of aggressive driving include following close behind another driver who failed to yield when one tried to merge onto the freeway or using one’s vehicle to bump another vehicle. This definition of aggressive driving does not include incidental behaviors that could be considered aggressive (e.g., swearing at another driver) because they are separate from the actual operation and maneuvering of the vehicle. (Although, swearing is a likely precursor to more overt retaliation.)
Of course there is conceptual overlap, and some driving behaviors could be considered either risky or aggressive. For example, tailgating could be considered aggressive if it is done to intimidate, or risky if it is simply due to impatience or thrill-seeking. The key difference between these behaviors, however, is the intent to intimidate or retaliate, and the assessment of risky and aggressive behaviors in this study reflects this distinction. RAD behaviors represent the key outcomes of interest in this study.

Technically, driving while under the influence of alcohol or drugs is an all too common example of risky driving. However, this type of impairment is the result of decisions made by drivers before they ever climb behind the wheel and is, therefore, tangential to the particular processes examined in this paper. Although one might argue that both the incidence and intensity of angry driving could be affected by mind-altering substances, this important topic remains beyond the scope of the current study.

Two Theories of Risky and Aggressive Driving

Researchers have identified two contrasting causes of RAD: a sensation-seeking motive and an anger response (Donovan, Umlauf, & Salzberg, 1988; Taubman-Ben-Ari, Mikulincer, & Gillath, 2004). A particularly illuminating study (Donovan et al.) examined young men (mean age = 28.1 years) who had attended a mandated driving safety program due to multiple driving infractions and accidents. Two maladaptive subgroups of drivers were identified within this sample. The first subgroup was characterized by competitive speeding, impulsivity, sensation-seeking, and overt acting-out behavior. The other subgroup was characterized by driving-related aggression, covert hostility, emotionality, irritability, and resentment. This second, “angry” subgroup also scored higher on an index of moving violations and accidents than the first, “sensation-
seeking” subgroup. Other researchers have since explored the sensation-seeking motive and anger as antecedents of RAD.

*Sensation-seeking RAD.* Sensation-seeking has been shown to be a key predictor of general risk-taking tendencies (Nicholson, Soane, & Fenton-O’Creevy, & Willman, 2005), and several studies support the theory of non-angry sensation- or thrill-seeking motives playing an important role in RAD (Castella & Perez, 2004; Dahlen, Martin, Ragan, & Kuhlman, 2005; Donovan et al., 1988). Specifically, sensation-seeking has been shown to be significantly predictive of RAD (Dahlen et al.; Schwebel, Severson, Ball, & Rizzo, 2006), although this relationship appears to be stronger for risky driving than for aggressive driving ($r = .33$ and $r = .20$, respectively; Dahlen et al.). Further, sensation-seeking does not seem to be related to anger while driving, yet both are incrementally predictive of RAD in multiple regression analyses (Dahlen et al.; Dahlen & White, 2006). This pattern suggests that RAD is sometimes used as a means to satisfy the thrill-seeking desire in such a way that does not necessarily include an anger element.

Gender effects have been found for sensation-seeking tendencies in studies of RAD. For example, Dahlen et al. (2005) and Dahlen and White (2006) found that men reported significantly higher levels of sensation-seeking than women did ($d = .54$ and $d = .48$, respectively). Men also reported more moving violation tickets than women did in both studies. Similarly, Castella and Perez (2004) examined a sample of Spanish drivers and found that the men engaged in riskier, less law-abiding driving behaviors than women did ($d = .68$). It has been suggested that sensation-seeking encourages risky and law-breaking conduct, and that the rewards of risky driving are likely to be more salient
than the possible consequences for those high in sensation-seeking (Castella & Perez, 2004).

In addition, younger drivers may be more likely to engage in risky driving behaviors than older drivers (Dahlen et al., 2005; Donovan et al., 1988; Houston, Johnson, & Skinner, 2006; Taubman-Ben-Ari, Mikulincer, & Gillath, 2004). Given the above finding, one can easily imagine a car full of teenage boys speeding and attempting risky driving maneuvers purely for the thrill of doing so. As troubling as this scenario is, it is the relative inexperience of such drivers that makes RAD for this demographic particularly problematic. For example, the National Highway Traffic Safety Administration (2006) reported, “In 2004, 38 percent of the male drivers age 15 to 20 who were involved in fatal crashes were speeding at the time of the crash” (p. 2).

Angry RAD. In recent years, much research has focused on the effects of anger on driving (Arnett, Offer, & Fine, 1997; Dahlen, Martin, Ragan, & Kuhlman, 2005; Dahlen & White, 2006; Maxwell, Grant, & Lipkin, 2005; Schwebel, Severson, Ball, & Rizzo, 2006). In particular, Jerry Deffenbacher and his colleagues have actively explored the relationships between angry driving and situational provocations (Deffenbacher, Oetting, & Lynch, 1994), RAD (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000), aggressive stimuli such as billboards (Ellison-Potter, Bell, & Deffenbacher, 2001), therapeutic interventions (Deffenbacher, Filetti, Lynch, Dahlen, & Oetting, 2002), means of expression (Deffenbacher, Lynch, Oetting, & Swaim, 2002), angry/hostile cognitions (Deffenbacher, Petrilli, Lynch, Oetting, & Swaim, 2003; Deffenbacher, White, & Lynch, 2004), urban versus rural drivers (Deffenbacher, 2008), and territorial markings such as bumper stickers (Szlemko, Benfield, Bell, Deffenbacher, & Troup, 2008). However,
what is missing from the research on angry driving is a more fine-grained approach that examines the underlying psychological processes that precede this anger.

Whereas sensation-seeking RAD is a relatively straightforward theoretical model, the processes underlying anger-induced RAD are less clear. For example, are there different elements within the driving context that are likely to cause anger? If so, how might individual differences interact with these elements to heighten or diminish the anger response while driving?

*The Role of Self-Construal*

*Anger and the courteous driver.* Although much research has examined the role of anger in RAD, relatively little has sought to understand why some people without high trait anger still experience acute anger while driving (Taubman-Ben-Ari, Mikulincer, & Gillath, 2004). Of course, one does not need to have high trait anger to become upset by extreme provocations such as another driver nearly running your vehicle off the road and then honking and displaying an obscene gesture as they drive away. However, many of us are familiar with people who are relatively calm and mild-mannered in most aspects of life, but who nevertheless react with greater anger in certain driving situations than other, similarly mild-mannered people would react.

It seems counter-intuitive, but the answer may lie with thoughtful, highly-considerate drivers. For example, recent research suggests there may be a connection between driving anger and a methodical driving style. Specifically, Taubman-Ben-Ari and colleagues (2004) sought to identify and categorize the most common driving styles and discovered that the need for control in one’s daily activities correlated positively with both their “Angry” and “Careful” driving typologies. The authors speculated that
“Whereas (need for control) could lead to more careful driving, its frustration could lead to angry driving” (p. 328). Thus, using care in one’s driving may carry the potential for anger as well.

The nature of conflict, in general, offers other reasons why considerate, courteous drivers may experience anger while driving, particularly in adverse encounters with other drivers. Bodtker and Jameson (2001) suggested that conflict with others, in general, (a) is emotionally defined (e.g., we know we are in a conflict because we feel anger), (b) invokes a moral stance (e.g., we evaluate other’s actions as right/wrong, fair/unfair, etc.), and (c) is identity-based such that the more our sense of self is salient in a conflict, the more intense and potentially volatile our emotions are likely to be. Therefore, a perceived provocative interaction with another driver typically triggers one’s moral sense of right and wrong, and the degree to which this invokes one’s self-identity as a courteous driver, the more likely one may be to experience acute anger.

Also, when we consider that the nature of courteous driving is self-sacrificial for the greater good (e.g., allowing a vehicle to merge ahead of us to facilitate a smoother flow of traffic), it becomes apparent that if one self-identifies as a courteous driver, this is likely to carry greater moral overtones than some other facets of self-identity might (e.g., being a good golfer). Thus, an individual who self-identifies as a courteous driver may be more likely to experience intense anger due to a more indignant evaluation of another driver who demonstrates what the courteous driver considers “immoral” driving behaviors.

The nature of self-construal. Besides the notion that courteous drivers experience a form of moral indignation to other drivers’ transgressions, there are other reasons to
suspect that those who see themselves (or self-construe) as courteous drivers may be
prone to angry driving in certain circumstances. That is due to the processes involved
with self-construal.

Self-construals are those beliefs we hold about ourselves; everything pertaining to
who we were, who we are, and who we will become (Oyserman, 2007). For example, we
may have beliefs regarding how tall we are, how we like to dress, and how we like to
behave, including how we drive. Such elements of our self-identities are so ingrained
that they operate at the level of automaticity and are unaffected by intense, conscious
thought processes (i.e., cognitive load). So unless we are under a light cognitive load and
are highly motivated to be more accurate, these automatic processes represent the
“default value” in our social perceptions (Smith, 1994). Accordingly, a self-construal of
being a courteous driver would likely remain instrumental in one’s social perceptions
even if one was under cognitive load from a demanding driving situation such as
navigating rush hour traffic.

Our self-construals show “chronic accessibility” (Oyserman, 2007), which means
that aspects of our self-persona are easily activated and readily accessible at all times.
Therefore a stimulus that is congruent with our self-construal is more meaningful than
stimuli unrelated to our self-construal (e.g., an avid golfer conversing with a new
acquaintance remembers a golf score mentioned in passing, but forgets the new
acquaintance’s name). Of course, a self-construal related to an activity is likely to be
particularly accessible and influential in social comparisons when the individual is
actually engaged in that activity (Markus, 1977; Stapel & Koomen, 2001; Stryker &
Serpe, 1994). Thus, a self-construal of being a courteous driver would be expected to be
chronically accessible, but even more salient while the individual is in the act of driving (i.e., in the role of driver), and where the priming of other self-construals may be limited.

*Self-construed courteous drivers’ evaluations of others.* Of particular interest is the evidence suggesting that we are more critical in our evaluations of others on dimensions that are related to valued self-construals than on dimensions of lesser self-construed importance. Specifically, Engle and Lord (1997) found that to the degree supervisors self-defined as good leaders, they were *less* well liked by their subordinates and had *poorer* leader-member exchange relationships with their subordinates, generally speaking. The same pattern was found for the degree to which supervisors self-defined as good performers. The authors suggested the supervisors’ self-views of being good leaders and performers created relatively high internal standards of behavior that influenced their social comparisons. Thus, those who saw themselves as effective leaders and strong performers were, in turn, quite stringent in their assessment of their subordinates’ leadership potential and performance levels. Engle and Lord’s (1997) findings suggest that subordinates of self-defined good leaders and performers were at least somewhat aware of their leaders’ harsh critique of their performance. The knowledge that their leaders felt this way about them was understandably detrimental to those subordinates’ perceptions of how much they liked their leaders and the perceived quality of those relationships. In addition, it is quite likely that self-defined effective leaders were not only making severe evaluations of their subordinates, they were also interacting with their subordinates in a manner consistent with the leaders’ negative assessments. From the subordinate’s perspective, one can imagine that such interactions would be seen as condescending or dismissive in nature.
Engle and Lord (1997) assessed participants’ self-construals for leadership and performance by having them rate whether characteristics of good leadership and performance were self-descriptive or not. If a characteristic was marked as self-descriptive, participants then rated the importance of the characteristic to their self-concepts on a Likert scale. Greater agreement with the leadership or performance characteristics as a whole indicated that that dimension was more central to the participant’s self-concept and also more personally meaningful. Thus, this methodology relied upon participants’ awareness of their own self-construals even though the processes by which self-construals influence social perceptions are thought to be automatic (Markus, 1977). As no other study has sought to assess a self-construal for courteous driving, the present study employed a similar methodology to assess the degree to which a self-construal for courteous driving was personally meaningful to participants.

If “Janet” self-defines as a courteous driver (i.e., believes in the importance of being polite to other drivers and conscientious of their goals), and especially if she believes this is a very laudable trait to have, this may result in elevated standards within her implicit theories of how people should drive and she may be quite critical of others’ driving behaviors. As previously mentioned, the salience of a self-defining trait such as courteous driving may be somewhat context specific, but it is likely to be highly accessible at the time of such an evaluation (i.e., while driving).

Thus, if our self-construed courteous driver, Janet, encounters another driver who violates her implicit norms of consideration (e.g., willfully endangering or inconveniencing her), then a negative evaluation and indignant anger may follow. Similarly, a high trait anger driver would also be expected to be reactive in this situation,
but only because it is provocative in general and not because of any particular self-
construal. However, if Janet encounters a potentially frustrating driving situation that is
un-related to her implicit standards of driving behavior (e.g., road construction requires a
detour), she would not be expected to react as angrily as the high trait anger driver
because this situation lacks the same form of personal meaning to her.

Finally, it is reasonable to consider how self-defined courteous drivers who are
angry over another’s driving might actually behave. One possibility is that some
courteous drivers become self-appointed enforcers of “proper” driving etiquette and
express their displeasure (and possibly punish the other driver) through anger-induced
RAD. Indeed, some have argued that a significant portion of angry aggression is
motivated by the desire to maintain a sense of honor (Cohen, Nisbett, Bowdle, &
Schwarz, 1996; Nisbett & Cohen, 1996; Vandello & Cohen, 2003). Therefore, a self-
defined courteous driver may be angrily motivated to retaliate against an offending driver
because he or she feels validated that this behavior is the only honorable course of action
to take in the situation. Figure 1 shows the theoretical model described in the preceding
discussion, and is followed by specific hypotheses that were tested.
Figure 1

Theoretical Model of Self-Construal for Courteous Driving
**Hypotheses**

**Hypothesis 1:** A measure of self-construal for courteous driving will be positively correlated with a measure of courteous driving behaviors.

**Hypothesis 2:** The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for courteous driving and a measure of state anger in response to those scenarios, such that the self-construal will be positively correlated with state anger *only* for provocative driving scenarios depicting driving norm violations.

**Hypothesis 3:** The positive, moderated relationship between self-construal for courteous driving and state anger described in Hypothesis 2 will hold true when controlling for general trait anger.

**Hypothesis 4:** A measure of state anger in response to provocative driving scenarios will be positively correlated with a measure of RAD behaviors associated with those scenarios.

**Hypothesis 5:** The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for courteous driving and a measure of RAD behaviors associated with those scenarios, such that the self-construal will show a positive
relationship to RAD only for provocative driving scenarios depicting driving norm violations.

Hypothesis 6: The positive relationship between self-construal for courteous driving and RAD described in Hypothesis 5 will hold true when controlling for general trait anger.

Hypothesis 7: A positive relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm violations will be mediated by a measure of state anger in reaction to those scenarios.

Hypothesis 8: The positive, mediated relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm violations described in Hypothesis 7 will hold true when controlling for general trait anger.
CHAPTER II
LITERATURE REVIEW

This literature review is divided into three sections. The first section provides an overview of the nature of anger and its effects on driving behaviors. Given the long-standing interest in the psychology of angry driving (e.g., Moss, 1929; Repond, 1935), a full review of the research in this area would be impractical. Therefore, this section will focus on the more recent research that shaped the direction of the current study. In particular, the research of Deffenbacher and his colleagues and the psychometric properties of the Driving Anger Scale (DAS; Deffenbacher, Oetting, & Lynch, 1994) will be discussed, as this body of work has greatly influenced the recent literature in this area (Sharkin, 2004).

The second section reviews relevant research and provides an explanation of the theoretical rationale behind each hypothesis. The final section provides a similar discussion of the rationale behind the chosen control variables (i.e., gender, age, narcissism, and behavioral approach/inhibition).

Understanding Anger

Although anger is a complex construct (Berkowitz, 1993; Darwin, 1872), for the present purposes it was defined as an emotional response to a negative evaluation with potential physiological, psychological, and experiential substrates (Eckhardt, Norlander, & Deffenbacher, 2004). Anger may range in intensity “from mild irritation or annoyance
to intense fury and rage” (Spielberger, Jacobs, Russell, & Crane, 1983, p. 16). In terms of physiological effects, anger is closely related to the “fight or flight” response of the sympathetic nervous system and has been associated with elevated blood pressure, increased muscle tension and respiratory rates, and the release of adrenaline and other hormones (Spielberger, 1996).

Psychologically, anger has several important affects. For one, anger has been linked to an approach (versus avoidance or withdrawal) motivational strategy whereby one stays actively engaged in narrowing the distance to a challenging goal (Carver, 2004; Carver & Harmon-Jones, 2009; Harmon-Jones, 2004; Putman, Hermans, & van Honk, 2004; Stemmlera, Aueb, & Wacker, 2007). In the driving context, the goal may be simply getting to work on time, or even expressing your displeasure with another driver. Indeed, interpersonal anger has been found to cause a change in goal orientation that emphasizes punishment or retaliation, especially if the transgression is seen as intentional (Bodtker & Jameson, 2001; Daly, 1991). In addition, anger at higher levels of intensity may cause deficits in information processing capabilities, leading to a condition called “emotional flooding” whereby one loses the ability to think clearly (Gottman, 1994).

Thus, even though anger has adaptive value in response to threat (Cosmides & Tooby, 2000), it is reasonable to assume that anger is not conducive to the defensive or avoidance (Carver & White, 1994; Higgins, 1997) motivational mind-set commonly associated with safer driving practices (NHTSA, 2004). The anger response operates within our powerful and extremely fast “emotional architectures” (Lord & Harvey, 2002), and this poses a challenge to slower, higher-order processing that may be attempting to rein in anger’s effects. Therefore, the emotional arousal of anger may impact drivers’
physiology, motivational disposition, goal orientation, and information processing in such as way that culminates in poorer motor performance in general, and greater RAD in particular (Deffenbacher, Oetting, & Lynch, 1994). For example, one study (Arnett, Offer, & Fine, 1997) found that being in an angry mood was the only negative mood state associated with speeding and reckless driving among adolescents.

Anger and the Provocative Nature of Driving

Moss’ (1929) chapter on the role of psychology in auto accidents began:

Each year several million new automobiles are put on the streets and at the end of the year we find that the accident fatalities have increased by several thousand. Approximately three fourths as many were killed in traffic accidents in the United States in 1927 as were killed in battle in the American Army in the World War (p. 376).

Clearly, psychology’s interest in driving behaviors and outcomes is nearly as old as the automobile, itself. Further, driving’s potent ability to illicit anger has long been lamented in the popular press. For example, a Better Homes and Gardens article (Crowder, 1948) featured a sketch of a saintly looking man with a halo above his head next to a devilish looking man behind a driving wheel. Between the men was the question: “Are you a Mr. Hyde on the highway?” (p. 48).

The nature of driving itself seems to produce anger more often than other common activities (Parkinson, 2001). Given the potentially detrimental effects of anger on safe driving practices mentioned above, it is particularly disconcerting when one considers two characteristics inherent to driving that can cause anger. First, as previously discussed, driving is typically goal-directed (e.g., getting to a restaurant or delivering freight). Hence, it is not difficult to see how occurrences that interfere with reaching
these goals in a safe, timely manner could cause frustration and subsequent anger (Berkowitz, 1993; Maxwell, Grant, & Lipkin, 2005).

Second, driving is a social experience that requires cooperative interaction with other, similarly goal-directed, drivers. For example, the ubiquitous morning rush hour puts many of us bumper-to-bumper as we strive to make it to work on time without incident. In the meantime, we are at the mercy of the whims, motivations, moods, and mistakes of other drivers. (Of course, they are at the mercy of ours, as well.) As there is only so much space on our roadways, these cooperative interactions may become more competitive, and the likelihood of one driver’s actions upsetting other drivers increases.

The potential for drivers to take their anger out on other drivers is also exacerbated by the inherent nature of driving. For instance, vehicles are equalizing in the sense that one’s physicality has no bearing on a vehicle’s ability to accelerate or maneuver. Thus, short or tall, weak or strong, we all have the ability to express anger through our vehicles if we choose to do so. For example, several studies found no gender differences in the likelihood of drivers using their vehicle to express their anger (e.g., flashing lights at or cutting off another driver) while driving (Deffenbacher, Lynch, et al., 2002; Deffenbacher, Richards, & Lynch, 2004; Hennessy, Wiesenthal, Wickens, & Lustman, 2004; see also Deffenbacher, White, & Lynch, 2004).

Another aspect of driving that heightens the potential for drivers to take their anger out on other drivers is that driving is typically anonymous. That is, our identities are largely hidden while driving and this loss of personal identity can lead to more socially unacceptable behaviors (Ellison, Govern, Petri, & Figler, 1995). Indeed, one study (Ellison-Potter, Bell, & Deffenbacher, 2001) found that participants who were
simply told to imagine they were driving a convertible with the top up (i.e., the anonymous condition) ran more red lights \((d = .30)\), had more collisions \((d = .28)\), “killed” more pedestrians \((d = .38)\), and drove faster \((d = .38)\) on a video driving simulator than those told to imagine they were driving a convertible with the top down (i.e., the identifiable condition).

The issue of driving anonymity applies to other drivers as well. The fundamental attribution error (Jones & Nisbett, 1972) would suggest that personal trait attributions are more likely made about the causes of others’ driving than our own, especially when the observed behavior is viewed as undesirable (Smith, 1984). If it is believed that others’ RAD is more likely caused by personal traits (e.g., idiocy) than by situational characteristics (Baxter, Macrae, Manstead, Stradling, & Parker, 1990), then our own lack of personal identity may liberate us to retaliate in some way, if we are inclined to do so.

The term “road rage” is often used to describe traffic incidents characterized by furious anger such as running another driver off the road or where drivers have come to physical blows. It should be noted, however, that for every violent incident of road rage, there are undoubtedly many cases of drivers who, though they may be acutely angry, choose to react in less extreme ways (Deffenbacher, White, & Lynch, 2004). Therefore, cases of road rage may grab headlines, but less overtly dangerous reactions are likely to be much more common, and thus, just as concerning to the driving public’s safety (Deffenbacher, Richards, & Lynch, 2004).

Gender and Driving Anger

Researchers have attempted to uncover differences in the degree of anger men and women report in response to provocations while driving. Some evidence of situational
gender affects have been found. For example, men have shown to react with more anger over slow drivers that impede their progress than women did (Deffenbacher et al., 2000; Deffenbacher, Oetting, & Lynch, 1994). Also, women have reacted with more anger over traffic obstructions and the dangerous driving of others than men did (Deffenbacher, Oetting, & Lynch), although this difference has not been replicated (Deffenbacher et al., 2000).

In broader, aggregated measures of driving anger, however, a different picture emerges. Specifically, a lack of gender differences in overall driving anger has been found in numerous studies (Deffenbacher, 2008; Deffenbacher, Deffenbacher, et al., 2003; Deffenbacher et al., 2000; Deffenbacher, Lynch, et al., 2002; Deffenbacher, Oetting, & Lynch, 1994; Deffenbacher, Petrilli, et al., 2003, Deffenbacher, Richards, & Lynch, 2004; Deffenbacher, White, & Lynch, 2004; Lajunen, Parker, & Stradling, 1998; Van Rooy, Rotton, & Burns, 2006). Although men and women report similar levels of anger in driving, men tend to think differently than women do in response to provocative driving situations. For example, men have shown greater tendencies to think in terms of revenge and physical aggression in driving situations (Deffenbacher, Petrilli, et al.; Deffenbacher, White, & Lynch) than women have. Together these findings suggest that women may be, on average, more successful than men at preventing their anger from manifesting in aggressive cognitions while driving.

Anger and Driving Outcomes

Self-reported angry driving has shown positive relationships with getting in an argument with another driver in the past year ($r = .36$), driving recklessly when out with friends ($r = .35$), instances of lost concentration ($r = .26$), instances of minor loss of
vehicular control \( (r = .15) \) (Deffenbacher et al., 2001), lifetime accidents (Deffenbacher et al., 2000), moving violations, speeding, use of vehicle to intimidate (Deffenbacher, Richards, & Lynch, 2004), and RAD in general (Deffenbacher et al., 2000; Deffenbacher, Oetting, & Lynch, 1994; DePasquale, Geller, Clarke, & Littleton, 2001; Mathews & Norris, 2002). Specifically, on driving logs, frequency and intensity of anger have been linked with measures of risky \( (rs = .36 \text{ and } .33, \text{ respectively}) \) and aggressive \( (rs = .69 \text{ and } .62, \text{ respectively}) \) driving behaviors (Deffenbacher et al., 2001).

Whereas sensation-seeking RAD may be enacted for the pleasure, or “rush” that it offers, angry RAD may be even more troubling because it typically includes an element of malice toward the provoking target. For example, anger has shown stronger relationships to aggressive driving than risky driving (Dahlen et al., 2005; Dahlen & White, 2006; Deffenbacher, Richards, & Lynch, 2004; Houston, Johnson, & Skinner, 2006; Nesbit, Conger, & Conger, 2007), which is the reverse of the strengths of the relationships found with sensation-seeking (Dahlen et al., 2005). In addition, the nature of anger is such that its effects on behavior may still be found even after its salience has passed (Spielberger, 1996). For example, driving at an elevated speed may continue even after the anger-inducing incident is forgotten and conscious awareness of anger has passed.

**Antecedents of Driving Anger**

Research on anger-induced RAD tends to focus on anger as either (a) state anger stemming from an interaction between various interpersonal characteristics and the driving context, or (b) a chronic predisposition toward frequent and intense anger while driving, or “Trait Driving Anger” (Deffenbacher, Huff, Lynch, Oetting, & Salvatore,
Deffenbacher and his colleagues originated the notion of Trait Driving Anger, which they conceptualize as being related to trait anger (Spielberger, 1999), but with a narrower, more contextual focus (Deffenbacher, Oetting, & Lynch, 1994). Specifically, Trait Driving Anger is defined as a “person’s general propensity to become angry encountering potential frustrations and provocations when driving” (Deffenbacher, Richards, & Lynch, 2004, p. 120).

The Driving Anger Scale. Several scales have been developed to assess the construct Trait Driving Anger including the Driving Vengeance Questionnaire (Hennessy & Wiesenthal, 2001; Wiesenthal, Hennessy, & Gibson, 2000), the Propensity for Angry Driving Scale (DePasquale, Geller, Clarke, & Littleton, 2001), and the Driver’s Stress Profile (Larson, 1996). However, the Driving Anger Scale (DAS; Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000; Deffenbacher, Oetting, & Lynch, 1994) has emerged as the predominant scale used to assess trait driving anger (Sharkin, 2004). (Of note is the fact that the DAS and the Driving Vengeance Questionnaire overlap $r = .75$; Van Rooy, Rotton, & Burns, 2006.) Although the DAS has been studied extensively (a recent PsycInfo search of Deffenbacher et al.’s original 1994 article showed it had been cited 115 times), there are several problems with the scale both in terms of its measurement and its theoretical basis.

Measurement issues with the DAS. The DAS (Deffenbacher et al., 1994) consists of six, factor-derived subscales of various provocative stimuli: Hostile Gestures, Illegal Driving, Police Presence, Slow Driving, Discourtesy, and Traffic Obstructions. The 33-item long form allows for analysis at the subscale level, and the 14-item short form
provides a global Trait Driving Anger score. The two forms correlate highly ($r = .95$; Deffenbacher et al., 1994). Deffenbacher and his colleagues have found global scores of the DAS to be predictive of driving accidents and accident-related outcomes (2005), however, the predictive validity of the DAS subscales for important driving outcomes has not been reported, to date.

There are two pieces of evidence that suggest the DAS is not unidimensional. First, interrelationships among DAS subscales and with global scores do not demonstrate a consistent pattern one would expect of a trait measure. For example, the Illegal Driving subscale showed negative correlations with two other subscales, Police Presence and Slow Driving (Deffenbacher et al., 1994). Also, the correlations between subscale scores on Illegal Driving and the DAS long form and short form were only .34 and .32, respectively (Deffenbacher et al., 1994). In another study, MANOVA revealed that a Trait Driving Anger variable (comprised of the highest quartile scorers and the lowest quartile scorers on the DAS short form) explained much more variance in other subfacets such as Slow Driving ($\eta^2 = .629$) than Illegal Driving ($\eta^2 = .127$; Deffenbacher, Richards, & Lynch, 2004).

The second piece of evidence to suggest the DAS is not unidimensional is that DAS subfacets do not relate similarly to conceptually similar constructs. For example, all the DAS subfacets positively correlated with facets of the Driver’s Stress Profile (Larson, 1996) except for Illegal Driving, which showed negative, non-significant correlations (Blanchard, Barton, & Malta, 2000). Hence, it does not seem plausible that the subscales of the DAS are measuring different facets of the same general construct.
In addition, although the DAS was created to assess Trait Driving Anger, it may actually be assessing state anger. Specifically, the DAS asks participants to imagine they are experiencing the situation described in each item (e.g., someone speeds up when you try to pass them) and indicate how angry they would likely feel on a scale from 1 = not at all to 5 = very much (Deffenbacher et al., 1994). The DAS has even been described as measuring “the extent to which driving situations provoke anger” (Blanchard, Barton, & Malta, 2000, p. 882). This is problematic because one would expect a measure of Trait Driving Anger to instead ask questions of anger intensity or frequency while driving (e.g., How often do you get angry while driving?). If the DAS measures respondents’ imagined state anger in each situation, responses would seem more indicative of state anger than an enduring trait.

Theoretical issues with the DAS. In addition to the measurement issues associated with the DAS, there are several theoretical issues that call into question the very construct the DAS purports to measure, namely Trait Driving Anger. For one, Trait Driving Anger is conceptualized as a personality factor, however, driving represents a relatively narrow context of experience. Thus, it seems questionable to label an emotional reaction to such a specific activity as its own personality trait. This is akin to observing those who tend to become angry while completing their tax forms and labeling it “tax-paying anger.” It may even be possible to find individuals who score highly on a tax-paying anger scale, but this hardly qualifies the construct as a personality trait.

The practice of linking an emotional reaction to a particular activity and labeling it a personality trait not only lacks scientific credibility, it also hinders the level of conceptual understanding that may be gained. There are two reasons for this. First, this
approach is too simplistic in that it neglects to consider other internal factors that may also play a role in the emotional reaction. Specifically, Trait Driving Anger seems to presume that becoming angry while driving is purely due to this particular “personality trait.” However, it seems likely that a range of internal characteristics (e.g., empirically established personality traits, self-construal) could differentially impact upon a driver’s emotional reaction to a particular driving scenario.

The second reason why labeling an emotional reaction a personality trait is problematic is because driving is far from a homogenous activity, and there may be environmental nuances that differentially interact with the internal factors mentioned above. This is particularly true with Trait Driving Anger due to the wide variety of driving scenarios one may encounter; the nature of what makes one situation provocative may be quite different from what makes another situation provocative. For instance, getting pulled over by the police and seeing someone weave in and out of traffic are both situations that might induce anger, but for quite different reasons. Too much focus on driving anger as a trait could lead to overlooking these potential contextual affects.

Also, for Trait Driving Anger to have empirical value, it should show distinct advantages above and beyond similar, broader constructs such as general trait anger (Spielberger, 1999). The distinction between Trait Driving Anger and general trait anger is unclear, however. For example, Deffenbacher and colleagues (2000; 2005) found that a Trait Driving Anger factor (those scoring in the upper quartile vs. those scoring in the lower quartile of the DAS) explained a substantial percentage of the variance in a measure of general trait anger ($\eta^2 = .446$ and $\eta^2 = .416$, respectively). Another study (Deffenbacher, Lynch, et al., 2002) found that anger experienced while driving in
ordinary traffic, which was the most ambiguous scenario in terms of potential provocation, significantly correlated with Trait Driving Anger and general trait anger at .38 and .30, respectively. Clearly, there was a fair amount of general trait anger driving the relationship between Trait Driving anger and anger in the ordinary traffic scenario, which represents a relatively weak situation (Mischel, 1977).

Moreover, general trait anger appeared to explain more unique variance than Trait Driving Anger in either risky (18.8% vs. 11.0%) or aggressive (32.5% vs. 16.3%) driving behaviors in four otherwise identical regression models (Deffenbacher et al., 2004). Unfortunately, general trait anger and Trait Driving Anger were never entered into the same regression equation, so it is impossible to determine if either subsumed the other in that instance. However, this differential in variance explained in RAD suggests that Trait Driving Anger does not provide meaningful improvements in prediction beyond that found with general trait anger. (It should be noted that statistical tests of the significance of these differences were not conducted; Deffenbacher et al., 2004)

Finally, Nesbit, Conger, and Conger’s (2007) meta-analysis of anger constructs and RAD found that driving anger measures (primarily the DAS) were no more predictive of important driving outcomes than measures of general trait anger. The authors concluded by calling for “a reevaluation both of the theoretical model currently driving the anger literature and measurement properties of existing driving anger questionnaires” (p. 171).

Relationships with other personality constructs. If one accepts the premise that the DAS actually measures state anger across a variety of driving scenarios, then research that includes the DAS along with other personality dimensions could shed some light on
these dimensions’ relationships with state angry driving. Indeed, some positive correlations have been found with DAS global scores, namely boredom proneness due to lack of external stimulation \(r = .19\), impulsiveness \(r = .21\) (Dahlen et al., 2005), and neuroticism \(r = .39\) (Dahlen & White, 2006). Additionally, nonsignificant correlations have been found between DAS global scores and sensation-seeking (Dahlen et al., 2005; Dahlen & White, 2006), boredom proneness due to lack of internal stimulation (Dahlen et al., 2005), extroversion, agreeableness, conscientiousness, and openness to experience (Dahlen & White, 2006). No research to date, however, has explored the potential role of self-construal as an antecedent to state driving anger.

Also, a limitation of the aforementioned research is that these personality dimensions were correlated only with DAS global scores, and not individual DAS subfacets. This is important because, as previously discussed, subfacets of the DAS (e.g., Illegal Driving) showed negative relationships with other subfacets (e.g., Police Presence; Deffenbacher et al., 1994). This pattern indicates that the provocative nature of the Illegal Driving items was somehow fundamentally different from the provocative nature of the Police Presence items. Very little research, however, has sought to explain why drivers differ in the types of situations they find provoking (Neighbors, Vietor, & Knee, 2002). Thus, a true test of the role of self-construal in state driving anger necessitates analyses across a range of potentially provocative driving situations.

**The Self and Self-Construals**

Whether described as self-schemata (Markus, 1977), -concepts (Fishman, 1949; Markus & Wurf, 1987), -identities (Baker, 1897; Dien, 2000) or -construals (Markus & Kitayama, 1991; Segal, 1988), the contemporary view of the self as a unique and
meaningful cognitive configuration that influences information processing is founded on research by Markus (1977) and Rogers, Kuiper, and Kirker (1977). Rogers et al. (1977) showed that information was better retained when it was processed in relation to the self than when it was processed in relation to another, or processed based on semantic characteristics. The authors argued this superior retention was due to deeper processing of self-related information that was facilitated by the rich array of interconnected concepts that comprise the self.

Indeed, Markus (1977) defined self-schemata (i.e., self-construals) as “cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information contained in the individual’s social experiences” (p. 64). In addition, self-construals entail goals, motives, and personal standards and values (Markus, 1983). Thus, for activities that are repeated with some frequency (e.g., driving), a cognitive generalization would be expected to emerge related to the manner in which that activity is typically performed (Markus, Smith, & Moreland, 1985). Such a cognitive generalization then becomes a portion of our understanding of who we are and how we behave (i.e., a self-construal). Subsequently, when we are thinking about or engaged in that activity, relevant self-construals surface within our current or “working” self-concept and influence perceptual processes (Markus & Nurius, 1986).

Self-construals may also affect the ways in which we interact with and evaluate others. For example, Fong and Markus (1982) found that those who self-construed as extroverted or introverted tended to prefer questions to be asked of an unfamiliar person that would uncover either extroverted or introverted characteristics, respectively. In part two of the same study, those with self-construals for either extroversion or introversion
reported higher confidence in rating audiotapes of interviewees on the dimension of extroversion-introversion than those with no self-construal for extroversion or introversion. Interestingly, self-construed extroverts rated the interviewees slightly lower in extroversion than the self-construed introverts did, although the difference was not significant. The authors argued that a self-construal for a particular personality trait creates both a preference for construal-relevant information about others and a sense of “expertise” that leads to greater confidence in the assessment of that trait.

The sense of expertise associated with a self-construal is important because it may also lead to a heightened sensitivity for behaviors related to that self-construal (Engle & Lord, 1997; Fong & Markus, 1982; Markus, 1983; Markus, Smith, & Moreland, 1985). Conversely, those lacking self-construals in a particular domain are likely to perceive others’ behaviors based on less nuanced “general knowledge” that is widely believed, rather than personally meaningful knowledge for that domain (Markus et al., 1985). The rich, elaborate knowledge structures that comprise a self-construal are likely the product of an active interest in and attention paid to the domain in question, which leads to a cyclical strengthening of the associated self-construal (Markus et al., 1985). This cyclical strengthening would likely occur not only with central self-construals, but also with peripheral self-construals that are linked with particular contexts that are frequently encountered (e.g., driving).

Self-construals provide a powerful frame of reference for social cognition, but they may sometimes lead to biased evaluations. For example, Markus and her colleagues (1985) found those with a self-construal for masculinity were more likely to make conjectural inferences (e.g., “Jack gets bad grades” or “Jack is a loser”) about an actor
performing traditional masculine behaviors than did those lacking this self-construal. The authors reasoned that a heightened familiarity with a self-construed domain increases the tendency to use self-referent knowledge to hypothesize about others beyond the information given. In turn, this could lead to biased inferences and inaccurate stereotyping in construal-relevant domains, especially where little is known of the other person. Also, to the degree a domain is construal-relevant, perceived similarities or differences with others along that domain could be exaggerated as perceivers add their own construal-based conjecture.

Besides the previously discussed study by Engle and Lord (1997), there are few other studies that have examined the role of self-construals in the evaluation of others along construal-relevant dimensions. One interesting exception is a study by Sheeran and colleagues (1993) that examined various religious and sexual attitudes of young (average age = 16.8 years) people who had never been married, nor had any children. In a multiple regression model that included the predictors religious upbringing, religious denomination, frequency of church attendance, and attitude regarding the appropriateness of discussing sexual matters in public; only a self-construal as a religious person significantly predicted attitudes toward those who engage in sex with multiple partners. Specifically, self-construed religious participants were more critical of those who had multiple sexual partners within one year than were those who did not self-construe as religious.

Another study by Hirt and McCrea (2009) suggests a link between personal codes of conduct and harsh evaluations of others who behave in ways counter to those codes of conduct. Specifically, the study not only replicated the robust finding that women are
less likely than men to utilize behavioral self-handicapping (i.e., creating ready-made excuses in case of failure), but it also found that women were more critical than men were in their evaluations of others who engage in self-handicapping. The authors argue this effect may be due to a greater level of personal value women place on effort than men do. Although this study did not assess a self-construal regarding putting forth effort or self-handicapping, it is not unreasonable to suggest that such self-construals could have played a role in the evaluative differences found between men and women.

Finally, a similar stringent evaluation effect has been shown for those whose behaviors or abilities would suggest a particular self-construal (Dunning & Cohen, 1992; Dunning & Hayes, 1996). For example, participants in a study who spent more time pursuing athletics or studying tended to rate a fictional character as less athletic or less studious, respectively (Dunning & Hayes, 1996). Similarly, those with higher math SAT scores tended to rate the character as less mathematically skilled. More often than not, these participants specifically mentioned themselves (as apposed to acquaintances, for example) as the comparative norm used in their evaluation process. Clearly, self-referent standards drove the evaluations made by many of these participants, although, again, no effort to assess self-construals was made in this study.

The present study adds to this line of research in several ways. For one, behaviors that would suggest a particular construal (i.e., courteous driving) are assessed along with a direct assessment of that construal. Second, not only is an affective evaluation of a target being measured in the form of anger, but also potential behavioral responses to the target are being assessed. Together, these variables will allow for a dynamic and complete investigation of the role of self-construals in a behavioral causal chain.
Hypotheses and Rationale

**Hypothesis 1.** Because a new scale was created to assess self-construal for courteous driving, a related behavioral scale was also created to test the convergent validity of the construal measure and to allow for further investigation in the area of courteous driving. There was also a concern for social desirability bias (Edwards, 1957) in a scale that assesses agreement with statements like “I consider myself a very considerate driver.” Of interest was how much agreement would be found for professions of being a courteous driver in the abstract and reports of actual courteous driving behaviors. Specifically, it may be relatively easier, for example, to state agreement with “I consider myself a very considerate driver” when that is knowingly false than to state agreement with “I never tailgate” when that is knowingly false. If there is more social desirability bias in the construal measure than in the behavioral measure of courteous driving, this could result in differential predictive patterns for the scales, which would likely provide insights into potential future research.

The self-construal measure and the behavioral measure of courteous driving were expected to be positively correlated. This is because behaviors that are consistent with construals provide reinforcement in several ways, such as the opportunity to maintain cognitive consistency (Aronson, 1969) and the benefit of both internal affirmation (i.e., positive feelings) and external affirmation (e.g., the customary “thank you” wave; Grant & Francesca, 2010). Hypothesis 1 states, “A measure of self-construal for courteous driving will be positively correlated with a measure of courteous driving behaviors.”

(Note: Table 1 includes a summary of all hypotheses and the type of analyses used to test them.)
Hypothesis 2. The central hypothesis in this study was developed in light of five converging factors. First, there are numerous jobs that require at least some driving on public roadways in their performance. Second, driving accidents involving employees can be costly to employers in the form of personal injury and economic losses. Third, anger-induced RAD represents one of the key avoidable causes (along with intoxication) of motor vehicle accidents. Fourth, there is some research to suggest that social evaluations within self-construal relevant domains may be especially critical. Fifth, if a person self-construes as a courteous driver, he or she could make overly harsh evaluations of other drivers that violate his or her implicit norms of driving, which could lead to anger-induced RAD. Therefore, organizations that have jobs that involve driving may be inadvertently inviting more driving accidents by selecting candidates who communicate a self-construal for courteous driving in some way. This is troubling because it is reasonable that a candidate who professes the importance of courteous driving would normally be considered less of an accident risk on the road.

This study proposes that self-construal for courteous driving will be related to state anger in reaction to driving norm violations such that the stronger construal, the higher the levels of state anger. Conversely, self-construal for courteous driving would not be expected to relate to state anger stemming from other types of provocative driving scenarios that lack a driving norm violation (e.g., being slowed by traffic congestion). This is because driving provocations without norm violations would not trigger any form of social evaluation that would be relevant to the construed domain of courteous driving. Hypothesis 2 states, “The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for
courteous driving and a measure of state anger in response to those scenarios, such that the self-construal will be positively correlated with state anger only for provocative driving scenarios depicting driving norm violations.” In hierarchical multiple regression analyses, the addition of self-construal for courteous driving would be expected to result in a significant change in $R^2$ in the prediction of anger stemming from driving norm violations, but not for anger stemming from other forms of driving provocations.

**Hypothesis 3.** Much of the extant literature on anger-induced RAD focuses on some sort of dispositional (i.e., trait) anger as the primary antecedent. Although the relationship between various forms of trait anger and anger-induced RAD is well-established, the present study sought to expand on this model by testing an alternative factor (self-construal for courteous driving) as an antecedent to the acute state anger that is associated with RAD.

In addition, there is no theoretical basis to indicate that self-construal for courteous driving would be associated with trait anger. This is important because it suggests the possibility that a person could have both low trait anger and a strong self-construal for courteous driving. If such a self-construal does, in fact, positively predict state anger in driving situations with driving norm violations, then it should also explain variance in anger-induced RAD above and beyond trait anger. Also, if this model is supported, it would help explain why otherwise calm, mild-mannered persons sometimes react with unexpectedly acute anger while driving. Hypothesis 3 states, “The positive, moderated relationship between self-construal for courteous driving and state anger described in Hypothesis 2 will hold true when controlling for general trait anger.”
Hypothesis 4. An important component of the overall theoretical model in the current study (see Figure 1) is the proposed relationship between state anger and RAD. That is, drivers would be expected to react with the emotional, physiological, and behavioral effects of anger when sufficiently provoked by the driving environment. It is proposed that the level or intensity of anger elicited by a driving provocation would positively predict the behavioral expression of that anger in the form of RAD. Such a relationship is the basis of the notion “anger-induced RAD.” Hypothesis 4 states, “A measure of state anger in response to provocative driving scenarios will be positively correlated with a measure of RAD behaviors associated with those scenarios.”

Hypothesis 5. As was previously discussed, courteous driving is self-sacrificial in nature. For example, when leaving a parking area after a large athletic event, there is a great deal of congestion and progress is generally slow as many drivers try to make their way toward the exits. The most self-serving (i.e., competitive) approach in this situation is to force your vehicle into the exit lane as quickly as possible and remain so close to the next vehicle’s bumper that no other driver can cut in. If all drivers in this situation adhere to this approach, however, then progress will be slowed by the constant stop-and-go required to stay close to the next vehicle and successfully prevent others from cutting in. Such a strategy also creates uncertainty as drivers in the peripheral lanes never know if the next driver will be the one to allow them entrance into an exit lane. All of which leads to false starts as drivers in the periphery constantly try to squeeze into traffic and more stop-and-go driving as those in the exit lanes try to keep them out. Thus, if all drivers adhere to a purely self-serving approach, then progress is also slowed for all.
Conversely, if a cooperative approach is adopted by all drivers in the same scenario, then an alternating pattern will emerge where each driver in the exit lanes allows entrance of one vehicle from a peripheral lane. A collective understanding of the process will remove uncertainly and false starts, and less stop-and-go driving will occur because there is no need to tailgate the vehicle ahead to block others’ entrance. The result is a smoother flow of traffic. Of course the catch here is that this requires collective trust in others’ willingness to self-sacrifice in the short-term to produce benefit for all. However, if only a single driver takes the self-sacrificial approach and wrongly trusts that others will do likewise, then that driver will be doubly delayed by (a) stopping to allow others to merge in traffic and (b) the generally slowed progress from everyone else taking the self-serving approach. Thus, because it is impossible to know what other drivers’ intentions will be, courteous driving is based upon a leap of faith that others will be like-minded. Otherwise, a lone courteous driver could find himself or herself being taken advantage of. This type of dilemma is reminiscent of the classic “Prisoner’s Dilemma” game (e.g., Kelley & Stahelski, 1970).

The benefits of courteous driving in other situations are less apparent, however. Suppose, for example, Janet creates room for another driver to merge into traffic in a more isolated incident of self-sacrifice. Here, Janet is delayed slightly for another who is able to save some time, and no benefit comes to Janet. So why would Janet choose to self-sacrifice where there is no benefit for her? One possible explanation is that Janet believes she is behaving consistently with what a “good” citizen should do. This type of rationale is consistent with a caring, prosocial self-identity (Grant, 2007; Grant, Dutton, & Rosso, 2008). Alternatively (or additionally), Janet might self-sacrifice in the short run
while trusting that other drivers will be similarly self-sacrificial when she stands to gain
in a future interaction. She contributes to this “social contract” when she can with the
belief that she will likely draw from it from time to time, as well.

If Janet, indeed, encounters a driving scenario where she would benefit from
another’s selfless act of kindness, but such an act is not forthcoming, this would likely be
perceived as a violation of good citizenship, and/or the driving norms “contract” that
Janet believes in and adheres to. As previously mentioned, such a violation would carry
moral overtones beyond a simple assessment of right or wrong. Also, Janet’s negative
evaluation could be acerbated by her stringent standards of what courteous driving
entails, due to the personal relevance of courteous driving (Engle & Lord, 1997).

Therefore, Janet may feel the need to retaliate against the offender to show her
indignation, possibly teach the “immoral” driver a lesson, or even punish the other driver
for the transgression. She may even feel obligated to do so as a defender of her implicit
social contract regarding courteous driving. Such a reaction might be characterized by
Janet driving in a risky or aggressive manner. Thus, RAD could result from a self-
construed courteous driver’s evaluation of a driving norm violation that unnecessarily
inconveniences, threatens to harm, or takes advantage of the focal driver. This
relationship would be expected to be positive, such that a stronger self-construal for
courteous driving would be associated with more RAD in these interactions.

Provocative driving scenarios that lack this type of norm violation would not be
likely to engender RAD by a self-construed courteous driver, however, because there is
no need to retaliate against or punish any other offending driver. Therefore, the
relationship between self-construal for courteous driving and RAD is based on an
interaction between this self-construal and situational characteristics (Tett & Burnett, 2003). In hierarchical multiple regression analyses, the addition of self-construal for courteous driving would be expected to result in a significant change in $R^2$ in the prediction of RAD in response to driving norm violations, but not for RAD in response to other forms of driving provocations. Hypothesis 5 states, “The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for courteous driving and a measure of RAD behaviors associated with those scenarios, such that the self-construal will show a positive relationship to RAD only for provocative driving scenarios depicting driving norm violations.”

**Hypothesis 6.** As was discussed for Hypothesis 3, this study sought to expand upon the traditional model of dispositional tendencies toward anger predicting angry reactions to driving provocations and, subsequently, RAD. If self-construal for courteous driving is positively predictive of RAD, but unrelated to trait anger, then self-construal for courteous driving would be expected to predict unique variance in RAD, above and beyond trait anger in certain circumstances. Hypothesis 6 states, “The positive relationship between self-construal for courteous driving and RAD described in Hypothesis 5 will hold true when controlling for general trait anger.”

**Hypothesis 7.** The previous discussions presented arguments for self-construal for courteous driving being predictive of drivers’ state anger (Hypothesis 2) and RAD (Hypothesis 5) in response to driving norm violations. It was also noted that emotional responses such as anger are believed to operate within “emotional architectures” (Lord & Harvey, 2002) that are much faster than the higher order-cognitions that would be
required to decide upon and coordinate a behavioral response such as RAD. This suggests that self-construed courteous drivers’ negative evaluation of another driver’s norm violation would trigger an increase in state anger before RAD-related cognitions could be formed.

Not only would state anger be expected to increase before other cognitions could occur, but it is also likely that state anger would influence the nature of those subsequent cognitions. For example, anger has been shown to positively predict hostile cognitions (Deffenbacher, White, & Lynch, 2004). Taken together, this evidence implies that the effects of self-construal for courteous driving on RAD in response to a driving norm violation would work through the resultant state anger. Hypothesis 7 states, “A positive relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm violations will be mediated by a measure of state anger in reaction to those scenarios.”

*Hypothesis 8.* The effects of trait anger on RAD would also be expected to be mediated by state anger in response to another’s driving norm violation. However, the heightened state anger of a driver with high trait anger would be due to the general sensitivity to provocation that goes with trait anger, and not necessarily because of a belief system regarding norms of courteous driving. Thus, trait anger and self-construal for courteous driving would be expected to both account for unique variance in the state anger-mediated prediction of RAD in response to driving norm violations. Hypothesis 8 states, “The positive, mediated relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm
violations described in Hypothesis 7 will hold true when controlling for general trait anger.”
Table 1

Summary of Hypotheses and Analyses

Hypothesis 1: A measure of self-construal for courteous driving will be positively correlated with a measure of courteous driving behaviors.
   Analyses: Bivariate correlation.

Hypothesis 2: The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for courteous driving and a measure of state anger in response to those scenarios, such that the self-construal will be positively correlated with state anger only for provocative driving scenarios depicting driving norm violations.
   Analyses: Hierarchical multiple regression.

Hypothesis 3: The positive, moderated relationship between self-construal for courteous driving and state anger described in Hypothesis 2 will hold true when controlling for general trait anger.
   Analyses: Same as for Hypothesis 2, if supported, but with the addition of general trait anger.

Hypothesis 4: A measure of state anger in response to provocative driving scenarios will be positively correlated with a measure of RAD behaviors associated with those scenarios.
   Analyses: Bivariate correlation.

Hypothesis 5: The type of provocative driving scenario (with vs. without driving norm violations) will moderate the relationship between a measure of self-construal for courteous driving and a measure of RAD behaviors associated with those scenarios, such that the self-construal will show a positive relationship to RAD only for provocative driving scenarios depicting driving norm violations.
   Analyses: Hierarchical multiple regression.

Hypothesis 6: The positive relationship between self-construal for courteous driving and RAD described in Hypothesis 5 will hold true when controlling for general trait anger.
   Analyses: Same as for Hypothesis 5, if supported, but with the addition of general trait anger.

Hypothesis 7: A positive relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm violations will be mediated by a measure of state anger in reaction to those scenarios.
   Analyses: Multiple regression.

Hypothesis 8: The positive, mediated relationship between self-construal for courteous driving and RAD behaviors associated with provocative scenarios depicting driving norm violations described in Hypothesis 7 will hold true when controlling for general trait anger.
   Analyses: Same as for Hypothesis 7, if supported, but with the addition of general trait anger.
Control Variables

To effectively test the aforementioned hypotheses and guard against other explanations for any findings, the control variables of gender, age, narcissism, and behavioral approach/inhibition were chosen for inclusion in the analyses. The following section will provide the rationale behind these particular control variables.

Gender. There were two reasons to include gender as a control variable in this study. For one, samples of participants from an urban and a rural setting were to be evaluated for differences. A demographic control variable such as gender aids in the estimation of true population differences, as opposed to those due to sample characteristics (i.e., disproportionately more women in one sample).

Second, gender differences represent a compelling issue in RAD research. For example, men have been found to be riskier drivers than women (Castella & Perez, 2004), and men report receiving more moving violations than women do (Dahlen et al., 2005; Dahlen & White, 2006). Also, a lack of gender differences have been found in anger sensitivity in driving when it was assessed by broad measures (Deffenbacher, 2008; Deffenbacher, Deffenbacher, et al., 2003; Deffenbacher et al., 2000; Deffenbacher, Lynch, et al., 2002; Deffenbacher, Oetting, & Lynch, 1994; Deffenbacher, Petrilli, et al., 2003, Deffenbacher, Richards, & Lynch, 2004; Deffenbacher, White, & Lynch, 2004; Lajunen, Parker, & Stradling, 1998; Van Rooy, Rotton, & Burns, 2006). However, men have shown greater tendencies toward retaliatory and physically aggressive cognitions stemming from provocative driving scenarios (Deffenbacher, White, & Lynch) than women have. Thus, it would be remiss to not include gender as a control variable because the findings related to gender could be of value in guiding future research.
Age. As previously mentioned, two samples from different population densities were tested in this study. Controlling for age was expected to be useful in parceling out true population differences from sample idiosyncrasies (i.e., difference between average age of the samples).

Several studies have also indicated that age is a factor in at least risky driving behaviors (Dahlen et al., 2005; Donovan et al., 1988; Houston, Johnson, & Skinner, 2006; Taubman-Ben-Ari, Mikulincer, & Gillath, 2004) such that younger drivers take more risks than older drivers. Therefore, controlling for age would enable a clearer test of effects related to self-construal for courteous driving, and not simply due to age.

Narcissism. Although a heightened anger response to others’ driving violations could be due to higher levels of trait anger or, as hypothesized, a self-construal as a courteous driver, it could also be due to an inherent sense of entitlement or grandiose sense of self-worth that would be reflective of narcissism (Raskin & Hall, 1979). For example, a narcissistic person would likely become upset at another driver for cutting in front of him or her simply because the person believes he or she is entitled to the right-of-way in all instances. Narcissistic individuals are characterized by extreme mood swings (Kernberg, 1980) that would likely include anger. In addition, one study (Bushman & Baumeister, 1998) found that narcissism predicted high levels of aggression in reaction to being insulted by another person. Thus, a measure of narcissism was used to control for this potentially confounding construct.

Behavioral approach/inhibition. Carver (2001) argued that the dimensional structure of affective experience was more richly and accurately represented by the approach/inhibition dimensions than by other approaches (e.g., positive/negative affect;
When offered a chance to earn a reward, individuals high in behavioral approach sensitivity would be expected to experience higher positive affect and engage in more approach behaviors than those lower in behavioral approach sensitivity. Conversely, when offered a chance to avoid an aversive situation, individuals higher in behavioral inhibition sensitivity would be expected to experience higher anxiety and engage in more avoidance behaviors than those lower in behavioral inhibition sensitivity.

Behavioral approach/inhibition also has shown interesting relationships with anger, which was an important element in this study. Specifically, behavioral approach has been linked to tendencies toward anger in several studies (Carver, 2004; Carver & Harmon-Jones, 2009; Harmon-Jones, 2004; Putman, Hermans, & van Honk, 2004; Stemmlera, Aueb, & Wacker, 2007). Thus, behavioral approach/inhibition was used to control for affective characteristics and provide a more rigorous test of the hypotheses.
CHAPTER III

METHOD

Participants

Student samples at the University of Akron (UA) and the University of South Dakota (USD) were used to test the hypotheses. As UA is in a large metropolitan area and USD is located in a rural area, the two samples allowed for a comparison of drivers from two, contrasting environments. Interestingly, the only study to-date to compare urban and rural drivers found no differences in their RAD (Deffenbacher, 2008).

After preparing the dataset (see discussion in the Results section), the sample consisted of 74 (24 men, 50 women) participants at UA and 148 (64 men, 84 women) participants at USD. The ratio of men to women was not statistically different for the two samples. The average age was 20.53 years at UA and 22.39 years at USD and this difference was statistically significant ($p < .01$; see Table 1 in the Results section).

Regarding employment, 67.6% of the UA sample, and 54.7% of the USD sample reported working at least part-time (i.e., 15 or more hours per week), and this difference was not statistically significant. Of those who were working, just 3 of the UA participants and 3 of the USD participants had jobs requiring them to drive over 50% of the time. Thus, although over half of each sample were employed, very few drove extensively for their jobs.
Miles Driven and Trip Frequency. Neither total number of miles driven or frequency of trips, which suggests level of exposure to potentially provocative situations, has shown significant relationships with driving anger (Deffenbacher, Deffenbacher, et al., 2003; Deffenbacher et al., 2000; Deffenbacher, Lynch, et al., 2002; Deffenbacher et al., 2004), RAD (Moore & Dahlen, 2008), moving violation tickets (Dahlen & White, 2006), or urban/rural status (Deffenbacher, 2008). Thus, miles driven and number of trips were assessed in this study only to provide descriptive sample characteristics and not for further analysis. Participants in the UA sample averaged 151.8 miles over 12.6 trips per week and participants in the USD sample averaged 125.8 miles over 7.1 trips per week. The difference between the samples in the average number of trips per week was significant ($t = 3.29, p < .01$), but the average number of miles driven per week was not.

Control Variable Measures

Demographics. Gender and age were assessed to control for potentially confounding effects. Participants were asked the question “What is your gender?” with the response options of male or female. They were then asked “What is your age in years?” and chose their age from a pull-down menu of ages that completed the sentence “I am ___ years old.”

Narcissism. A shortened form (NPI-15; Schütz, Marcus, & Sellin, 2004) of the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979) was used to control for the potentially confounding effect of narcissism on angry driving. A sample item was “I think I’m a special person.” Items were added together to yield a total score for each participant. The NPI-15 has shown acceptable internal consistencies ($αs = .78-.81$) and has correlated highly with the original NPI ($r = .91$; Ames, Rose, & Anderson, 2006).
Behavioral approach & behavioral inhibition. Carver and White’s (1994) Behavioral Approach/Behavioral Inhibition (BAS/BIS) scales were used to control for general affective and motivational disposition. The BAS consisted of 7 items (e.g., I go out of my way to get things I want) and the BIS consisted of 13 items (e.g., I worry about making mistakes). Participants were asked to indicate level of agreement on a scale from 1 = strongly disagree to 5 = strongly agree. Items were added together to yield a total BAS score and a total BIS score for each participant.

General trait anger. The Trait Anger Scale (TAS; Spielberger, 1999) assesses one’s inherent tendency to become angry. The 10-item scale asked participants how often they feel or react in ways described in each item (e.g., I have a fiery temper) on a scale of 1 = almost never to 4 = almost always. Items were added together to yield a total score for each participant. Cronbach’s alphas for the TAS have ranged from .81 to .91 (Spielberger, 1999).

Independent Variable Measures

Courteous driving self-construal. The newly created 5-item Courteous Driving Self-Construal Scale (CDSCS) asked participants to read each statement (e.g., I consider myself a very courteous driver) and indicate how self-descriptive it was on a scale from 1 to 5 (strongly disagree to strongly agree). Items were rationally derived by the author based on the new construct of self-construal for courteous driving. Pilot testing revealed that an initial 6-item scale showed low reliability (Cronbach’s alpha = .60). Another item (I think it is important to be considerate to other drivers) was added to improve scale reliability. This brought the total number of items to seven, but reliability analysis with the current, combined sample revealed two items that performed poorly and were
subsequently dropped from the final measure (see Appendix A). The elimination of the two poorly performing items raised Cronbach’s alpha for the scale from .67 to .74. Responses were summed to yield a total courteous driving self-construal score.

**Dependent Variable Measures**

*Courteous driving behaviors.* The newly created 11-item Courteous Driving Behaviors Scale (CDBS) asked participants to read each statement (e.g., I try to avoid cutting anybody off on the freeway) and indicate how self-descriptive it was on a scale from 1 to 5 (strongly disagree to strongly agree). Items were rationally derived by the author based on the theoretical conception of courteous driving presented in the text. Pilot testing of the CDBS showed acceptable reliability (Cronbach’s alpha = .73). Initially, the scale included twelve items, but reliability analysis with the current, combined sample uncovered a poorly performing item that was dropped (see Appendix A). The elimination of the poorly performing item raised Cronbach’s alpha for the scale from .67 to .74. Responses were summed to yield a total courteous driving behavior score.

*Provocative driving scenarios.* Two sets of driving scenarios were created by the author for this study. Approximately 40 students in the author’s organizational behavior course were asked to write three provocative driving scenarios that involved other drivers and three provocative driving scenarios that did not involve other drivers. Similarly themed scenarios were combined and a list of eleven scenarios involving driving norm violations and eleven not involving driving norm violations were presented to approximately 40 students in the author’s human resource management course. The second group of students rated each of the scenarios with regard to how angry they would
be if they experienced the scenario described. Five scenarios of each type (i.e., with vs. without driving norm violations) were chosen based on higher average levels of state anger elicited and a balance in the severity of the two sets of scenarios. Specifically, the total state anger score for the five chosen norm-violation scenarios was highly similar to the total state anger score for the five chosen scenarios without norm violations.

The first set consisted of five provocative scenarios depicting a range of norm violations by other drivers (e.g., a driver pulls right out in front of you, forcing you to slam on your brakes). The norm-violation scenarios reflected the key elements of other drivers’ actions that endanger, inconvenience, or take advantage of the focal driver. The second set of five provocative scenarios did not involve norm violations by other drivers (e.g., you get pulled over for speeding). The scales asked participants to imagine they were experiencing the situation described in each item and indicate (A) how angry they would likely feel (i.e., state anger; 1 = not at all to 5 = extremely), (B) the likelihood of reacting (1 = very unlikely to 5 = very likely) with a range of RAD options listed for each scenario, and (C) the ease (1 = very difficult to 5 = very easy) with which they were able to imagine the scenario was happening to them.

RAD items were adapted by the author from the driving anger expression inventory (DAX; Deffenbacher, Lynch, Oetting, & Swaim, 2002) and varied based on their logical fit with the nature of that scenario. Initially, each scenario listed up to 33 RAD options. Pilot testing was used to identify and eliminate RAD options for each scenario that were rarely endorsed or showed little variance. All of the scenarios were left with 10 RAD response options except for two (i.e., “looking for a restaurant” had 4
RAD options and “getting a speeding ticket” had 3 RAD options) within the set of scenarios lacking norm violations.

Both sets of scenarios were summed to yield a total state anger score and a total RAD score for each. This was potentially problematic for the RAD score for scenarios lacking norm violations because the two scenarios with fewer than 10 RAD options (“looking for a restaurant” and “getting a speeding ticket”) contributed proportionately less to the total score than the other three scenarios within that set. However, factor analysis with a maximum likelihood extraction showed that the RAD options for “looking for a restaurant” and “getting a speeding ticket” performed in a highly similar fashion to the other three scenarios’ options in terms of factorial loadings. Thus, although there were fewer RAD options for those two scenarios, their proportionately smaller influence on the total score did not adversely impact the measurement of the underlying construct. Scenarios that included norm violations and scenarios that lacked norm violations were presented to participants in a counter-balanced order.

Driving Incidents. Three questions asked participants the number of times a particular incident has happened in their lifetime experience of driving. The three questions were: gotten moving (non-parking) tickets, had a minor accident (e.g., a fender bender), and had a major accident (e.g., significant damage to property or a vehicle). Participants who had experienced an incident five or more times were asked to choose the “5+” option, which was consistent with previous research (Deffenbacher, 2008).

Other Variables Measured
The following measures were included to allow the possibility of exploring their relationships with the other variables being investigated. These measures were not included in any of the hypotheses for this study.

*Trait driving anger.* The short-form of the Driving Anger Scale (DAS; Deffenbacher et al., 1994) consists of 14 items designed to assess general propensity to become angry while driving. Items (e.g., How angry would you be if someone honked at you about your driving?) are rated on a 5-point scale ranging from 1 (not at all) to 5 (very much) and summed to provide an aggregate DAS score. The short-form of the DAS has demonstrated acceptable internal consistencies ($\alpha = .80-.93$), shown a 10-week test-retest reliability of .84 (Deffenbacher, 2000), and correlated highly with the long-form of the DAS ($r = .95$; Deffenbacher et al., 1994).

*Sensation seeking.* A subscale of the ZKPQ-50-CC (Aluja, Rossier, Garcia, Angleitner, Kuhlman, & Zuckerman, 2006), which is a shortened version of the original Zuckerman–Kuhlman Personality Questionnaire (ZKPQ; Zuckerman, Kuhlman, Teta, Joireman, & Kraft, 1993), was used to assess sensation seeking. Specifically, the Impulsive-Sensation Seeking (ImpSS) subscale of the ZKPQ-50-CC includes 10 items pertaining to the need for excitement, unpredictability, and novelty, as well as the tendency to act quickly without thinking. Each item was scored as 1 or 0 (true or false), and summed to compute the scale score. Higher scores indicate greater sensation seeking. This recently developed version of the ImpSS has demonstrated satisfactory reliability for American college students ($\alpha = .72$; Aluja et al., 2006), similar to the original 19-item version of ImpSS ($\alpha = .79$; Zuckerman, 2002). The correlation between the shortened version of ImpSS and the original was .87 (Aluja et al., 2006).
Procedure

Students were recruited to complete an online survey of the measures used in exchange for extra course credit. The psychology departments of the University of South Dakota and the University of Akron both utilized a similar web-based system to facilitate and track student participation in approved research studies. In courses where extra credit was available through participation in academic research, instructors typically made students aware of the web-based system at their school and encouraged participation if students were interested in earning extra credit. Approval was granted to post an online survey on both of these Universities’ systems.

All of the instructions and measures in the online survey in the order they were presented may be found in Appendix A. As separate groups of participants were not compared, this study was within-subjects in design.
CHAPTER IV
RESULTS

Manipulation Check and Dataset Preparation

Participants were asked after they had finished responding to each provocative driving scenario how easy or difficult it was to imagine this scenario was happening to them on a scale from 1 = very difficult to 5 = very easy. This manipulation check was used to identify any driving scenarios that may have lacked sufficient familiarity or were foreign to the participants’ driving experience. Averages for the scenarios ranged from 3.65 to 4.34. Thus, participants did not find any of the scenarios particularly difficult to imagine.

Exploratory analyses revealed that overall ease in imagining the scenarios was positively related to anger stemming from scenarios with norm violations \( (r = .18; p < .01) \) and anger stemming from scenarios lacking norm violations \( (r = .20; p < .01) \). Overall ease in imagining the scenarios was also negatively related to RAD in response to scenarios lacking norm violations \( (r = -.25; p < .001) \), but not at all related to RAD in response to norm violations. In particular, overall ease in imagining the scenarios was related to RAD in response to driving behind a large truck \( (r = -.28; p < .001) \), getting caught in traffic from an athletic event \( (r = -.26; p < .001) \), and receiving a speeding ticket \( (r = -.28; p < .001) \). A possible interpretation is that the easier it was for participants to imagine experiencing the scenarios, the more realistically they were
perceived, which resulted in a stronger anger response and less RAD in certain circumstances.

In isolated cases, missing data was replaced with the mean for that item. In terms of outliers, extreme scores beyond three standard deviations above or below the mean were rare, which may have been due to the number of relatively short (10 items or less) scales being used. For narcissism, there were three low outliers (case 8, 212, and 120). For behavioral approach, there was one low outlier (case 120). RAD in response to driving scenarios with norm violations and RAD in response to driving scenarios without norm violations had the same two high outliers (case 7 and 65). Ease in imaging the driving scenarios and the CDSCS also shared the same low outlier (case 50). No other variables had outliers. Statistical analyses were conducted with and without the outlying cases and no discernable differences were found. However, the conservative approach was taken and the cases that were repeated outliers (i.e., 120, 7, 65, and 50) were dropped from the dataset.

Statistical Analyses

Urban vs. rural samples. The UA and USD samples were examined to determine which variables, if any, differed based on urban (UA) verses rural (USD) settings. Independent-samples t-tests (see Table 2) revealed significant differences between the settings for both state anger (UA was higher; $p < .01$) and RAD (UA was higher; $p < .05$) in response to driving scenarios without norm violations. However, when controlled for gender and age, the differences between the samples in state anger and RAD fell below the level of significance. Because there were no significant differences between the
Table 2

Descriptive Statistics and Independent Samples T-Tests

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<th>Variable</th>
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<th>U. of S. Dakota</th>
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<td>SD</td>
<td>M</td>
<td>SD</td>
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<tr>
<td>17. MajorAcc</td>
<td>1.45</td>
<td>0.71</td>
<td>1.52</td>
<td>0.91</td>
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</tbody>
</table>

Note. N for U. of Akron = 74 and for U. of S. Dakota = 148. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; TAS = Trait Anger Scale; DAS = Driving Anger Scale; ImpSS = Impulsive-Sensation Seeking; CDSCS = Courteous Driving Self-Construal Scale; CDBS = Courteous Driving Behaviors Scale; AngerVio = Anger from driving norm violations; AngerNoVio = Anger without driving norm violations; RADVio = Reckless and Aggressive Driving from driving norm violations; RADNoVio = Reckless and Aggressive Driving without driving norm violations; Tickets = Moving Tickets; MinorAcc = Minor Accidents; MajorAcc = Major Accidents.

*a-t-test adjusted due to unequal variances (based on Levene’s Test of Homogeneity of Variances).

* p < .05.  ** p < .01.
samples for any of the control or independent constructs, the samples were combined for all of the following analyses.

**Hypotheses 1 and 4.** Hypotheses 1 and 4 were tested using bivariate correlations (all variable correlations and scale reliabilities may be found in Table 3). Hypothesis 1 stated that self-construal for courteous driving would be positively related to courteous driving behaviors and this was supported ($r = .59; p < .01$). Also, Hypothesis 4 stated that state anger would be positively related to RAD responses to provocative driving scenarios and this, too, was supported. Specifically, state anger stemming from both types of driving scenarios (with/without driving norm violations) correlated with RAD responses to those scenarios .47 ($p < .01$) and .39 ($p < .01$), respectively.

**Comparison of Newly Created Scales.** Although the CDBS and the CDSCS were both designed to capture elements of courteous driving, it is interesting to examine the relational differences between the CDBS (a behavioral scale) and the CDSCS (a self-construal scale). For example, the CDSCS was one of the only variables to significantly predict both minor and major accidents (see Table 3). Thus, those with a stronger self-construal as a courteous driver were less likely to report minor and major accidents, which are difficult to predict due to their low base-rates. In addition, the CDBS related more strongly with age than the CDSCS did, and the CDSCS related more strongly with narcissism than the CDBS did.

**Driving incidents.** Participants were asked three questions regarding driving incidents in their lifetime of driving (i.e., number of moving violations, number of minor accidents, and number of major accidents). Due to the historically low base-rate of these incidences, no particular hypotheses were made regarding their relationships to the other
### Table 3

#### Correlations and Reliabilities for the Observed Variables

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<th>6</th>
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<td>-.53**</td>
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<td>.02</td>
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</table>

**Note.** N = 222. Scale reliabilities (Cronbach’s alphas) are on the diagonal; for Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; TAS = Trait Anger Scale; DAS = Driving Anger Scale; ImpSS = Impulsive-Sensation Seeking; CDSCS = Courteous Driving Self-Construal Scale; CDBS = Courteous Driving Behaviors Scale; AngerVio = Anger from driving norm violations; AngerNoVio = Anger without driving norm violations; RADVio = Reckless and Aggressive Driving from driving norm violations; RADNoVio = Reckless and Aggressive Driving without driving norm violations; Tickets = Moving Tickets; MinorAcc = Minor Accidents; MajorAcc = Major Accidents. *p < .05. **p < .01.
variables. However, several significant bivariate correlations were found in addition to the aforementioned relationships between the CDSCS and the accident variables (see Table 3). For example, both the number of moving violations and minor accidents were positively related to age, which was not surprising since more such incidents would be expected to occur over a longer history of driving. Individually, the number of moving violations was also positively related to behavioral approach and impulsive sensation-seeking, and negatively related to state anger from driving scenarios with norm violations; while the number of minor accidents was positively related to driving anger.

Lastly, the numbers of minor and major accidents were both positively related with RAD stemming from driving scenarios without norm violations. This finding is in contrast with the non-significant relationships between the accident measures and RAD in reaction to driving scenarios that included a driving norm violation.

**Hypotheses 2 and 3.** Hierarchical multiple regression analyses were used to test Hypotheses 2 and 3. In step 1, state anger in response to driving scenarios without norm violations was regressed upon the control variables of gender, age, narcissism, behavioral approach, and behavioral inhibition. Step 2 added the CDSCS and step 3 added trait anger to the model (regression results are found in Table 4). The constant was included in the equation throughout the regression analyses. The $R^2$ change was not significant in step 2, which was partially supportive of Hypothesis 2 that self-construal for courteous driving would not predict state anger from driving scenarios without norm violations. No hypothesis was made regarding step 3 in this case, however, the change in $R^2$ was significant. In this step, trait anger and gender (women were reportedly more angry)
Table 4

Summary of Hierarchical Regression Analyses for Variables Predicting State Anger Stemming from Driving Scenarios Without Norm Violations

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>ΔR²</th>
</tr>
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<td>0.14***</td>
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<td></td>
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<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.14</td>
<td>0.15</td>
<td>2.18*</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.17</td>
<td>-0.20</td>
<td>-3.09**</td>
<td></td>
</tr>
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<td>0.07</td>
<td>0.14</td>
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<td></td>
</tr>
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<td>BAS</td>
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<td>-0.04</td>
<td>-0.50</td>
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</tr>
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<td>0.21</td>
<td>2.94**</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>1.15</td>
<td>0.15</td>
<td>2.18*</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.17</td>
<td>-0.20</td>
<td>-3.09**</td>
<td></td>
</tr>
<tr>
<td>NPI-15</td>
<td>0.07</td>
<td>0.14</td>
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<td></td>
</tr>
<tr>
<td>BAS</td>
<td>-0.02</td>
<td>-0.04</td>
<td>-0.53</td>
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</tr>
<tr>
<td>BIS</td>
<td>0.18</td>
<td>0.21</td>
<td>2.87**</td>
<td></td>
</tr>
<tr>
<td>CDSCS</td>
<td>0.02</td>
<td>0.01</td>
<td>0.19</td>
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</tr>
<tr>
<td>Step 3</td>
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<td>0.10</td>
<td>1.35</td>
<td></td>
</tr>
<tr>
<td>CDSCS</td>
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<td>0.07</td>
<td>1.04</td>
<td></td>
</tr>
<tr>
<td>TAS</td>
<td>0.18</td>
<td>0.32</td>
<td>4.91***</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; CDSCS = Courteous Driving Self-Construal Scale; TAS = Trait Anger Scale.
*p < .05. **p < .01. ***p < .001.
were positive predictors, and age was a negative predictor of state anger in reaction to 
driving scenarios without norm violations.

The moderated element of Hypothesis 2 and 3 were tested in similar hierarchical 
multiple regression analyses where state anger in response to driving scenarios with norm 
violations was regressed on the control variables in step 1. Then the CDSCS was added 
in step 2 and trait anger was added in step 3. Contrary to Hypothesis 2, the $R^2$ change 
was not significant in step 2 as the CDSCS failed to uniquely account for variance in state 
anger stemming from driving norm violations (see Table 5). Because Hypothesis 3 was 
based upon the support of Hypothesis 2 (i.e., the same moderated relationship would hold 
true when controlling for trait anger), the failure of the CDSCS to uniquely account for 
variance in step 2 meant that Hypothesis 3 was also not supported. Again, the change in 
$R^2$ was significant in step 3. In this model, trait anger, gender (women were reportedly 
more angry), and narcissism were positive predictors; and behavioral approach and age 
were negative predictors of state anger stemming from driving violations.

**Hypotheses 5 and 6.** Hierarchical multiple regression analyses were again used to 
test Hypotheses 5 and 6. In step 1, RAD responses to driving scenarios with norm 
violations were regressed upon the control variables of gender, age, narcissism, 
behavioral approach, and behavioral inhibition. Step 2 added the CDSCS and step 3 
added trait anger to the model. The $R^2$ change was significant in step 2 as the CDSCS did 
provide unique variance accounted for in RAD responses to driving scenarios with norm 
violations, but contrary to Hypothesis 5, the relationship was negative in direction (see 
Table 6). This meant that those with a stronger self-construal for courteous driving were 
less likely to advocate RAD in response to driving scenarios with norm violations. The
Table 5

Summary of Hierarchical Regression Analyses for Variables Predicting State Anger Stemming from Driving Scenarios With Norm Violations

<table>
<thead>
<tr>
<th>Step</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>β</td>
<td>t</td>
</tr>
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<td>3.19**</td>
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<tr>
<td>BIS</td>
<td>0.21</td>
<td>0.23</td>
<td>3.15**</td>
</tr>
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<td>-0.05</td>
</tr>
<tr>
<td>Step 3</td>
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<td>2.29*</td>
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<tr>
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<td>-0.12</td>
<td>-2.04*</td>
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<td>0.10</td>
<td>1.38</td>
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<td>0.97</td>
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<tr>
<td>TAS</td>
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<td>0.38</td>
<td>5.92***</td>
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Note. N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; CDSCS = Courteous Driving Self-Construal Scale; TAS = Trait Anger Scale.
*p < .05. **p < .01. ***p < .001.
Table 6

Summary of Hierarchical Regression Analyses for Variables Predicting RAD Responses to Driving Scenarios With Norm Violations

<table>
<thead>
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<th>$t$</th>
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<td>-0.07</td>
<td>-0.93</td>
</tr>
<tr>
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<td>-0.19</td>
<td>-2.87**</td>
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<td>TAS</td>
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Note. N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; CDSCS = Courteous Driving Self-Construal Scale; TAS = Trait Anger Scale. *$p < .05$. **$p < .01$. ***$p < .001$. 
CDSCS remained a significant negative predictor of RAD in step 3 with the addition of the TAS. Because Hypothesis 6 presupposed the support of Hypothesis 5, the aforementioned negative direction of the CDSCS’s relationship in step 2 meant that Hypothesis 6 was also not supported. In this step, trait anger and narcissism were positive predictors; and the CDSCS, age, and behavioral approach were negative predictors of RAD in response to driving scenarios with norm violations.

In a final hierarchical multiple regression analyses, RAD in response to driving scenarios without norm violations was regressed on the control variables in step 1. Then the CDSCS was added in step 2 and trait anger was added in step 3. As was the case with RAD associated with driving norm violations, the $R^2$ change in step 2 was significant and the direction of the relationship for the CDSCS was negative (see Table 7). In the full model (step 3), the CDSCS, behavioral approach, age, and gender (men endorsed more RAD) were negative predictors; and trait anger was a positive predictor of RAD in response to driving scenarios without norm violations.

**Hypotheses 7 and 8.** To test the mediated relationship proposed in Hypothesis 7, first RAD in response to driving scenarios with norm violations was regressed upon the CDSCS. This relationship was significant ($p < .001$), but in the negative direction. Second, RAD in response to driving scenarios with norm violations was regressed upon state anger stemming from those scenarios. This relationship was significant in the positive direction ($p < .001$). Third, the correlation between the CDSCS and anger from driving scenarios with norm violations was examined and found to be non-significant (see Table 3). Fourth, the same dependent variable was regressed upon the CDSCS and state anger from driving scenarios with norm violations. In this model, state anger from
Table 7

Summary of Hierarchical Regression Analyses for Variables Predicting RAD Responses to Driving Scenarios Without Norm Violations

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>ΔR²</th>
</tr>
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<td>0.11</td>
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<tr>
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<td>-3.20**</td>
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</tr>
<tr>
<td>NPI-15</td>
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<td>2.25*</td>
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<td>Step 3</td>
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<td>-3.65***</td>
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<td>-0.79</td>
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<tr>
<td>CDSCS</td>
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<td>-0.32</td>
<td>-5.43***</td>
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<td>TAS</td>
<td>1.41</td>
<td>0.36</td>
<td>6.09***</td>
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</table>

Note. N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; CDSCS = Courteous Driving Self-Construal Scale; TAS = Trait Anger Scale.
*p < .05. **p < .01. ***p < .001.
driving scenarios with norm violations remained positively significant \((p < .001)\), however the CDSCS retained its predictive power \((p < .001)\). Both the lack of a significant correlation between the CDSCS and state anger in the third step and the failure of the CDSCS to lose predictive power in the fourth step indicate a lack of mediation in this model. Thus, Hypothesis 7 was not supported, and because Hypothesis 8 presupposed the support of Hypothesis 7, Hypothesis 8 was also not supported.

**Exploratory analyses.** In light of the differences noted between the CDBS (a behavioral scale) and the CDSCS (a self-construal scale), along with the failure of the CDSCS to perform as predicted by the hypotheses, the CDBS was examined using exploratory analyses. Specifically, another series of hierarchical multiple regression analyses were run using the same variables in the same steps as were used to test Hypotheses 2, 3, 5, and 6; except that the CDSCS was replaced by the CDBS in all cases.

One noteworthy difference was found between the first and second series of regression analyses, which used the CDBS in place of the CDSCS. When the dependent variable was state anger in response to driving scenarios with norm violations, the \(R^2\) change was non-significant in step 2 when the CDBS was added, just as the CDSCS had been (see Table 8). However, in step 3, which added trait anger, the CDBS became a positive, significant predictor of the dependent variable. Hence, courteous driving behaviors accounted for unique variance in state anger stemming from driving scenarios with norm violations above and beyond trait anger, but not in state anger stemming from driving scenarios without norm violations. This pattern of results matches what was predicted, but not supported, in Hypothesis 3 for the CDSCS.
Table 8

Summary of Hierarchical Regression Analyses for Variables Predicting State Anger Stemming from Driving Scenarios With Norm Violations (CDBS Instead of CDSCS)

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>ΔR²</th>
</tr>
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<td></td>
<td></td>
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</tr>
<tr>
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<td>1.82</td>
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</tr>
<tr>
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</tr>
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<td></td>
</tr>
<tr>
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<tr>
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<td>0.23</td>
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<td>0.19</td>
<td>2.95**</td>
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Note. N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; CDBS = Courteous Driving Behaviors Scale; TAS = Trait Anger Scale.

*p < .05. **p < .01. ***p < .001.
Due to the finding that courteous driving behaviors became a significant, positive predictor of state anger stemming from driving scenarios with driving norm violations when trait anger was added, another set of hierarchical multiple regression analyses were conducted to further explore this relationship. In step 1 for this model, state anger in response to driving scenarios with norm violations was regressed upon the control variables of gender, age, narcissism, behavioral approach, and behavioral inhibition. Step 2 added trait anger and step 3 added the CDBS to the model, which was the reverse of the previous model. This time, the adjusted $R^2$ change was significant for all three steps (see Table 9). Adding the CDBS in step 3 resulted in an $R^2$ change of .03 ($p < .01$). A review of Table 3 shows that the CDBS was not significantly correlated with trait anger or state anger in response to either type of driving scenario. Why the CDBS would add unique variance accounted for in state anger only when trait anger was also included in the regression model is unclear. A possible explanation would be that trait anger suppressed some of the error variance in the CDBS.

Reexamination of courteous driving and RAD variables. The courteous driving variables (CDSCS and CDBS) and the RAD options were reexamined to further explore their psychometric properties and relationships. First, to assess the type of courteous driver who not only self-construes as such, but also follows through with courteous driving behaviors, the CDSCS and CDBS were summed to create a new Self-Construal Plus Courteous Driving Behaviors (SCPCDB) scale. Second, principal axis factoring of the 87 RAD options across all driving scenarios revealed a two-factor structure consisting of 70 overt RAD (e.g., cutting off another driver) and 17 mild RAD (e.g., giving another driver dirty looks) items.

70
Table 9

Summary of Hierarchical Regression Analyses for Variables Predicting State Anger Stemming from Driving Scenarios With Norm Violations (CDBS Instead of CDSCS)

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>β</th>
<th>t</th>
<th>ΔR²</th>
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<td>0.23</td>
<td>3.19**</td>
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<td>0.41</td>
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Note. N = 222. For Gender, 1 = male and 2 = female; NPI-15 = Shortened Version of the Narcissistic Personality Inventory; BAS = Behavioral Approach Scale; BIS = Behavioral Inhibition Scale; TAS = Trait Anger Scale; CDBS = Courteous Driving Behaviors Scale.

*p < .05. **p < .01. ***p < .001.
Third, this two-factor RAD structure (i.e., RADOvert and RADMild) was used to guide the creation of four new RAD subscales consisting of overt and mild RAD stemming from driving scenarios with and without driving norm violations (RADOvertVio, RADOvertNoVio, RADMildVio, RADMildNoVio). Within the overall RADMild factor, items that referenced glaring, shaking of one’s head, and giving dirty looks each occurred five times. Items that referenced glaring, shaking of one’s head, and giving dirty looks were also each found once within the overall RADOvert factor, but were adopted as RADMild items due to the consistent reoccurrence of similar items within the RADMild factor. The RAD item “Drive a little faster than I was” occurred twice in the survey, and one occurrence loaded on the RADMild factor and the other occurrence loaded on the RADOvert factor. Therefore, the two “Drive a little faster than I was” items were dropped from further consideration.

Provocative driving scenarios that were left with only one type of RAD item (i.e., lacked a combination of both Mild and Overt items) were also dropped from further consideration. This left four scenarios characterized by driving norm violations (Vio) and two scenarios without driving norm violations (NoVio) that were utilized to create the four RAD subscales. The total number of items for each subscale were 28 for RADOvertVio, 14 for RADOvertNoVio, 12 for RADMildVio, and 6 for RADMildNoVio (see Appendix 1).

Fourth, hierarchical multiple regression analyses were used to test specific relationships between the four new RAD subscales and the new courteous driving variable, SCPCDB. In each case, the RAD subscale was regressed upon the control variables of gender, age, narcissism, behavioral approach, and behavioral inhibition in
Step 1. Step 2 added the SCPCDB and step 3 added the TAS to the model. Thus, these series of analyses mirrored those used in tests of the hypotheses.

Several notable relationships were found with the four new RAD subscales and the SCPCDB. Specifically, the SCPCDB in step 2 was a strong, negative predictor of RADOvertVio ($\Delta R^2 = .15, p < .001$) and RADOvertNoVio ($\Delta R^2 = .19, p < .001$), but was a weak, negative predictor of RADMildNoVio ($\Delta R^2 = .03, p < .01$). The SCPCDB was not significantly predictive of RADMildVio. These results suggest that the effects of the SCPCDB were more meaningful in terms of RAD severity (overt vs. mild) than in terms of driving context (norm violation vs. no norm violation). Finally, the TAS in step 3 was positively predictive of all four RAD subscales ($\Delta R^2$ from .06 to .09, $ps < .001$), which was consistent with earlier analyses.

*Trait driving anger and sensation seeking.* The DAS and ImpSS were used to assess trait driving anger and sensation seeking, respectively. The correlations in Table 3 showed moderately positive relationships (i.e., .53 to .55) between the DAS and state anger in response to both sets of driving scenarios, which were significantly higher than any other variable’s relationships to the state anger variables. Also, the relationships between the DAS and the state anger variables were both significantly stronger than the relationship between the DAS and general trait anger ($r = .35$). Both of these findings support the prior assertion that the DAS actually measures state anger, rather than trait driving anger. Lastly, the DAS was a significantly weaker predictor of both sets of RAD responses than was general trait anger.

The ImpSS showed significant positive relationships with narcissism ($r = .20$), behavioral approach ($r = .37$), and moving violations ($r = .23$); and negative relationships
with gender \((r = -0.21)\), behavioral inhibition \((r = -0.23)\), and courteous driving behaviors \((r = -0.14)\). The ImpSS and the DAS were not significantly correlated. Thus, those who scored higher in sensation seeking tended to be male, were less likely to report courteous driving behaviors, and more likely to receive moving violations.

Model of angry driving. Lastly, the variables measured lent themselves to an examination of the processes through which anger impacts upon RAD. Specifically, it is reasonable to expect trait anger to predict state anger in a provocative driving situation, which in turn, would be expected to impact upon the level of RAD exhibited. The effects of trait anger on RAD should, therefore, be mediated by state anger in relation to the scenario.

To determine whether the effect of trait anger on RAD was mediated by state anger required a four-step analysis for scenarios with and without driving norm violations. In the first step, RAD in response to driving scenarios with norm violations was regressed upon trait anger. This relationship was positive and significant \((p < .001)\) with an \(R^2\) of .18. Then RAD in response to driving scenarios without norm violations was regressed upon trait anger. This relationship was also positive and significant \((p < .001)\) with an \(R^2\) of .10.

Second, RAD in response to driving scenarios with and without norm violations were each regressed upon state anger stemming from their respective set of scenarios. Both of these relationships were significant in the positive direction \((ps < .001)\) with an \(R^2\) of .22 and .16 for driving scenarios with and without norm violations, respectively.
Third, the correlations between trait anger and state anger from driving scenarios with and without norm violations were examined and were both found to be significant in the positive direction (see Table 3).

Fourth, RAD in response to driving scenarios with norm violations was regressed upon its corresponding state anger and trait anger. In this model, state anger from driving scenarios with norm violations remained positively significant ($p < .001$), and $R^2$ change for trait anger dropped to .06 ($p < .001$). Total $R^2$ for this model was .28 ($p < .001$). Then, RAD in response to driving scenarios without norm violations was regressed upon its corresponding state anger and trait anger. In this model, state anger from driving scenarios without norm violations remained positively significant ($p < .001$), and $R^2$ change for trait anger dropped to .04 ($p < .01$). Total $R^2$ for this model was .19 ($p < .001$).

Figure 2 illustrates the mediation models. Both the positive, significant relationships in these analyses and the relative loss in predictive power of trait anger in the fourth step indicated at least partial mediation in this model. Indeed, the percentage of variance in RAD predicted by trait anger decreased about 67% and 60% when controlling for the effects of state anger in driving scenarios with and without norm violations, respectively. Thus, state anger partially mediated the relationship between trait anger and RAD, whether the situation entailed a driving norm violation or not.
For Driving Scenarios *With* Driving Norm Violations

For Driving Scenarios *Without* Driving Norm Violations

*Note.* N = 222. Values are standardized Beta coefficients. Values in parentheses are unstandardized coefficients. RAD = Risky and Aggressive Driving.

* *p < .05. ** *p < .01. *** *p < .001.

Mediation Model of Angry Driving
CHAPTER V
DISCUSSION

Given the potential harm caused by RAD on our roadways, a more thorough understanding of its psychological underpinnings is important both theoretically and practically. The present study sought to explore those underpinnings, especially in relation to people’s self-construals. Specifically, participants’ self-construal as courteous drivers was assessed to test the role, if any, of this construal in state anger and RAD in reaction to scenarios with and without driving norm violations. The results of this study provide several theoretical contributions to the driving and accident-related literatures, and are discussed below.

Hypothesized Moderation and Causal Model

The central theory of the present study was that a stronger self-construal for courteous driving would predict increased state anger and RAD in reaction to driving scenarios with norm violations, but not for scenarios lacking such violations. Additionally, this pattern of relationships for courteous driving self-construal was predicted to hold true when controlling for the effects of trait anger. The results, however, did not support this theory (see Figure 3). Instead, self-construal for courteous driving was not significantly related to either state anger variable and was negatively related to both RAD variables. Thus, those with a stronger-self construal for courteous driving were no angrier in response to driving scenarios with norm violations and were
Figure 3

General Trait Anger

+  

State Anger from Provocation  

+  

Risky & Aggressive Driving

n.s.  

Self-Construal for Courteous Driving

n.s.  

Presence/Absence of Driving Norm Violation

Courteous Driving

Note.  

+ = positive relationship, - = negative relationship, and n.s. = nonsignificant relationship.

Results of Hypothesized Model
actually less likely to respond with RAD than those with a weaker or nonexistent self-construal for courteous driving.

The lack of support for the underlying theory of this paper suggests that self-construals do not lead to more critical evaluations of others in terms of the corresponding dimension, or at least not where it applies to the self-concept of being a courteous driver. Indeed, the results indicate that the reverse may be true. That is, a stronger self-construal for courteous driving predicted greater behavioral restraint (less RAD) when faced with both forms of provocative driving scenarios. Exploratory analyses showed that this behavioral restraint may be more pronounced for overt forms of RAD (e.g., cutting off another driver) than for mild forms of RAD (e.g., giving another driver dirty looks).

Overall, self-construed courteous drivers tended to react in a manner that was behaviorally consistent with a positive attitude toward courteous driving when faced with a hypothetical norm violation from another driver, as opposed to reacting with elevated, indignant anger and vengeful behaviors.

Interestingly, when courteous driving behaviors was substituted for courteous driving self-construal in repeated tests of the hypotheses, a somewhat different picture emerged. Specifically, courteous driving behaviors was a significant, positive predictor of state anger in response to driving scenarios with norm violations, but not for driving scenarios lacking norm violations. However, courteous driving behaviors was only predictive of that particular state anger after trait anger was added to the regression equation. In essence, trait anger may have been acting as a suppressor (Conger & Jackson, 1970) variable and, thus, facilitating courteous driving behaviors’ ability to predict state anger. In other words, trait anger may have been correlated with a portion of
the error variance in the courteous driving behaviors construct, and when this error variance was controlled for (suppressed; Maassen & Bakker, 2001), then courteous driving behaviors was able to significantly predict state anger, in that instance. Although the evidence suggests that trait anger is truly a suppressor variable for courteous driving behaviors, the affect could also be an artifact of this particular study.

**Secondary Findings**

Although the central hypotheses were not supported, two other notable findings emerged from this study. First, the results support the two predominant theories concerning the antecedents of RAD: anger and sensation-seeking. Both state anger in response to the driving scenarios and general trait anger were positive predictors of both RAD variables. Exploratory analyses showed that the effects of trait anger on RAD were partially mediated by the corresponding state anger for both sets of scenarios. Also, sensation-seeking was a significant predictor of reported moving violations. Sensation-seeking was not related to either state anger variable or the DAS, however, which was consistent with prior research (Dahlen et al., 2005; Dahlen & White, 2006). Overall, these findings support a long history of research in the area of RAD.

Second, although no gender differences were found for trait anger, women in the study reportedly reacted with more state anger than men to driving scenarios with \( d = .40 \) and without \( d = .45 \) norm violations. In an exploratory analysis of gender differences divided by sample, women reported stronger anger reactions to scenarios lacking a norm violation than men at both universities. Women also reported stronger anger reactions to scenarios with norm violations than men at both institutions, but the difference was only significant for the University of Akron sample.
This finding contrasts with the lack of gender differences found in courteous driving behaviors, RAD measures, number of moving violations, or number of accidents (minor or major). Several studies have also found similarities in the driving behavior of men and women (Deffenbacher, Lynch, et al., 2002; Deffenbacher, Richards, & Lynch, 2004; Hennessy & Wiesenthal, 1999). Together, this suggests that women drive similarly to men and behave similarly when they encounter provocative driving situations, but women also exercise greater restraint in order to overcome more state anger in response to those driving situations. The cause of this relative restraint (e.g., cognitive or affective) is unclear. Perhaps it is because women may be less likely to ruminate over more retaliatory and physically aggressive options in response to provocative driving situations than men do (Deffenbacher, White, & Lynch, 2004). Future research is needed to help explain the processes involved that allow women to respond with a level of RAD that is lower than that which would be predicted, given the level of anger reportedly experienced. Or, stated another way, why men report less state anger for provocative driving scenarios than women, but respond with the same level of RAD as women.

Descriptive Findings

Setting. A relatively unique element of the study was the inclusion of samples representing two different settings: urban and rural. Previous research examining the driving practices and attitudes of drivers from urban vs. rural settings (Deffenbacher, 2008) found very few differences between the settings, and this was supported in the present study. The rural (USD) sample was slightly older than the urban (UA) sample, but that aside, the only other difference was in reactions to driving scenarios lacking a
norm violation. Specifically, the urban sample reacted with more anger and RAD than the rural sample to driving scenarios that were provocative for reasons other than another driver’s norm violation (e.g., encountering a detour while searching for a restaurant). A caveat to this finding was that gender and age were significantly related to the state anger and RAD variables, respectively, and when controlling for those demographics, the effects of setting on state anger and RAD were no longer significant.

Intuitively, one might expect an urban setting to be more conducive to anger and RAD while driving. This is because urban settings would seem to provide greater exposure to other drivers and increased perceptions of anonymity while driving due to higher population density as compared with rural settings (Deffenbacher, 2008). The current finding of a lack of differences is important for two reasons. First, it suggests that perhaps antecedents of anger while driving and RAD have little to do with population density and exposure. Living and driving in a congested area where the likelihood of knowing the driver next to you is miniscule may have no bearing on driving anger or RAD. This may also explain why the number of miles driven and frequency of trips, which also suggest level of exposure to other drivers, have consistently failed to predict driving anger (Deffenbacher, Deffenbacher, et al., 2003; Deffenbacher et al., 2000; Deffenbacher, Lynch, et al., 2002; Deffenbacher et al., 2004) or RAD (Moore & Dahlen, 2008). Second, this finding supports previous research that suggests samples of drivers from urban or rural settings should be considered equivalent. As drivers in urban areas and drivers in rural areas appear to drive and react similarly to provocative driving situations, it is likely that driving study results generalize across settings that differ only in population density.
**Behavioral approach.** Among the control variables, behavioral approach (the tendency to seek out and pursue rewarding outcomes) emerged as a consistent predictor of less RAD in response to both types of driving scenarios. Indeed, behavioral approach predicted unique variance in RAD above and beyond other significant predictors such as gender, age, narcissism, courteous driving self-construal, and trait anger. The negative relationship between behavioral approach and RAD was intriguing because other research has linked behavioral approach to negative affect such as anger (Carver, 2004; Carver & Harmon-Jones, 2009; Harmon-Jones, 2004; Putman, Hermans, & van Honk, 2004; Stemmlera, Aueb, & Wacker, 2007), which is typically a positive predictor of RAD. Yet behavioral approach was related to state anger in only one instance; that stemming from driving norm violations, and that relationship was negative in direction. In addition, behavioral approach’s counterpart, behavioral inhibition, has been linked to nervousness and fear (Carver, 2004), which would seem likely to reduce the incidence of RAD. However, behavioral inhibition failed to significantly predict RAD in multiple regression analyses.

One possible explanation for the findings concerning behavioral approach is that RAD, as it was collectively assessed in this study, was not seen as a “rewarding outcome” by those with higher levels of behavioral approach. Rather, it could be argued that the more rewarding path in the driving scenarios was to minimize the provocation and get on with life, which might also explain the lack of a relationship between behavioral approach and state anger. Moreover, the provocative driving scenarios in the study may not have elicited fear in a way that would have been reactive to those with a more sensitive behavioral inhibition system.
Relationships of the CDBS and CDSCS

The relationship between courteous driving self-construal and courteous driving behaviors was significant, as predicted. The more strongly participants identified with the self-concept of being a courteous driver, the more likely they were to report performing courteous acts behind the wheel. However, the newly created measures of these two related constructs showed notable differences in the way they related to other variables in the study. Specifically, self-construal for courteous driving negatively predicted minor and major accidents, whereas courteous driving behaviors related to neither accident measure.

It is reasonable to expect a courteous driver to have fewer accidents (a behavioral outcome), but why would the related self-construal have predicted this while the actual courteous behaviors did not? Compounding the confusion was the fact that self-construal for courteous driving and courteous driving behaviors both predicted less RAD, which was designed to reflect behavioral outcomes, in reaction to both sets of driving scenarios. Courteous driving self-construal’s ability and courteous driving behaviors’ inability to predict accidents suggests the effects of a third variable, such as one’s attitude toward safe driving, in general. Courteous driving practices (e.g., letting another driver merge in front of you) may not significantly reduce accidents, but a positive attitude toward safe driving could reduce the chance of accidents and predict a self-construal for courteous driving. General attitude regarding safe driving was not measured in this study, so it is not possible to determine if it is the underlying cause of the relationships found between courteous driving self-construal and the accident measures. Future research is needed to
determine if the relationship between courteous driving self-construal and number of accidents (minor and major) is indeed spurious.

Limitations

A clear limitation involved with using student samples was a relatively narrow age range, which hinders generalizability. However, age has been shown to be negatively related to separate measures of both risky and aggressive driving, even in samples of college students (Dahlen & White, 2006). Therefore, using samples of undergraduate students may offer the advantage of targeting the most problematic age range in terms of RAD.

Other limitations of the present study include reliance on self-report data and potential mono-method bias. It is acknowledged that self-report data may be prone to response styles, demand characteristics, and inaccurate recall. An alternative that addresses these limitations would be to install surveillance equipment in a sample of drivers’ vehicles to capture the provocative scenarios they encounter along with their reactions to these scenarios. The cost of such equipment, however, is likely to be prohibitive. Also, drivers who know they are being recorded may choose to alter their normal behavior in some way (i.e., the observer effect).

Ultimately, the present methodology of self-report survey data was chosen for five reasons. First, the cost was far less than the cost of buying, installing, and uninstalling surveillance equipment in participants’ vehicles. Second, self-report data offered the advantage of being able to assess unseen psychological phenomena, such as self-construals. Third, self-report was consistent with the methodology that has been used to study these topics in the past (Nesbit, Conger, & Conger, 2007). Fourth, research
now suggests that common method variance is less of a confound than had been previously reported, especially when the attenuating effects of measurement error are considered (Lance, Dawson, Birkelbach, & Hoffman, 2010). Fifth, self-report was also consistent with the manner in which organizations typically collect selection information from job candidates. This last point is important because, as was previously mentioned, a practical application of this paper could be to provide organizations with a better understanding of who is more or less likely to engage in risky or aggressive driving while on the job.

Finally, it may be argued that short, written descriptions of provocative driving scenarios are limited to respondents’ imagination and lack much of the psychological fidelity of actual provocative driving scenarios with sometimes life-and-death consequences. As such, it may be difficult for a respondent to truly report how he or she would react to a written description. Indeed, those who reported greater ease in imagining the scenarios were happening to them also reported stronger anger reactions. It is reasonable to believe that anger and subsequent RAD reactions were likely underreported due to this limitation. However, there were several reasons to justify the use of written descriptions of driving scenarios. First, written descriptions provided standardization in that each participant reacted to the exact same sets of scenarios. Second, the driving scenarios were carefully written to capture a range of provocations that either included or lacked a type of norm violation. This level of control would be impossible with a real-world driving methodology. Third, a manipulation check revealed that participants were easily able to imagine experiencing the scenarios depicted. Thus, although written scenarios may have lacked the intensity and immediacy of actual driving
provocations, they seemed to represent driving scenarios that were, unfortunately, familiar within participants’ driving experiences. This level of familiarity raises the potential for participants’ ability to accurately judge how angry they would be and the type of behavioral reaction they would have in those situations.

**Future Research**

The present study sought to examine the role of self-construals in the affective and behavioral reactions of drivers. Although the central hypotheses were not supported, other findings suggest the need for future research. For example, the heightened level of anger reported by women (relative to men) in reaction to the driving scenarios requires further research to explore the different processes utilized by men and women in determining whether or how to act on their emotions while driving.

Future research might also benefit from the use of videotaped vignettes to depict provocative driving scenarios rather than using written descriptions. The advantage of videotaped scenarios is the possibility of greater psychological fidelity, while maintaining the standardization of written depictions. Also, participants would need to use less of their imagination and draw less from personal driving experience with videotaped scenarios than with written ones.

Finally, future research should continue to explore other individual characteristics beyond trait anger and sensation-seeking in the prediction of RAD. In the present study, for example, behavioral approach emerged as predictive of RAD in both sets of driving scenarios. Presumably, there are other such individual difference factors that contribute to RAD, and prediction is the first step toward understanding. The better we understand the nature and underpinnings of RAD, the better we can identify individuals that (A) we
should hire for jobs that entail driving, and (B) might benefit from intervention efforts designed to reduce RAD (see Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000).

Summary

In the context of selecting for employment positions where driving is a significant portion of the job, some general advice may be given. To reduce the chances of RAD or other negative driving outcomes such as moving violations or accidents, employers would do well to hire applicants with stronger self-construals for courteous driving and more sensitive behavioral approach systems. In particular, stronger self-construal for courteous driving was related to less RAD across a range of situations and fewer reported accidents (both major and minor). Conversely, employers would be wise to avoid those with higher levels of trait anger, narcissism, and sensation-seeking for jobs that require a significant amount of driving.

In addition, those who responded with more RAD to the driving scenarios lacking norm violations (e.g., dealing with road construction) tended to report having been in more minor and major auto accidents, so that particular RAD measure could also have potential as a selection device. However, for both self-construal for courteous driving and RAD in response to driving scenarios, there is a high degree of transparency in their measures, and faking would likely be a problem with job applicants. Perhaps such measures could be best utilized to screen out low scorers, rather than ranking those to receive an offer of employment.

Among the demographic variables, age consistently provided unique variance accounted for in both measures (with and without norm violations) of state anger and RAD. Specifically, older drivers tended to score lower on those variables than younger
drivers, which was supportive of other research (Dahlen, Martin, Ragan, & Kuhlman, 2005). The use of largely traditional college age students in the present study, however, limits the generalizations that may be made about whether organizations should recruit older individuals for positions that require driving. Indeed, evidence suggests that narcissism may increase in mid-life (e.g., Rhodewalt & Peterson, 2009), and narcissism was related to increased anger and RAD in response to drivers’ norm violations in the present study. Research utilizing a broad range of ages is needed to shed light on this important issue.
Automotive accidents are costly in terms of economic losses and personal injury (NHTSA, 2006), and human error represents a key preventable factor in these accidents. In addition, the costs of motor vehicle accidents provide strong motivation for organizations who require driving of their employees to understand the psychological processes contributing to these accidents. A better understanding of these processes allows organizations to effectively manage the risks associated with them through employee selection procedures or interventions. The present study tested the role of self-construal for courteous driving in RAD using two newly-developed scales, and replicated established relationships concerning trait anger and sensation-seeking in the RAD literature.

*Self-Construal for Courteous Driving*

Although some evidence suggests that social judgments along self-relevant domains may be especially stringent (Engle & Lord, 1997; Hirt & McCrea, 2009), this was not supported for the domain of courteous driving. Rather, the findings suggest that those with a stronger self-construal for courteous driving are no more likely to get angry and actually less likely to respond with RAD when confronted with a wide range of provocative driving situations.
The affect of self-relevant constructs on social interactions and evaluations is complex. At times these constructs appear to influence internal standards and bias social evaluations, and at other times they appear not to do so. Perhaps the difference has more to do with the centrality (Stryker & Serpe, 1994) than the salience (Markus, & Wurf, 1987) of these self-relevant constructs, as salience is thought to be more contextual and less influential than centrality (Tett & Burnett, 2003). The salience of being a courteous driver may be present while driving, but this type of self-construal appears to lack the centrality required to motivate a relatively high-stakes behavior such as RAD when driving norm violations are encountered.

Although the newly created measure of self-construal for courteous driving (CDSCS) did not perform fully as hypothesized, it did show potential in other ways. For example, it was able to explain unique variance in RAD for both sets of scenarios and was one of the few predictors of both major and minor accidents. This, coupled with its acceptable reliability, brevity (just five items), and lack of gender effects, suggests potential usefulness as a selection device for jobs that require driving. Validation studies are required to determine the true potential of the CDSCS in this context.

*Traditional Antecedents of RAD*

Those who are generally more prone to experience anger (higher trait anger) were more likely to react to potentially provocative driving scenarios with higher levels of RAD, and this relationship was partially mediated by greater state anger. This pattern of relationships was evident regardless of whether the provocation involved some type of norm violation from another driver or not. Therefore, a driver who is a bit hot-headed will react with more intense anger to a provocative driving scenario and will be more
likely to respond with RAD. Also, drivers who reported higher sensation-seeking tendencies were more likely to report a higher number of speeding tickets and less courteous driving behaviors. These findings support both the anger-induced and sensation-seeking antecedents of RAD that have been reported in numerous studies.

Secondary Findings

The present study revealed several additional findings of note. For example, in spite of no gender difference relating to trait anger, women tended to report stronger anger reactions to the driving scenarios than men did. Interestingly, this anger differential did not translate into more RAD for women, and the reasons for this are unclear. To date, no other research has examined this gender difference, and it remains to be seen whether such a difference would even be replicated.

Another noteworthy finding was the fact that urban versus rural setting, when controlled for gender and age, did not matter with regard to the findings in this study. This is supportive of the only other study to have examined such settings (Deffenbacher, 2008), and strengthens the argument that greater exposure to other drivers does not translate into greater anger sensitivity or tendencies toward RAD.

Final Thoughts

At present, the study of individual difference factors in anger-induced RAD is too focused on anger related traits, which is problematic for two reasons. First, the predominant measure of trait driving anger, the DAS (Deffenbacher, Oetting, & Lynch, 1994), is questionable on both theoretical and psychometric grounds (Nesbit, Conger, & Conger, 2007). The findings of the present study cast the validity of the DAS into even more doubt. Second, this preoccupation with anger related traits comes at the expense of
a more fine-grained understanding of other individual differences involved with anger-induced RAD. For example, the present study shows that gender, behavioral approach, and narcissism may be fruitful individual difference factors in future studies. Clearly, much more remains to be done to better understand the psychological underpinnings of anger-induced RAD.
REFERENCES


APPENDICES
APPENDIX A

WEB-BASED SURVEY

*The following is the text and the items used in the online survey:*

You are invited to participate in a research study titled “Driving Attitudes Study Spring 2009” that is being conducted by Damian J. Lonsdale, a doctoral student in the Industrial & Organizational Psychology program at The University of Akron. The study will include about 300 total participants. The purpose of the study is to examine the relationships between driving attitudes and beliefs and important outcomes like auto accidents. If you agree to participate, you will be asked to answer survey questions and respond to statements that may or may not be self-descriptive. It should take about 20-25 minutes to complete the survey.

Those who do not have a valid driver’s license are not eligible to participate. If you do not have a valid driver’s license, please stop now and review this site for other research studies you may participate in.

No personally identifying information is asked and your responses will be anonymous, which means that they cannot be linked to you. You will not be contacted after you participate. If a report is written about this study, it will be done in such a way that you cannot be identified.
There are no known risks from being in this study, and you will not benefit personally. However, it is hoped that others may benefit in the future from what is learned as a result of this study.

Given that this survey can be completed from any computer (e.g., personal, work, school), it is not possible to guarantee the security of the computer on which you choose to enter your responses. As a participant in this study, please be aware that certain “key logging” software programs exist that can be used to track or capture data that you enter and/or websites that you visit.

Participation is completely voluntary, and you may choose not to continue at any time without penalty or loss of any benefits for which you are otherwise entitled.

If you have any questions, concerns or complaints now or later, you may contact the principle investigator or his advisor at their respective number below.

This study has met the standards set forth by The University of Akron Institutional Review Board. If you have any questions about your rights as a human subject, complaints, concerns or wish to talk to someone who is independent of the research, contact the Office of Research Services & Sponsored Programs at 330-972-7666. Thank you for your time.

Principle Investigator: Damian J. Lonsdale (605) 677-5694
Advisor: Dennis Doverspike, Ph.D., ABPP (330) 972-8372

Clicking below indicates that you have read the description of the study and voluntarily agree to participate. (You may print a copy of this consent statement for future reference.)
1. What is your gender?
Male ____  Female ____

2. What is your age in years?
I am ____ years old.

3. Are you currently employed at least part-time (i.e., work at least 15 hours per week)?
Yes ____  No ____

4. If you answered yes to the above question, please indicate what percentage of your typical workday includes driving (not including commuting to and from work). ____%

A number of statements that people use to describe themselves are given below. Read each statement and indicate the degree to which you agree or disagree with how well it generally describes you. There are no right or wrong answers. Do not spend too much time on any one statement.

(1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree)

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Shortened Version of the Narcissistic Personality Inventory

5. I have a natural talent for influencing people.

6. I know I’m good because everyone keeps telling me so.
7. I like to be the center of attention.
8. I think I’m a special person.
9. I see myself as a good leader.
10. I like authority over others.
11. I find it easy to manipulate others.
12. Everybody likes to hear my stories.
13. I have a strong will to power.
14. I really like to be the center of attention.
15. People always seem to recognize my authority.
16. I would prefer to be a leader.
17. I am going to be a great person.
18. I am a born leader.
19. I am an extraordinary person.

Behavioral Inhibition Scale

20. If I think something unpleasant is going to happen I usually get pretty “worked up.”
21. I worry about making mistakes.
22. Criticism or scolding hurts me quite a bit.
23. I feel pretty worried or upset when I think or know somebody is angry at me.
24. Even if something bad is about to happen to me, I rarely experience fear or nervousness. (Reverse-scored)
25. I feel worried when I think I have done poorly at something.
26. I have very few fears compared to my friends. (Reverse-scored)
Behavioral Approach Scale

27. When I get something I want, I feel excited and energized.
28. When I’m doing well at something, I love to keep at it.
29. When good things happen to me, it affects me strongly.
30. It would excite me to win a contest.
31. When I see an opportunity for something I like, I get excited right away.
32. When I want something, I usually go all-out to get it.
33. I go out of my way to get things I want.
34. If I see a chance to get something I want, I move on it right away.
35. When I go after something I use a “no-holds-barred” approach.
36. I will often do things for no other reason than that they might be fun.
37. I crave excitement and new sensations.
38. I’m always willing to try something new if I think it will be fun.
39. I often act on the spur of the moment.

Trait Anger Scale

40. I am quick tempered.
41. I have a fiery temper.
42. I am a hotheaded person.
43. I get angry when I’m slowed down by others’ mistakes.
44. I feel annoyed when not given recognition for good work.
45. I fly off the handle.
46. When I get mad, I say nasty things.
47. It makes me furious when I am criticized in front of others.
48. When I get frustrated, I feel like hitting someone.
49. I feel infuriated when I do a good job and get a poor evaluation.

**Impulsive-Sensation Seeking (ImpSS)**

The following are a series of statements that persons might use to describe themselves. Read each statement and decide whether or not it describes you. If you agree with a statement or decide that it describes you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE. Be sure to respond to each statement with TRUE or FALSE even if you are not entirely sure of your answer. There are no good or bad answers, so any option is correct.

50. I often do things on impulse.
51. I would like to take off on a trip with no preplanned or definite routes or timetables.
52. I enjoy getting into new situations where you can’t predict how things will turn out.
53. I sometimes like to do things that are a little frightening.
54. I’ll try anything once.
55. I would like the kind of life where one is on the move and travelling a lot, with lots of change and excitement.
56. I sometimes do “crazy” things just for fun.
57. I prefer friends who are excitingly unpredictable.
58. I often get so carried away by new and exciting things and ideas that I never think of possible complications.
59. I like “wild” uninhibited parties.

*Provocative Scenarios With (even numbered) and Without (odd numbered) Driving Norm Violations*

(alphanumeric items comprise the RAD scales and are followed by their mean and standard deviation)

Please read the following scenarios and indicate how angry you would typically be on a scale from 1 to 5 if you experienced that scenario. Then, indicate how likely you would be to do the things listed after each scenario. (Remember, nobody’s perfect, so please be honest!) Finally, please indicate how easy or difficult it was to imagine that each scenario was happening to you.

(Anger options: 1 = not at all angry, 2 = a little angry, 3 = somewhat angry, 4 = quite angry, 5 = extremely angry)

(Reaction options: 1 = very unlikely, 2 = somewhat unlikely, 3 = neither unlikely nor likely, 4 = somewhat likely, 5 = very likely)

It is ___________ that I would…

(Ease/difficulty imagining options: 1 = very difficult, 2 = somewhat difficult, 3 = neither difficult nor easy, 4 = somewhat easy, 5 = very easy).

I found it ___________ to imagine that this scenario was happening to me.

60. It’s a clear, sunny Saturday morning and very few other cars are out on the road. But while trying to merge onto the freeway, an oncoming driver fails to get over and you have to swerve onto the shoulder to avoid a major collision.
a. Glare at the other driver. 3.93 (1.05)
b. Shake my head at the other driver. 3.98 (1.04)
c. Give the other driver dirty looks. 3.75 (1.10)
d. Give the other driver the finger. 2.67 (1.30)
e. Shake my fist at the other driver. 2.36 (1.20)
f. Try to cut in front of the other driver. 2.18 (1.14)
g. Follow right behind the other driver for a long time. 2.29 (1.22)
h. Drive alongside the other driver for a long time. 2.09 (1.06)
i. Purposely block the other driver from doing what he/she wants to do. 2.14 (1.14)
j. Pass the other driver and then slow down to frustrate him/her. 2.31 (1.19)

61. You’re driving across town in heavy traffic when you get stuck behind a bicyclist who is in the middle of your lane.

a. Yell questions like ‘What do you think you’re doing?’ 2.41 (1.31)
b. Glare at the bicyclist. 3.17 (1.37)
c. Shake my head at the bicyclist. 3.21 (1.33)
d. Give the bicyclist dirty looks. 2.99 (1.32)
e. Try to get out of the car and tell the bicyclist off. 1.53 (.86)
f. Try to force the bicyclist to the side of the road. 1.57 (.88)
g. Honk at the bicyclist. 2.76 (1.34)
h. Try to scare the bicyclist. 1.54 (.90)
i. Try to cut in front of the bicyclist. 1.63 (.99)
62. You’re on the freeway heading home after a long trip when you begin to pass a series of slower cars. Suddenly, one of the cars pulls out in front of you and then drives side-by-side another car, blocking both lanes and holding up traffic. After a long time, the driver finally merges back into the slow lane.

a. Glare at the other driver. 3.71 (1.18)
b. Shake my head at the other driver. 3.67 (1.16)
c. Give the other driver dirty looks. 3.52 (1.22)
d. Give the other driver the finger. 2.48 (1.30)
e. Shake my fist at the other driver. 2.30 (1.23)
f. Drive right up on the other driver’s bumper. 2.37 (1.34)
g. Try to cut in front of the other driver. 2.31 (1.29)
h. Follow right behind the other driver for a long time. 2.24 (1.25)
i. Purposely block the other driver from doing what he/she wants to do. 2.08 (1.13)
j. Pass the other driver and then slow down to frustrate him/her. 2.14 (1.18)

63. You’re driving in an unfamiliar area looking for a particular restaurant. You’re tired and hungry when you encounter road construction that requires a lengthy detour.

a. Yell things like ‘I can’t believe this!’ 3.07 (1.30)
b. Drive a little faster than I was. 2.95 (1.23)
c. Drive a lot faster than I was. 2.30 (1.14)
d. Go ballistic behind the wheel. 1.68 (.96)
64. You’re on the freeway in light traffic when you notice another driver is following too close behind you for an extended period of time.

   a. Glare at the other driver. 3.26 (1.25)
   b. Shake my head at the other driver. 3.25 (1.23)
   c. Give the other driver dirty looks. 3.00 (1.25)
   d. Gesture that I want to physically fight the other driver. 1.64 (.90)
   e. Give the other driver the finger. 2.05 (1.15)
   f. Try to scare the other driver by hitting my brakes. 2.62 (1.32)
   g. Slow way down until the other driver passes and then follow right behind the other driver for a long time. 2.45 (1.24)
   h. Speed up to frustrate the other driver. 2.50 (1.18)
   i. Purposely block the other driver from doing what he/she wants to do. 2.18 (1.17)
   j. Slow down to frustrate the other driver. 2.87 (1.37)

65. It’s dark and you’re on a hilly, two-lane road on the way to a friend’s place when you come up behind a large, slow truck that kicks up gravel and blocks your view.

   a. Try to force the truck to the side of the road. 1.56 (.89)
   b. Gesture that you want to physically fight the truck driver. 1.50 (.79)
   c. Give the truck driver the finger. 1.82 (1.10)
   d. Shake my fist at the truck driver. 1.79 (1.02)
   e. Try to scare the truck driver. 1.60 (.96)
   f. Drive right up on the truck’s bumper. 1.68 (.99)
   g. Try to pass the truck even though it’s a no-pass zone. 2.25 (1.24)
h. Flash my lights at the truck driver. 2.18 (1.27)
i. Do to the truck driver what he/she did to me. 1.72 (.98)
j. Leave my brights on in the truck driver’s side mirrors. 1.78 (1.02)

66. You’re out running errands when suddenly someone pulls right out in front of you, forcing you to slam on your brakes. Soon, the car pulls into the same small parking lot for the store you are going to. Now you’re within earshot of each other.

   a. Call the other driver names aloud. 1.91 (1.07)
   b. Make negative comments about the other driver aloud. 2.37 (1.28)
   c. Glare at the other driver. 3.28 (1.23)
   d. Shake my head at the other driver. 3.26 (1.20)
   e. Give the other driver dirty looks. 3.12 (1.24)
   f. Try to scare the other driver. 1.72 (.92)
   g. Drive slowly past the other driver. 2.14 (1.19)
   h. Bump the other driver’s bumper with mine. 1.50 (.91)
   i. Purposely block the other driver from doing what he/she wants to do. 1.67 (1.01)
   j. Drive closely behind the other driver. 1.93 (1.13)

67. You leave home with just enough time to make it to an important appointment. However, you run into heavy traffic that is leaving an athletic event and now you realize you’re going to be late.

   a. Glare at the other drivers. 2.22 (1.24)
   b. Shake my head at the other drivers. 2.20 (1.22)
   c. Give the other drivers dirty looks. 2.10 (1.21)
d. Honk my horn at the other drivers. 1.98 (1.15)

e. Give the other drivers the finger. 1.64 (1.01)

f. Try to scare the other drivers. 1.59 (.94)

g. Bump another driver’s bumper with mine. 1.49 (.90)

h. Drive right up on another driver’s bumper. 1.74 (1.09)

i. Try to cut in front of another driver. 2.04 (1.23)

j. Purposely block other drivers from doing what they want to do. 1.63 (.97)

68. You’re on a long road trip and you pass a slower vehicle on the freeway, but minutes later they pass you and then slow down again.

a. Give the other driver the finger. 2.05 (1.23)

b. Roll down the window to help communicate my anger. 1.74 (1.00)

c. Shake my fist at the other driver. 1.91 (1.08)

d. Drive right up on the other driver’s bumper. 1.96 (1.17)

e. Try to cut in front of the other driver. 2.18 (1.29)

f. Follow right behind the other driver for a long time. 2.00 (1.11)

g. Speed up to frustrate the other driver. 2.37 (1.29)

h. Flash my lights at the other driver. 2.02 (1.20)

i. Do to the other driver what he/she did to me. 2.19 (1.26)

j. Leave my brights on in the other driver’s rear view mirror. 1.94 (1.16)

69. You’re nearly home after a long trip when a law enforcement officer pulls you over for speeding and gives you a $100 ticket. Now, you’re back on the road.

a. Go ballistic behind the wheel. 1.77 (1.06)

b. Drive a little faster than I was. 1.62 (.96)
c. Drive a lot faster than I was. 1.47 (84)

_Miles Driven and Trip Frequency_

70. How many miles per week do you normally drive? ____

71. How many trips do you normally make in your vehicle every week? ____

_Courteous Driving Self-Construals Scale (CDSCS)_

The next set of statements concerns attitudes toward driving that you may or may not agree with. Nobody is perfect in everything they say or do, so please be honest in your responses.

72. I consider myself a very considerate driver.

73. If everyone did their part, traffic would flow much more smoothly.

74. I like it when a passenger comments on my thoughtful driving (e.g., “that was nice of you to…”).

75. I think it is important to be considerate to other drivers.

76. I take pride in the fact that I am a courteous driver.

77. (Dropped item) When I’m driving, I don’t worry too much about what other drivers are trying to do. (Reverse-scored)

78. (Dropped item) Courteous driving is just something they talk about in Drivers’ Education. (Reverse-scored)

_Courteous Driving Behaviors Scale (CDBS)_

77. In stopped traffic, I try not to block side entryways.
78. I wait to back into traffic until I’m sure I won’t cause any other vehicles to slow down.

79. I slow down if it helps another vehicle that is trying to pass.

80. I leave high-beam headlights on when oncoming vehicles approach. (Reverse-scored)

81. I follow close behind the vehicle ahead of me. (Reverse-scored)

82. I try to avoid cutting anybody off on the freeway.

83. I ignore long trucks that are trying to merge into my lane. (Reverse-scored)

84. I drive close behind the vehicle ahead of me to prevent merging traffic from squeezing in. (Reverse-Scored)

85. I pull out into traffic even when it causes other vehicles to slow down. (Reverse-scored)

86. If I’m the first or lead car at a red light, I make an effort to be alert and accelerate as soon as it changes.

87. I don’t bother using turning signals. (Reverse-scored)

90. (Dropped item) I make crisp turns to prevent vehicles behind me from hitting their brakes.

Driving Incident Items

Finally, the last three questions ask about things that have happened to you or you have done in your LIFETIME of driving (i.e., since you received your driver’s license). Please indicate how many times you have done or experienced the item. If it has happened 5 or more than times, choose the 5+ option.
In your LIFETIME of driving, how many times have you…

**Number of times happened**

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5+</th>
</tr>
</thead>
</table>

88. Gotten moving (non-parking) tickets?

89. Had a minor accident (e.g., a fender bender)?

90. Had a major accident (e.g., significant damage to property or a vehicle)?

*The Driving Anger Scale (short-form)*

Imagine that each situation described is actually happening to you. Please rate how much anger it would make you feel. (1 = none at all; 2 = a little; 3 = some; 4 = much; 5 = very much)

91. Someone is weaving in and out of traffic.

92. A very slow vehicle on a winding road will not pull over and let people by.

93. Someone backs right out in front of you without looking.

94. Someone runs a red light or stop sign.

95. You pass a radar speed trap.

96. Someone speeds up when you try to pass them.

97. Someone is slow in parking and holding up traffic.

98. You are stuck in a traffic jam.

99. Someone makes an obscene gesture toward you about your driving.

100. Someone honks at you about your driving.

101. A bicyclist is riding in the middle of the lane and slowing traffic.

102. A police officer pulls you over.
103. A truck kicks up sand or gravel on the car you are driving.

104. You are driving behind a large truck and you cannot see around it.
APPENDIX B

HUMAN SUBJECTS APPROVAL

NOTICE OF APPROVAL

Date: April 27, 2009
To: Damian J. Lonsdale
728 Prairie Blvd.
Dakota Dunes, SD 57049

From: Sharon McWhorter, IRB Administrator

Re: IRB Number 20090415 “Driving Attitudes Study Spring 2009”

Thank you for submitting your IRB Application for Review of Research Involving Human Subjects for the referenced project. Your application was approved on April 27, 2009. Your protocol represents minimal risk to subjects and matches the following federal category for exemption:

☐ Exemption 1 - Research conducted in established or commonly accepted educational settings, involving normal educational practices.

☐ Exemption 2 - Research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior.

☐ Exemption 3 - Research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior not exempt under category 2, but subjects are elected or appointed public officials or candidates for public office.

☐ Exemption 4 - Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens.

☐ Exemption 5 - Research and demonstration projects conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine public programs or benefits.

☐ Exemption 6 - Taste and food quality evaluation and consumer acceptance studies.

Annual continuation applications are not required for exempt projects. If you make changes to the study’s design or procedures that increase the risk to subjects or include activities that do not fall within the approved exemption category, please contact me to discuss whether or not a new application must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to implementation.

Please retain this letter for your files. If the research is being conducted for a master’s thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Cc: Dennis Dooverspike - Advisor
Cc: Stephanie Woods - IRB Chair

☐ Approved consent form/s enclosed

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