2017

Measuring aggressive driving motivations: Instrument development and validation

Ashley Buller
Iowa State University

Measuring aggressive driving motivations: Instrument development and validation

by

Ashley Arden Buller

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Psychology

Program of Study Committee:
Kevin Blankenship, Major Professor
Susan Cross
Marcus Credé
Larry Ebbers
Jing Dong

The student author and the program of study committee are solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2017

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

There are a variety of different motivations that may provoke aggressive driving in individuals. Research on aggressive driving has mostly overlooked addressing these various motivations, however it can be argued that the best way to reduce aggressive driving is to understand the root causes of the behavior. These causes can be explained by individual differences in personality, specifically the characteristics of narcissistic and rigid personalities. These two types of personalities both become angry in the driving context, although they may be provoked for different reasons. To reduce aggressive driving researchers may design persuasive appeals that match these motivations. The purpose of the present research was to design an instrument that clearly measures these motives and to validate the instrument by comparing responses on the instrument to related and unrelated constructs. The Aggressive Driving Motivations Questionnaire scores evidenced good reliability, and satisfactory content and construct validity. After the instrument was validated, it was used to compare anger responses to both participant-generated and researcher-presented driving scenarios. Although both the rigid and narcissism subscales predicted higher anger responses, only the narcissism subscale successfully predicted past aggressive driving behavior. Further research using this validated narcissism sub-scale will hopefully be able to develop persuasive appeals that influence the anger and behavioral response of this type of aggressive driver.

CHAPTER 1: INTRODUCTION

Who is the aggressive driver? Why do people drive aggressively? Psychologists have been studying these empirical questions for well over 50 years, but they have not been answered to the point of significantly reducing aggressive driving, a substantial public health concern. The earliest descriptions of aggressive driving date to the late 1940s. Tillmann and Hobbs (1949) argued that it was the personality characteristics and social background of an individual that led to individuals' aggressive driving, described as "horn-honking and racing other cars away from a stop light" (p. 325). However it is the increased reporting of "road rage" incidents by the media in the 1990s and 2000s that has garnered greater attention to aggressive driving research in recent years.

Among the many reasons to advance research on aggressive driving, the most salient is the cost of motor vehicle accidents on public health and safety. In 2012 alone, there were approximately 5.6 million police-reported crashes in the U.S., resulting in about 33,500 fatalities and 2.3 million injured persons (National Highway Traffic Safety Administration, 2014). Aggressive driving has been shown to increase the risk of motor vehicle accidents, and is also associated with a greater severity of injuries resulting from collisions (Galovski, Matla, & Blanchard, 2006; Paleti, Eluru, & Bhat, 2010). The AAA Foundation for Traffic Safety (2009) reported that the top causes of fatal motor vehicle accidents in the U. S. from 2003-2007 were related to human factors: approximately 30% speeding, 11% failure to yield the right of way, 7% reckless and careless driving, and 6% failure to obey traffic signs or devices. These human factors may be influenced in part by aggressive driving motivations. In fact, NHTSA (2008) estimated that roughly two-thirds of motor vehicle fatalities can be accredited to behaviors associated with aggressive driving.

Defining Aggressive Driving

Historically, driver aggression has been defined broadly, but there has been a lack of consistency in its operational definition (Aronson, 1980; Baron & Richardson, 1994; Galovski et al., 2006; Goranson, 1970; Tasca, 2000). Defining which specific driving acts should be considered aggressive driving or reckless driving has been a source of controversy. The National Highway Traffic Safety Administration (1999) defined aggressive driving as "the operation of a motor vehicle in a manner which endangers or is likely to endanger persons or property." This definition includes an array of behaviors that greatly range in their severity: moving violations such as speeding, weaving, unsafe lane changes and passing; facial gestures, screaming, and honking; and even violent confrontations. Noticeably, this imprecise definition does not distinguish between driving behaviors that may be the result of errors or lapses, versus intentional acts of the driver.

Many researchers have argued that aggressive driving behavior must include intent to harm, either physically, psychologically, or emotionally (Ellison-Potter, Bell, & Deffenbacher, 2001; Galovski & Blanchard, 2002; Hauber, 1980; Hennessy & Wiesenthal, 1999). For example, a lapse of judgment with no intent to harm would not be considered aggressive, even though an observer may interpret the behavior as aggressive. The determining factor is the driver's intention. Ellison-Potter, Bell and Deffenbacher (2001) defined aggressive driving as behavior that "intentionally (whether fueled by anger or frustration or as a calculated means to and end) endangers others psychologically, physically, or both" (p. 432). Deffenbacher (1999) supports this view, voicing concern that two categories reflecting intent be kept conceptually separate: *aggressive* driving motivated by harmful intentions, and *reckless* driving which does not necessarily include intent to harm. Hennessy and Wiesenthal (2005) have also emphasized the

importance of distinguishing between types of unsafe driving practices, underlining the motives of each type of unsafe practice. They contrast *aggressive* driving that is motivated by intention to harm other drivers, whether it be through verbal or physical means, compared with *assertive* driving (e.g., speeding and weaving in and out of traffic) which has time urgency as its primary concern, without inherent intent to harm or punish other drivers. Hennessy and Wiesenthal (2005) have argued that while both types of driving behavior pose concerns for traffic safety, they are distinct categories with unique motives and behavioral consequences.

Tasca (2000) has offered a more precise definition that focuses on the motivation and intent of the driver: "A driving behavior is aggressive if it is deliberate, likely to increase the risk of collision and is motivated by impatience, annoyance, hostility and/or an attempt to save time" (p.2). This definition emphasizes that these behaviors, though intentional, are not necessarily motivated by the desire to harm another driver, but are willful and deliberate actions that are likely to increase a harmful outcome (Galovski et al., 2006). The more violent behaviors, such as deliberate attempts to collide with, kill or injure another driver would be better classified as criminal acts, rather than being grouped with aggressive driving behaviors not intending to physically harm (Tasca, 2000). Tasca lists specific behaviors that would constitute aggressive driving, including but not limited to: tailgating, weaving in and out of traffic, improper passing or lane changes, failure to yield, preventing other drivers from passing, unwillingness to merge or change lanes due to traffic conditions, excessive speeding, and running stop signs or red lights. Along with these behaviors, he also notes displays of annoyance or hostility that would indicate a motivation to intimidate or irritate other drivers, though not necessarily intended to physically harm others. These displays include flashing headlights, sustained horn-honking,

glaring at another driver to show disapproval, yelling, or gesturing. Tasca argues these behaviors should also be considered to be in the domain of aggressive driving behaviors.

Dula and Geller's (2003) review aimed to generate a definition that could be used consistently by researchers in an effort to better understand the causes of aggressive driving. They argue that leaving the definition ambiguous impedes the reconciliation of accurate and precise information, limiting generalizability and precluding researchers from communicating their findings effectively. The authors offer three categories of dangerous driving, a continuous behavioral spectrum that encompasses any behavior that endangers or has the potential to endanger others: (1) intentional acts of bodily or psychological aggression toward other motorists, (2) negative emotions such as anger or frustration, and (3) risk-taking behaviors that pose danger to others, but lack intent to harm. Dula and Geller propose that only those behaviors that fall into the first category should be specifically defined as aggressive behaviors – those that are intentional acts. While negative emotions can distract drivers and divert attention away from safe driving, those emotions should not be labeled as aggressive, nor should errors or lapses that do not have a motivation to harm others.

The problem with this strict categorization is that the same behavior may fall into either the first or third category, depending upon the driver's motivation – was the driver intending their action to cause harm or not? For example, when asking an individual to report the number of times they have cut off someone in the past 12 months, researchers do not typically ask the participant to differentiate between cutting off in order to harm, versus cutting off without an intention to harm. The anger generated in a particular situation is the key factor to identifying the motive or lack of motive. Was the individual provoked? Our measures must be very precise to

use this framework. And it is questionable whether an individual's memory would be accurate enough to recall the number of incidents in both categories.

Progress has been made toward constructing an operational definition of aggressive driving, but further research investigating the motivations that lie behind these behaviors may lend some momentum towards establishing a generally accepted definition. For the purposes of this project, aggressive driving will be defined as any willful act that may cause harm to another driver, in concordance with Tasca's (2000) catalog. This is both the broadest and most precise definition, and therefore includes the most behaviors, increasing the likelihood of finding associations between these behaviors and aggressive driving motivations.

Aggressive Driving Motivations

The broad range of aggressive behaviors included in the various definitions of aggressive driving have an equally diverse range of motivations that may fuel those behaviors. For example, if a driver encounters a slow moving vehicle on a single lane highway, a dangerous move to pass the other vehicle could be driven by a number of motives: impatience to get to the destination more quickly, a means to express annoyance or distain, to punish the other driver for a perceived insult, to teach the other driver a lesson, or it could be motivated by a desire to experience the thrill of a dangerous situation. Differentiating between aggressive driving motivations would enable researchers to more accurately address the causes of the behavior. There has only been one attempt to empirically differentiate between aggressive driving motivations. Ho and Gee (2008) found a three-factor structure representing the motives underlying aggressive driving behavior: driving fast/risking taking, confidence in one's driving skills, and disrespect for traffic laws. However, these factors seem to describe sets of behaviors, rather than the motives for those behaviors. What kind of person likes to drive fast and take risks? What kind of person is

overconfident in their driving ability or disrespects traffic laws? To answer these kinds of questions, we need to look at the personality factors that underlie why people engage in the aggressive behaviors. The personality factors most likely to be useful in explaining aggressive driving behavior are narcissism and rigidity.

Narcissism

Some researchers interested in the motivational factors behind aggressive driving have focused on identifying personality traits that may predispose an individual to engage in riskier and more aggressive driving behaviors. In clinical settings, descriptions of narcissism have emphasized vanity, self-preoccupation, arrogance, and entitlement as the key characteristics of this personality type (Cain, Pincus, & Ansell, 2008; Ronningstam, 2005; Westen, 1990). Narcissists are overly concerned with attention and approval from others, and respond to criticism or threat to their self-esteem with feelings of anger, embarrassment, or humiliation. Narcissism is also characterized by disturbances in interpersonal relationships, often because narcissistic individuals communicate a sense of entitlement, tend to exploit others, and fail to empathize (Rhodewalt & Morf, 1995).

Narcissism and Aggression. A consistent relationship has been found between narcissistic personality traits and general aggression (Baumeister, Bushman, & Campbell, 2000; Bushman & Baumeister, 1998; Konrath, Bushman, & Campbell, 2006; Malkin, Zeigler-Hill, Barry & Southard, 2013; Reidy, Foster, & Zeichner, 2010; Reidy, Zeichner, Foster, & Martinez, 2008; Rhondewalt & Morf, 1998; Stucke & Sporer, 2002; Twenge & Campbell, 2003). Bushman and Baumeister (1998) found that very high positive self-views were predictive of violence and aggression when an individual is provoked. They posited that individuals who hold unreasonably high and idealistic views of themselves may be more apt to use aggression to defend and

maintain their inflated self-views (Baumeister, Bushman, & Campbell, 2000). Narcissists are strongly motivated by a need to confirm and maintain their own self-views and other's positive perceptions of them. This need renders them both arrogant, and paradoxically also vulnerable, continually in a defensive posture to protect their fragile self-concept. Narcissists have been found to respond aggressively to provocation (Bushman & Baumeister, 1998), but also are more likely to be unprovoked aggressors than their low narcissism peers (Reidy et al., 2010).

More specifically, narcissism traits have also proven useful in predicting aggression in the driving context (Edwards, Warren, Tubré, Zyphur, & Hoffner-Prillaman, 2013; Lustman, Wiesenthal, & Flett, 2010; Schreer, 2002). Narcissism was found to be a unique predictor of aggressive driving above and beyond driving anger (Edwards et al., 2013). Schreer (2002) found that different components of narcissism predicted belligerent driving behavior depending on gender. Men high on the entitlement dimension of narcissism (e.g., "I insist upon getting the respect that is due me") and women high on the exhibitionism dimension (e.g., "I really like to be the center of attention") reported greater amounts of aggressive driving. More recently, Lustman et al., (2010) found that narcissists were more likely to respond with aggression when presented with provoking driving scenarios. Participants were asked to rate their anger in response to the scenarios, and how they would likely respond, with response options ranging from doing nothing, to getting out of the car and confronting the other driver. Controlling for anger, individuals high in narcissism responded with more aggression to the provoking scenarios than those low in narcissism.

Importantly, recent research has identified two aspects of narcissism that may distinguish two routes to aggressive behavior, namely, narcissistic *grandiosity* and *vulnerability* (Cain et al., 2008). Grandiose narcissism is distinguished by overconfidence, exhibitionism, self-promotion,

and manipulation. Alternatively, vulnerable narcissism is characterized by self-centeredness, suspicion, insecurity, and resentfulness (Pincus & Lukowitsky, 2010; Miller & Campbell, 2008; Wink, 1991). Empirical research has demonstrated that narcissistic individuals differ on these two dimensions. Wink (1991) performed a factor analysis on multiple self-report measures and spousal reports of personality. Both dimensions of narcissism were positively related to being viewed as "arrogant," "argumentative," and "opportunistic," however grandiose and vulnerable narcissism diverged on other attributes. Only vulnerability positively predicted being viewed by one's spouse as "complaining," "bitter," and "defensive," and only grandiosity positively predicted being viewed as a "show-off," "egotistical," and "assertive." Other studies have replicated these findings in various populations, and have demonstrated that grandiosity is related to dominance, low emotional distress, and high self-esteem, whereas vulnerability is related to introversion, high emotional distress, and low self-esteem. Both grandiosity and vulnerability share a common core of entitlement and self-absorption (Glover, Miller & Lynam, 2012; Krizan & Johar, 2012; Miller, Hoffman, Gaughan, Gentile, Maples, & Campbell, 2011; Rathvon & Holstrom, 1996; Wink, 1991).

The literature is mixed on whether grandiose or vulnerable narcissists are more prone to behave aggressively. Vulnerable narcissism has been shown to predict reactive and displaced aggression when the narcissist is provoked (Krizan & Johar, 2015). Okada (2010) used a social rejection paradigm to examine the anger and aggression responses of different types of narcissists. He found that after remembering their own socially rejected experience, vulnerable narcissists felt more anger and hostility and tended to retaliate with a more negative evaluation of the person who provoked them than did grandiose narcissists. In that study, vulnerable narcissists were also more likely to use indirect aggression than grandiose narcissists, who were more likely

to use overt physical or verbal aggression. The most commonly used measure of narcissism, the Narcissistic Personality Inventory (NPI; Rasking & Hall, 1981) captures only grandiose narcissism, not vulnerability (Krizan & Johar, 2012). Many studies that have utilized the NPI have shown that grandiose narcissism also predicts aggressive behavior (Bushman & Baumeister, 1998; Konrath, Bushman & Campbell, 2006; Lustman et al., 2010; Reidy, Foster & Zeichner, 2010; Twenge & Campbell, 2003).

These two sub-types of narcissism have not yet been studied in the driving context. Grandiose and vulnerable narcissists may differ in their driving behavior in a number of ways. It is possible that vulnerable and grandiose narcissists' aggression may depend upon the specific situation they are in. They could also choose different aggressive responses in the same situations, or they may differ in the amount of anger experienced or aggression exhibited in a provoking driving scenario. While vulnerable narcissists may be more apt to use indirect aggression (Okada, 2010), it may be that the anonymity of driving could free them to act more explicitly in their aggressive responses.

Narcissistic Motives. Because of these differing facets of narcissism, various motives may be a source for aggression for a narcissist in the driving context. For example, grandiose narcissists may be motivated to compete with other drivers on the road (competitiveness), to show off their driving skills (exhibitionism), or to assert their superiority and dominance (manipulation) when offended by other drivers. Both vulnerable and grandiose narcissists could be motivated by ego-defensiveness, though one may come from a posture of defensiveness and suspicion associated with low self-esteem, whereas the other may come from a preemptive reinforcement of high self-esteem. Entitlement, a core sub-trait of both types of narcissism, has been strongly associated with perceived aggression by close others (Malkin et al., 2013), self-

reports of aggression (Krizan & Johar, 2012; 2015), and direct aggression in the form of delivering electric shocks in a laboratory setting (Reidy et al., 2008). Therefore, to extrapolate to the driving context, it is possible that both vulnerable and grandiose narcissists may act aggressively if they feel they are not getting what they deserve in the way of courtesy and right of way from other drivers.

Rigidity

Defined broadly, rigidity is the tendency to develop a mental or behavioral set, and continuing to use that set in the face of pressure to change (Schultz & Searleman, 2002). Rigidity is a multidimensional construct, and there is no universally accepted way to measure it (Steinmetz, Loarer, & Houssemand, 2011). However, many researchers have studied rigidity using various focused measures within their own domains, including attitudes (Stone, Kemmerer & Guetutal, 1984; Levy, 2008); intellectual development (Schaie, 1994); perception (Beer, 1989; Cunningham, Ridley, & Campbell, 1988; Maltby & Lewis, 1996); personality (McCrae, 1996; McCrae & Costa, 1996); political ideology and belief systems (Budner, 1962; Toner, Leary, Asher, & Jongman-Sereno, 2013); problem solving (Luchins, 1942; Stroop, 1935); and social cognition (Kruglanski, Webster, & Klem, 1993; Neuberg & Newsom, 1993). Rigidity is characterized by a pervasive need for structuring one's environment in a more manageable way, preferring routines and familiarity, and resisting change (Steinmetz et al., 2011). Rigid individuals persist in their familiar attitudes and behaviors even when they are no longer adaptive to an altered situation, which prevents the individual from acquiring new patterns of behavior (Schultz & Searleman, 2002). Rigid individuals also show an intolerance for ambiguous situations (Stewin, 1983).

Although not always explicitly identified with rigidity, it can be argued that the specific constructs of intolerance of ambiguity, personal need for structure (PNS), need for closure (NFCS), and close-mindedness may define different aspects of the overarching construct of rigid personality. Using a multi trait-multi method matrix, rigidity was shown to strongly correlate with personal need for structure, almost to the point of being indistinguishable as a separate construct (r= .80, Steinmetz et al., 2011). Several other studies have shown significant correlation coefficients between these constructs: PNS and openness to experience, the converse of close-mindedness (r = -.42, Neuberg & Newsom, 1993); NFCS and Intolerance for Ambiguity scale (r = .29, Webster & Kruglanski, 1994); NFCS and PNS (r = .24, Webster & Kruglanski, 1994); NFCS and openness (r = -.12, Neuberg, Judice & West, 1997). There has only been one factor analysis in the literature that combines some of these constructs (Stenmetz et al., 2011), but the authors only presented a correlated trait correlated uniqueness model without comparing any alternative models. It would be helpful to investigate further how these constructs relate to one another by testing for an overarching construct of rigid personality using a bi-factor model.

Rigidity and Aggression. There is a paucity of research on the broader construct of rigidity and aggression, however there are a few studies that have investigated personality traits associated with rigidity. In Heyman's (1977) study, dogmatism, defined as the relative openness or closed-ness of a belief system, significantly correlated r = .33 with an aggression measure and r = .43 with a measure of hostility (N = 74 men). Biaggio (1980) found that high-anger arousal individuals scored lower on flexibility, and Crowson (2009) found that participants who were higher on need for structure were more likely to exhibit dogmatic aggression. Although these findings are not extensive, there is enough evidence to suggest some relationship between rigidity and aggression. There may not be a strong association between rigidity and aggression in

general, but rigidity may be an antecedent variable associated with anger, which in turn leads to aggression. Particularly in the driving context, rigid individuals may be more prone to become angry, and further may be more motivated to exhibit aggression.

Rigid Motives. Driving a vehicle is a changeable situation, one in which individuals are expected to adapt to fluctuating conditions. If a rigid individual encounters another driver who is not following what he or she views as the "rules of the road," this may create frustration and anger to the point of provoking an aggressive response. The rigid person may feel that they are responsible for enforcing "black and white" rules, or they may take pride in teaching others a lesson. They may be more conservative or use more caution in their driving because they like to feel in control, and when this conservatism conflicts with a driver who wants to drive more recklessly, their behavior may provoke a perfect storm of aggressive interactions.

Vengeance

A fundamental motive for driver aggression may be the desire to punish another driver for a perceived transgression. If an offended party believes that an instigator took dangerous actions or behaved in a manner that was inconsiderate, they are motivated to respond in an aggressive manner in order to retaliate. Driving vengeance has been defined as the purposeful infliction of harm, including physical pain, emotional distress, humiliation, and annoyance on another within the driving environment in response to a perceived offense (Wiesenthal, Hennessy & Gibson, 2000). Research has shown that the perception of being wronged by another driver is a significant factor in the expression of driver aggression (Gulian, Matthews, Glendon, Davies, & Debney, 1989). In both simulated and hypothetical driving situations, drivers with vengeful attitudes have been found to demonstrate higher levels of mild aggression, and also

report more violence in their driving history (Hennessy & Wiesenthal 2001; 2005; Wiesenthal et al., 2000).

Vengeance may be a motive that is an outcome of other personality driven motives. For example, an individual with rigid tendencies may feel that during a driving conflict, the distinct rules and norms that define appropriate driving behavior have been violated, and as such the individual may feel it is their right or duty to punish the offender. It is the event of rule-breaking that drives the desire for vengeance. On the other hand, an offended party with narcissistic tendencies may also feel that a strong reaction on their part is justified in order to defend their personal rights and freedoms (Daly & Wilson, 1988). The reaction of the offended party often times can be of greater severity than the original act because the retaliation is an attempt to exert power over the original offender (Daly & Wilson, 1988; Stuckless & Goranson, 1992). In the case of the narcissist, it would be the desire to exert power or defend one's ego that drives the desire for vengeance. However, both primary motives of rigidity and narcissism can lead to similar outcomes and behavior.

Matching Effects and Persuasive Appeals

Although not a formal theory, the concept of matching between internal representations and external information is one that pervades the social psychological literature. Research in the cognitive domain has demonstrated that our minds are structured to match new information to existing knowledge structures to facilitate the organization and processing of information (Andersen, Moskowitz, Blair & Nosek, 2007). Individuals have better recall for information if their mood is congruent with the mood at the time of encoding (Bower & Forgas, 2000), and they judge outcomes to be more likely if their mood is congruent with their thoughts (Mayer, Gaschke, Braverman & Evans, 1992). In social settings, individuals seek out information that

corresponds to the knowledge they already believe to be true – the confirmation bias (Nickerson, 1998). Individuals also use matching in a systematic, functional way to self-regulate, coordinating their behavior with endeavored goals (Brunstein, Schultheiss, & Grässmann, 1998). In the area of the self, individuals experience a sense of fit when signs in the environment are congruent with their motivational orientation. This sense of fit increases the value assigned by individuals to corresponding cues or messages, thereby increasing the persuasive power of a message (Agrawal & Maheswaran, 2005). The breadth of these examples point to the utility of matching in the human experience.

Similar findings have been demonstrated in the persuasion literature. For example, individual differences in self-monitoring have been linked to the functions that are likely to be fulfilled by the attitudes of high and low self-monitors (Snyder & DeBono, 1985). High self-monitors have a propensity to change their outward behavior to match the needs of the situation, and so are likely to hold attitudes that fulfill a social-adjustive function, a function that helps individuals identify with people they like and to distance themselves from those they do not like. Low self-monitors on the other hand, have a tendency to always display their "true selves," and therefore are more likely to hold attitudes that fulfill a value-expressive function, one that enables the individual to express attitudes that demonstrate their values or self-concept to others. Snyder and DeBono tested whether these differences in attitude function would influence how individuals responded to different persuasive appeals. They found that appeals that focused on the image of a product were more convincing for the high self-monitors (social-adjustive), whereas appeals that focused on the quality of a product were more persuasive for the low self-monitors (value-expressive). This matching of persuasive appeals to the functional bases of the attitudes demonstrates the importance of identifying the motives that drive individuals' attitudes

and behavior. In order to craft effective persuasive messages to change an undesirable behavior, one must first identify the motives to be able to create matching appeals.

The various aggressive driving motivations present a challenge for researchers who aim to reduce aggressive driving behavior. But perhaps parsing out the motivations for aggressive driving in order to address them individually would enable researchers to create a more comprehensive solution than would treating all aggressive drivers the same way. Discovering the motives that fuel aggressive driving will give researchers the tools to change that behavior by matching persuasive appeals to specific motives.

The Present Research

The goal of the current project was to develop an instrument that identifies and differentiates between aggressive driving motives. The focus of this project was on identifying the specific motives of narcissism and rigidity. Vengeance is the response of interest, as it is a motive that may be evoked in either rigid or narcissistic individuals for different reasons. Narcissists may seek vengeance due to their need to defend their ego, but rigid individuals may also seek vengeance to teach others a lesson or to be a self-appointed enforcer of the rules. Rigidity and narcissism have a wide range of potential motives, therefore an instrument assessing these two constructs would have the broadest applicability for constructing persuasive appeals to change aggressive driving behavior.

Validation Goals and Hypotheses

A measure of Aggressive Driving Motivations. Although many measures of aggressive driving attitudes and behavioral responses exists (i.e., Driving Anger Scale, Deffenbacher, Oetting & Lynch, 1994; Dula Dangerous Driving Index, Dula & Ballard, 2003; Motives for

Dangerous Driving Scale, Ho & Gee, 2008), there exists no measure that assesses the personality driven motives behind aggressive driving. The currently available instruments are insufficient for the task of developing matched persuasive appeals aimed at specific populations of aggressive drivers.

A valid measure. Studies 1 and 2 validated the newly created measure of aggressive driving motivations by means of correlations in the expected size and direction with associated personality measures. It was predicted that the Aggressive Driving Motivations Questionnaire (ADMQ) would reflect the identified motives of narcissism and rigidity, and would factor appropriately into those two domains. Additionally, it was expected that the ADMQ scores would have adequate reliability and would evidence satisfactory content, construct, and predictive validity.

A widely applicable measure. Study 2 used a sample from a non-college population in addition to a sample from undergraduate psychology students. This provided additional validity evidence and supported the case for generalizability to the general driving population. It was expected that the factor structure would be confirmed in the non-college population sample.

Application. Study 3 used the Aggressive Driving Motivations Questionnaire to identify the two types of anger-prone drivers, and then asked participants to generate driving scenarios in which they became angry and to respond to a pre-selected set of driving scenarios. They also were asked to report their reasons for becoming angry in each scenario. It was expected that certain scenarios would evoke more anger from high narcissistic individuals relative to high rigid individuals, and vice versa, and that they would also differ in the reasons they used to explain their anger.

CHAPTER 2. PRETESTING: ITEM GENERATION

There was insufficient previous research on the concepts of rigidity and narcissism associated with aggressive driving, therefore several pilot studies were used to establish the viability of these concepts. Pilot Study 1 tested the content validity of potential items for the new instrument and examined the convergent and divergent validity of the potential items. Pilot Study 2 examined the convergent and divergent validity of a second set of items.

Pilot Study 1: Method

Participants

Three hundred forty six participants were recruited from the Psychology Undergraduate Research pool and received course credit in exchange for their participation. Participants had a mean age of 19.77 years, *SD* = 2.63. Participants were 35% male, 65% female; 88% Caucasian, 3% Black, 3% Asian or Pacific Islander, 4% Hispanic, 2% Other. On average, participants drove 4.2 days per week, for an average of 74.8 miles.

Because individuals can sometimes hurry through online surveys without giving much attention to the questions, a "lie" scale was included that was developed by Kruglanski (2012) to assess acquiescence bias when collecting data online. Participants rated 5 items on a Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), e.g. "I have never been late for an appointment or work." If the sum of the items was greater than 15, participants were excluded from analyses (n = 49, 14.2%).

Procedure & Measures

Participants completed the study online using the SONA system. Following the consent form, participants were first presented with the new items designed to assess aggressive driving motivations. Items within each scale were presented randomly. Participants then completed several personality measures associated with narcissism and rigidity, with the scales presented in random order. Next participants answered the "lie" scale, a driving history questionnaire, and demographic items.

Aggressive Driving Motivations Questionnaire

To ensure sufficient breadth in the item pool, a literature search was conducted to identify measures that have been used to assess aggressive driving motivations. Seven items from the Motives for Dangerous Driving Scale (Ho & Gee, 2008) and 6 items from the Dula Dangerous Driving Index (Dula & Ballard, 2003) that were face valid for assessing genuine motivations for aggressive driving behavior, rather than just describing the aggressive behavior itself were included. For example, "I like to weave in and out of slower traffic" is a behavioral item that was not included, but items like "I am a more skillful driver than most other drivers on the road" and "I am always in control of my driving" evaluate attitudes and beliefs of the driver, and thus were logical to include in the initial item pool.

Although not an empirically validated scale, James and Nahl (2000) delineated a typology of drivers with checklists for each type of driver. With permission from the authors, 21 relevant items were adapted from the Automotive Vigilante, Rushing Maniac, and Aggressive Competitor checklists that assessed attitudes and beliefs of the driver. Finally, 40 additional items were created for the item pool by considering descriptions of aggressive driving

experiences and individuals' descriptions of their thoughts while driving aggressively. From all of these sources, a preliminary list of 74 items were developed which participants rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Narcissism Scales

Narcissistic Personality Inventory (NPI). The 16 item short form of the Narcissistic Personality Inventory is the most widespread measure of narcissism used by non-clinical researchers, and captures well the sub-clinical variance in narcissism found in general populations (Ames, Rose, & Anderson, 2006). It presents 16 pairs of statements, and participants are asked to choose one to endorse. Participants rated their agreement with items such as "I like to be the center of attention" versus "I prefer to blend in with the crowd." The NPI-16 score was computed as the mean of the 16 items, with narcissism-consistent responses coded as 1 and inconsistent responses coded as 0.

Pathological Narcissism Scale (PNI). The PNI is a 52 item scale that captures seven dimensions spanning grandiose and vulnerable narcissism (Pincus et al., 2009). Items are rated on a 6-point Likert scale ranging from 0 (*not at all like me*) to 5 (*very much like me*). Example items include "I often fantasize about being admired and respected" and "I hate asking for help." The PNI total score was computed as the sum of all items ($\alpha = .95$), with subscale totals for Contingent Self-Esteem (CSE, $\alpha = .93$), Exploitative (EXP, $\alpha = .78$), Self-Sacrificing Self-Enhancement (SSSE, $\alpha = .79$), Hiding the Self (HS, $\alpha = .79$), Grandiose Fantasy (GF, $\alpha = .87$), Devaluing (DEV, $\alpha = .84$), and Entitlement Rage (ER, $\alpha = .85$).

Psychological Entitlement Scale (PES). The PES is a self-report measure of psychological entitlement, a sub-component of grandiose narcissism (Campbell, Bonacci,

Shelton, Exline, & Bushman, 2004). The scale consists of nine items rated on a 7-point Likert scale, ranging from 1 (*strong disagreement*) to 7 (*strong agreement*). Sample items include "I honestly feel I'm just more deserving than others" and "Things should go my way." The nine items were summed to form a composite score.

Rigidity Scales

Personal Need for Structure Scale (PNS). Individuals differ in their chronic desire for simple structures to help process the world around them (Neuberg & Newsom, 1993). Participants responded to 12 items on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Items (2) "I'm not bothered by things that interrupt my daily routine", (6) "I find that a well-ordered life with regular hours makes my life tedious", and (11) "I enjoy the exhilaration of being in unpredictable situations" were reversed scored such that higher score indicate a greater desire for simple structure. The PNS total score was computed as the sum of all items ($\alpha = .82$), with subscale totals for Desire for Structure (DFS, $\alpha = .65$), and Response to Lack of Structure (RLS, $\alpha = .77$).

Need for Closure Scale (NFCS). The need for closure scale measures an individual's desire for an unambiguous opinion (Kruglanski et al., 1993). The NFCS is a 42 item measure that requires participants to rate the extent to which they agree with statements that reflect a preference for closure (e.g. "I don't like situations that are uncertain") or a preference for avoiding closure (e.g. "I tend to put off making important decisions until the last possible moment"). Ratings were made on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). A composite score was formed by summing across items after reverse scoring items reflecting a preference for avoiding closure.

Openness Scale (NEO-FFI-3). The openness to experience subscale of the NEO-FFI-3 assesses the extent to which a person is open to new experiences and feelings, and has flexibility of thought (Digman, 1990). Openness is also associated with broad mindedness, imagination and curiosity (Barrick & Mount, 1991). Participants rated 12 items on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) scale. Sample items include "I think it's interesting to learn and develop new hobbies" and "I have a lot of intellectual curiosity." After reverse scoring relevant items, responses were summed to form a composite score.

Driving History Questionnaire

Participants were asked to complete a 35 item survey of driving history adapted from Deffenbacher, Huff, Lynch, Oetting, and Salvatore (2000) assessing four types of driving outcomes. Most relevant to the hypotheses are the aggressive driving behavior outcomes (14 items) including estimates of the number of times an individual had purposefully broken or damaged part of a vehicle, argued with a passenger, argued with another driver, fought physically with another driver, drove while very angry, or lost control of anger. It also includes items measuring specific aggressive behaviors: making angry gestures, swearing at another driver, flashing headlights in anger, honking horn in anger, cut another driver off in anger, yelling, driving up close behind another driver, and tailgating. Additionally, participants also answered questions relevant to risky driving behavior (15 items): driven without seatbelt, drinking alcohol and driving, driving drunk, speeding, excessive speeding, passing unsafely, changing lanes unsafely, drifting, switching lanes to speed through, out of turn at a red light or stop sign, illegal turn, driving recklessly, running a red light or stop sign, entering an intersection when light is red, and using a phone while driving. Participants responded by estimating the

frequency they have engaged in the various outcomes in the past three months on a 0 to 5 or more scale.

Pilot Study 1: Results

Content Validity

A small sample of fifteen undergraduate research assistants assessed the content validity of the Aggressive Driving Motivations Questionnaire items using a substantive validity approach, an approach that is particularly suited to theory testing and development research in applied settings. Substantive validity is the extent to which a measure is judged to reflect or be theoretically linked to the construct of interest (Anderson & Gerbing, 1991). Participants were asked to sort the Aggressive Driving Motivations Questionnaire items into the predicted categories of narcissistic driving motivations, rigid driving motivations, and a third category of other motivations using the following instructions and definitions:

> *Please read the following items and for each decide if it describes a narcissistic motivation, a rigid motivation, or other motivation.*
>
> *Narcissistic motivations: An individual's reasons for his/her actions are self-centered, based on feelings of entitlement, wanting to show off, arrogance, or right to command.*
>
> *Rigid motivations: An individual's reasons for his/her actions are based on rule-following, close-mindedness, being inflexible or strict, having a low tolerance for uncertainty or high preference for order, or fear of being wrong.*
>
> *Other: If you do not think the item fits in either category, choose this option.*

The proportion of substantive agreement is defined as the proportion of participants who assign an item to its intended construct. Items that are correctly sorted by most participants (e.g., 75% rule) were considered acceptable and were used in the next set of analyses. All items are shown in Table 1.

Table 1

Items sorted into categories: Narcissistic, Rigid, and Other Motivations

	Narcissistic	Rigid	Other
52. I have no problems exceeding the speed limit because I know I am a good driver.	15	0	0
16. I can force my way into any lane by being pushy.	15	0	0
43. Other drivers need to get out of my way because I am the most important driver on the road.	15	0	0
18. I feel good when I can cut in at the front of a line of cars.	15	0	0
62. I like to show off my driving skills to my passengers.	14	0	1
63. I can drive any way I want to.	14	0	1
47. I'm not worried about speeding, I can talk my way out of a ticket.	14	0	1
53. I am a more skillful driver than most other drivers on the road.	14	0	1
31. I have a right to be angry at drivers who inconvenience me.	14	0	1

Table 1 continued

	Narcissistic	Rigid	Other
14. I see other cars as obstacles in my way that I need to get around.	14	1	0
29. When I see a merge sign, I pass all of those suckers waiting in line and cut to the front.	14	1	0
64. Other drivers recognize that they need to get out of my way.	13	0	1
75. When someone cuts me off, I feel I should punish that driver.	13	0	2
76. I feel it is my right to get where I need to go as quickly as possible.	13	1	1
34. I like to give aggressive drivers "a taste of their own medicine."	13	2	0
15. I really hate it when traffic is congested and I can't get ahead of others because I feel like I'm losing.	13	0	2
73. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me.	12	2	0
19. Other drivers intentionally try to slow me down or block my way.	12	1	1
22. When a faster vehicle comes up behind me, I am reluctant to let them pass.	12	0	2

Table 1 continued

	Narcissistic	Rigid	Other
9. It's no big deal to hold up a long line of drivers on a one-lane road. I'll go the speed I want.	12	2	1
58. It is okay to violate traffic laws.	11	0	4
56. Exceeding the speed limit by 10 mph is no big deal.	11	0	4
25. If I give into another driver's pushiness, the other driver wins.	11	0	4
48. I am more skilled than the average driver.	11	0	2
77. I feel that passive drivers should learn how to drive or stay home.	11	1	2
21. I don't care if my driving makes others angry.	11	2	1
33. It is my duty to teach bad drivers a lesson.	11	3	1
32. I am constantly on the lookout for incompetent drivers on the road who will slow me up.	11	4	0
24. I view other drivers' aggressiveness as a personal challenge to best them.*	5	0	0
51. Traffic laws are black and white; you're either following them or you're not.	0	14	1

Table 1 continued

	Narcissistic	Rigid	Other
8. I insist on driving at the speed limit in the passing lane because it's the law.	0	14	1
66. It is important for everyone to obey the rules of the road.	0	14	1
23. I'm often annoyed by other drivers who don't follow the rules of the road.	0	14	1
70. Following the rules makes me a better driver.	0	13	2
49. I feel safe when I'm following the rules of the road.	0	13	2
65. I like knowing what to expect on the road.	0	13	2
45. I am a cautious driver.	0	12	2
28. When I see a merge sign, I get over as soon as I can because that's the correct way to drive.	1	12	1
27. Drivers who don't follow the rules infuriate me.	2	12	1
2. You need to retaliate against aggressive drivers in order to maintain law and order on highways.	3	11	1

Note. *Item 24 was inadvertently left off the first set of surveys, so only 5 participants rated it.

Correlations

The correlations between the personality scales are shown below in Table 2. The Narcissistic Personality Inventory, Pathological Narcissism Scale and Psychological Entitlement Scale all had significant positive correlations, as expected. The Personal Need for Structure Scale and Need for Closure Scale were also very strongly positively correlated. The Openness scale correlated negatively with the PNS and NFCS scales as expected, but also correlated positively with the PNS and negatively with the PES, and as such may not be the most reliable measure for discriminating between items. Therefore only the PNS and NFCS were used, and the Openness correlations were not used to evaluate the correlation patterns. Correlations between the personality scales and aggressive and risky driving behaviors from the Driving History Questionnaire are also shown in Table 2.

Table 2

Pilot Study 1: Personality Scale and Demographic Correlations

	1	2	3	4	5	6	7	8	9	10	11	Mean	*SD*
1. Narcissistic Personality Inventory	.74	.29**	.38**	-.09	.06	-.04	-.15*	.06	.03	.28**	.31**	-.23	.19
2. Pathological Narcissism Scale		.95	.34**	.29**	.36**	.12*	.02	-.01	-.01	.17**	.16**	124.44	38.25
3. Psychological Entitlement Scale			.89	.15*	.19**	-.27**	.06	.02	-.04	.29**	.17**	19.69	9.74
4. Personal Need for Structure Scale				.82	.75**	-.14*	.23**	.08	.04	.00	-.05	21.08	7.79
5. Need for Closure Scale					.84	-.23**	.21**	-.04	.08	.07	.05	44.33	18.07
6. Openness						.80	-.03	.08	-.03	-.26**	-.21**	13.41	7.03
7. Gender							-	-.10	-.11	-.08	-.13*	.65	.48
8. Age								-	.26**	-.01	.03	19.77	2.63
9. Miles per week									-	.07	.11	74.80	111.94
10. Past Aggressive Driving Behaviors										.85	.69**	9.58	9.77
11. Past Risky Driving Behaviors											.88	14.93	12.20

*p < .05, **p < .01, Gender (0 = Male, 1 = Female), α on diagonal

As an initial assessment of convergent and divergent validity, the individual items that were retained from the content validity study were correlated with the personality scales. Rigid items were predicted to correlate positively with the Personal Need for Structure Scale and Need for Closure Scale scales, and negatively with the Openness scale, and have no correlation with the Narcissistic Personality Inventory, Pathological Narcissism Scale, Psychological Entitlement Scale scales. The narcissistic items were predicted to correlate positively with the NPI, PNS, and PES scales and have no correlation with the other three. Correlations are shown in Tables 3 and 4.

Table 3

Pilot Study 1: Rigid Item Correlations

	PNS	NFCS	OPEN	NPI	PNI	PES
51. Traffic laws are black and white; you're either following them or you're not.	.06	.08	-.03	.00	-.03	-.05
8. I insist on driving at the speed limit in the passing lane because it's the law.	.14*	.04	-.05	-.12*	.05	.06
66. It is important for everyone to obey the rules of the road.	.24**	.17**	.23**	-.20**	.07	-.12*
23. I'm often annoyed by other drivers who don't follow the rules of the road.	.26**	.16**	.15*	-.12*	.13*	-.01
70. Following the rules makes me a better driver.	.23**	.14*	.16**	-.09	.05	-.06
49. I feel safe when I'm following the rules of the road.	.23**	.19**	.17**	-.09	.07	-.13*
65. I like knowing what to expect on the road.	.20**	.23**	.16**	-.05	.21**	-.08
45. I am a cautious driver.	.18**	.07	.23**	-.25**	.03	-.10
28. When I see a merge sign, I get over as soon as I can because that's the correct way to drive.	.12*	.12*	.18**	-.09	.10	-.06

Table 3 continued

	PNS	NFCS	OPEN	NPI	PNI	PES
27. Drivers who don't follow the rules infuriate me.	.26**	.20**	.02	-.09	.15*	.05
2. You need to retaliate against aggressive drivers in order to maintain law and order on highways.	-.09	-.05	-.19**	.16**	.11	.28**

Note. *p < .05. **p < .01. Bolded items follow the predicted pattern, italicized items follow an alternate pattern.

Table 4

Pilot Study 1: Narcissistic Item Correlations

	NPI	PNI	PES	PNS	NFCS	OPEN
52. I have no problems exceeding the speed limit because I know I am a good driver.	.29**	.17**	.21**	.00	.11	-.09
*16. I can force my way into any lane by being pushy.^*	.30**	.14*	.22**	-.17**	-.11	-.15*
43. Other drivers need to get out of my way because I am the most important driver on the road.	.33**	.15**	.46**	-.04	.10	-.22**
18. I feel good when I can cut in at the front of a line of cars.	.18**	.13*	.17**	-.11	.02	-.05
62. I like to show off my driving skills to my passengers.	.09	.16**	.13*	-.12*	-.02	-.08
63. I can drive any way I want to.	.20**	.08	.33**	-.11	-.05	-.17**
47. I'm not worried about speeding, I can talk my way out of a ticket.	.20**	.02	.22**	-.13*	.01	-.20**
53. I am a more skillful driver than most other drivers on the road.	.31**	.13*	.23**	.03	.11	-.11

Table 4 continued

	NPI	PNI	PES	PNS	NFCS	OPEN
31. I have a right to be angry at drivers who inconvenience me.	.12*	.25**	.20**	.06	.21**	-.08
14. I see other cars as obstacles in my way that I need to get around.	.24**	.26**	.27**	-.02	.09	-.11
29. When I see a merge sign, I pass all of those suckers waiting in line and cut to the front.	.18**	.16**	.28**	-.06	.00	-.15*
64. Other drivers recognize that they need to get out of my way.	.27**	.21*	.33**	-.01	.08	-.08
75. When someone cuts me off, I feel I should punish that driver.	.22**	.22**	.29**	-.02	.08	-.16**
76. I feel it is my right to get where I need to go as quickly as possible.	.24**	.22**	.33**	.04	.11	-.16**
34. I like to give aggressive drivers "a taste of their own medicine."	.17*	.20**	.28**	-.05	.08	-.17**
15. I really hate it when traffic is congested and I can't get ahead of others because I feel like I'm losing.	.20**	.26**	.24**	-.02	.15**	-.16**

Table 4 continued

	NPI	PNI	PES	PNS	NFCS	OPEN
73. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me.	.21**	.26**	.24**	-.08	.05	-.17**
19. Other drivers intentionally try to slow me down or block my way.	.17**	.23**	.31**	.02	.14*	-.19**
22. When a faster vehicle comes up behind me, I am reluctant to let them pass.	.10	.21**	.21**	.04	.07	-.17**
9. It's no big deal to hold up a long line of drivers on a one-lane road. I'll go the speed I want.	-.08	-.08	.07	.05	-.06	.01
58. It is okay to violate traffic laws.	.21**	.16**	.14*	-.17**	-.07	.01
56. Exceeding the speed limit by 10 mph is no big deal.	.22**	.16**	.23**	-.03	.01	-.04
25. If I give into another driver's pushiness, the other driver wins.	.17**	.26**	.30**	.00	.12*	-.09
48. I am more skilled than the average driver.	.30**	.01	.21**	-.04	.08	-.13*
77. I feel that passive drivers should learn how to drive or stay home.	.17**	.28**	.33**	.08	.15*	-.20**

Table 4 continued

	NPI	PNI	PES	PNS	NFCS	OPEN
21. I don't care if my driving makes others angry.	.19**	.05	.28**	-.06	.03	-.19**
33. It is my duty to teach bad drivers a lesson.	.15**	.11	.32**	-.03	.07	-.10
32. I am constantly on the lookout for incompetent drivers on the road who will slow me up.	.19**	.24**	.18**	-.03	.07	-.10
24. I view other drivers' aggressiveness as a personal challenge to best them.	.14*	.18**	.29**	-.01	.05	-.21**

Note. *p < .05. **p < .01. Bolded items follow the predicted pattern, italicized items follow an alternate pattern. ^This item may be confounded with aggressive driving behavior. If it drives the relationship between the scale and driving behavior, it will need to be removed.

One pattern of note was the lack of correlation for the Pathological Narcissism Scale on several narcissistic items that did have positive correlations for the Narcissistic Personality Inventory and Psychological Entitlement Scale. Correlations between these specific items and the subscales of the PNI were examined, which revealed positive correlations with the Exploitative subscale for four of the five items (Item 63, $r = .17$, $p < .01$; Item 47, $r = .18$, $p < .01$; Item 48, $r = .24$, $p < .01$; Item 21, $r = .13$, $p < .01$), and a positive correlation with the Devaluing and Entitlement Rage subscales for the fifth item (Item 33, $r_{DE} = .23$, $p < .01$; $r_{ER} = .24$, $p < .01$). These items were included in the expected pattern group.

There were a sufficient number of narcissistic items (noted in bold) that correlated with the personality scales in the expected pattern, but there were not a satisfactory number of rigid items that met the construct validity criteria of 75% agreement and correlated in the expected pattern. Notably, there were many items that had positive correlations with the predicted scales, but also had negative correlations with the opposing personality scales. One could make the argument that there should be a negative correlation between rigid motivations and narcissistic motivations in the specific context of driving. Rigid individuals could be characterized as obsessed with following the rules, but narcissistic individuals may have the opposite attitude in the driving context - they only care about getting things their way, and may ignore the rules if they do not serve their goals. Items that fit this second pattern of a negative correlation (instead of no correlation) for opposing personality scales are noted in italics. Because of the lack of rigid items fitting either pattern, a new set of rigid items were created and a second pilot study was conducted.

Internal Consistency. For the 20 narcissistic items that fit one of the convergent and discriminant validity patterns, Cronbach's alpha was estimated as an index of internal

consistency, $\alpha = .89$. The items had similar variances, so it was not necessary to compute a standardized alpha. There were no items that significantly lowered alpha, and so all 20 items were retained for the first dissertation study.

Pilot Study 2: Method

Participants

Sixty-four students from the Social Cognition class participated in a class demonstration for the second pilot study in exchange for class credit. Participants had a mean age of 21.36 years, *SD* = 3.20. Participants were 37.5% male, 62.5 female; 86% Caucasian, 3% Black, 8% Asian or Pacific Islander, 1.5% Hispanic, 1.5% Other. The "lie" scale (Kruglanski, 2012) was used with the same cutoff criteria. Five participants (7.8%) whose sum was larger than 15 were excluded.

Procedure & Measures

Participants completed the study online using the same procedures and Pilot Study 1. Following the consent form, participants were first presented with the new rigid items along with the acceptable rigid items from Pilot Study 1 in a random order. They then completed the Psychological Entitlement Scale and the Personal Need for Structure Scale, randomly ordered. Next participants answered the "lie" scale and demographic items.

Psychological Entitlement Scale (PES). The scale consists of nine items rated on a 7-point Likert scale, ranging from 1 (*strong disagreement*) to 7 (*strong agreement*). The nine items were summed to form a composite score.

Personal Need for Structure Scale (PNS). Participants responded to 11 items on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Items (2) "I'm not bothered by things that interrupt my daily routine", (5) "I find that a well-ordered life with regular hours makes my life tedious", and (10) "I enjoy the exhilaration of being in unpredictable situations"

were reversed scored such that higher score indicate a greater desire for simple structure. The PNS total score was computed as the sum of all items.

Pilot Study 2: Results

Correlations

The individual rigid items were correlated with the personality scales as an initial indicator of convergent and divergent validity. Rigid items were expected to correlate positively with the Personal Need for Structure Scale, and have no correlation or a small negative correlation with the Psychological Entitlement Scale. Correlations are shown in Table 5.

Table 5

Pilot Study 2: Rigid Item Correlations

	PNS	PES
1. Traffic laws are black and white; you're either following them or you're not.	.32*	.19
2. It is important for everyone to obey the rules of the road.	.36**	-.18
3. Following the rules makes me a better driver.	.06	.03
4. I feel safe when I'm following the rules of the road.	.42**	-.06
5. I like knowing what to expect on the road.	.35**	.00
6. I'm often annoyed by other drivers who don't follow the rules of the road.	.12	.00
7. Drivers who don't follow the rules infuriate me.	.21	-.01
8. I am a cautious driver.	.17	-.03
9. Traffic laws exist for a reason and they should be followed by everyone.	.25	.01
10. I feel comfortable driving because traffic laws exist.	.03	.09

Table 5 continued

	PNS	PES
11. I don't like it when other drivers don't follow the rules.	.31*	.10
12. I have difficulty understanding why people break traffic laws.	.29*	.12
13. I don't like being around drivers who can't follow the rules.	.40**	.14
14. I don't like it when people drive unpredictably.	.41**	.04
15. I would never doubt (or question) the rules of the road.	.32*	.20
16. When it comes to traffic accidents, the driver not following the rules is always at fault.	.22	-.08
17. Rules of the road should only be followed when they help you get there as quickly as possible.	.10	-.12
18. A driver who doesn't follow the rules is a bad driver.	.25	-.02
19. I feel uncomfortable when the rules of the road are not clear.	.47**	.21
20. I'm not bothered when my driving routine is interrupted.	.10	.13
21. It excites me to be around unpredictable drivers.	.23	-.13

Table 5 continued

	PNS	PES
22. I feel uncomfortable when I don't understand why another person is driving aggressively.	.20	-.02
23. Everyone should drive cautiously.	.21	-.23
24. There are many styles of driving that are equally safe.	.08	-.01
25. I feel uncomfortable when it's not clear who is at fault.	.22	.02
26. People should be ticketed if they don't follow the law.	.54**	.02
27. I always follow traffic laws.	.24	-.17

Note. *p < .05. **p < .01. Bolded items follow the predicted pattern.

Keeping four items from Pilot Study 1 and adding seven new ones from Pilot Study 2, there are now a sufficient number of rigid items that correlate with the personality scales in the expected pattern.

Internal Consistency. For the 11 rigid items, Cronbach's alpha was estimated as an index of internal consistency, $\alpha = .83$. The items had similar variances, so it was not necessary to compute a standardized alpha. There were no items that significantly lowered alpha, and all 11 items were retained in Study 1.

CHAPTER 3: STUDY 1: ITEM SELECTION

The purpose of Study 1 was to validate the results from the pilot studies and compile additional validity evidence for the items of the Aggressive Driving Motivations Questionnaire (ADMQ). Specifically, an exploratory factor analysis was performed to discover the factor structure of the items and finalize the items to be included in the instrument.

Method

Participants

Three hundred seventy-nine participants were recruited from the Psychology Undergraduate Research pool and received course credit in exchange for their participation. The rule of thumb for number of participants for an exploratory factor analysis is ten participants for every item (Nunnally, 1978). Thirty-one items were retained from the pilot studies. The "lie" scale (Kruglanski, 2012) was again included to reduce acquiescence bias in the online sample. For 79 participants (20.8%) the sum of the items was greater than 15, therefore those participants were excluded from analyses, leaving a sample of 300 participants. Participants had a mean age of 19.48 years, *SD* =2.37. Participants were 44% male, 56% female; 84% Caucasian, 3% Black, 5% Asian or Pacific Islander, 4% Hispanic, 3% Other. On average, participants drove 3.9 days per week, for an average of 56.3 miles.

Procedure

Participants completed the study online using the SONA system. Following the consent form, participants were first presented with the items from the pilot studies in random order that are designed to assess aggressive driving attitudes and motivations. They then completed the personality measures associated with narcissism and rigidity in random order, using the same

measures as in the pilot studies. In addition to the rigidity measures in the pilot studies, a fourth measure was added, the Intolerance for Ambiguity Scale, to better capture the full breadth of the rigid personality construct. Next participants answered the "lie" scale, trait anger measures and a Self-Control Scale to be used as control measures, and finally the driving behavior questionnaire and demographic items.

Measures

Narcissistic Personality Inventory (NPI). The 16 item short form of the Narcissistic Personality Inventory presents 16 pairs of statements, and participants are asked to choose one to endorse. The NPI-16 score was computed as the mean of the 16 items, with narcissism-consistent responses coded as 1 and inconsistent responses coded as 0.

Pathological Narcissism Scale (PNI). The PNI is a 52 item scale with items rated on a 6-point Likert scale ranging from 0 (*not at all like me*) to 5 (*very much like me*). The PNI total score was computed as the sum of all items.

Psychological Entitlement Scale (PES). The scale consists of nine items rated on a 7-point Likert scale, ranging from 1 (*strong disagreement*) to 7 (*strong agreement*). The nine items were summed to form a composite score.

Personal Need for Structure Scale (PNS). Participants responded to 11 items on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Items (2) "I'm not bothered by things that interrupt my daily routine", (5) "I find that a well-ordered life with regular hours makes my life tedious", and (10) "I enjoy the exhilaration of being in unpredictable situations" were reversed scored such that higher score indicate a greater desire for simple structure. The PNS total score was computed as the sum of all items.

Need for Closure Scale (NFCS). The need for closure scale is a 42 item measure that requires participants to rate the extent to which they agree with statements that reflect a preference for closure (e.g. "I don't like situations that are uncertain") or a preference for avoiding closure (e.g. "I tend to put off making important decisions until the last possible moment"). Ratings were made on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). A composite score was formed by summing across items after reverse scoring items reflecting a preference for avoiding closure.

Intolerance for Ambiguity Scale (IAS). The IAS consists of a 16 item Likert scale that assesses the tendency of an individual to perceive ambiguous situations as a source of threat (Budner, 1962). To these individuals, situations that are not easily structured or categorized are undesirable – either because of their novelty and unfamiliarity, or because of the complexity or contradictory nature of a situation. Example items include "There is really no such thing as a problem that can't be solved" and "Often the most interesting and stimulating people are those who don't mind being different and original." Participants rated their agreement on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Negative items were reverse scored so that higher scores indicate intolerance for ambiguity, and a total sum computed.

Self-Control Scale. The Self-Control Scale consists of a 10 item Likert scale that assesses how well individuals control thoughts, emotions, impulses, and performance (Tangney, Baumeister, & Boone, 2004). Example items include "I have a hard time breaking bad habits" and "I'm good at resisting temptation." Participants rated their agreement on a 5-point scale ranging from 1 (*not at all like me*) to (*very much like me*). Negative items were reverse scored so that higher scores indicate higher self-control, and an average score computed.

State Trait Anger Expression Inventory (STAXI). The STAXI consists of two subscales: state anger, which refers to the emotional state of feeling angry, and trait anger, which is defined as the predisposition to experience state anger in a wide range of situations with relatively high frequency (Spielberger, 1996). Participants rated their trait anger on 10 items (e.g. "I am quick tempered"), with responses ranging from 1 (*almost never*) to 4 (*almost always*). Responses were summed to form a composite score.

Driving Anger Scale (DAS). The DAS measures a stable personality trait that is related to trait anger, but more narrowly defined as a tendency to become more easily angered in the driving context (Deffenbacher, Oetting & Lynch, 1994). Participants rated the extent to which 14 imagined incidents would provoke feelings of anger on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*very much*). For example, participants are instructed to imagine that "someone honks at you about your driving" or "you are stuck in a traffic jam," and then are asked to rate their anger resulting from that scenario. A composite score was formed by summing across the items.

Driving History Questionnaire. Participants were asked to complete a 35 item survey of driving history adapted from Deffenbacher, Huff, Lynch, Oetting, and Salvatore (2000) assessing four types of driving outcomes. Most relevant to the hypotheses are the 14 items assessing aggressive driving behavior outcomes, and the 15 items relevant to risky driving behavior. Participants responded by estimating the frequency they have engaged in the various outcomes in the past three months on a 0 to 5 or more scale.

Results

Item Selection

Correlations with IAS. First, the correlations of the 31 items with the Intolerance for Ambiguity Scale were examined; see Table 6 for the narcissism item correlations below. The narcissism items that had significant positive correlations with the IAS were removed, leaving 11 rigid items and 10 narcissism items. Two pairs of the remaining narcissism items appeared to be too similar, so one of each of the pairs was dropped, keeping "I have no problems exceeding the speed limit because I know I am a good driver" and "I am a more skillful driver than most other drivers on the road," and dropping "Exceeding the speed limit by 10 mph is no big deal" and "I am more skilled than the average driver."

Table 6

Narcissistic Item Correlations with IAS

Items	IAS
N52. I have no problems exceeding the speed limit because I know I am a good driver.	.09
N16. I can force my way into any lane by being pushy.	.05
N18. I feel good when I can cut in at the front of a line of cars.	.03
N63. I can drive any way I want to.	.13*
N47. I'm not worried about speeding, I can talk my way out of a ticket.	.20*
N53. I am a more skillful driver than most other drivers on the road.	.02

Table 6 continued

Items	IAS
N14. I see other cars as obstacles in my way that I need to get around.	.10
N29. When I see a merge sign, I pass all of those suckers waiting in line and cut to the front.	.12*
N64. Other drivers recognize that they need to get out of my way.	.12*
N75. When someone cuts me off, I feel I should punish that driver.	.04
N76. I feel it is my right to get where I need to go as quickly as possible.	.15**
N34. I like to give aggressive drivers "a taste of their own medicine."	.12*
N73. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me.	.12*
N58. It is okay to violate traffic laws.	.08
N56. Exceeding the speed limit by 10 mph is no big deal.	.07
N48. I am more skilled than the average driver.	.04
N21. I don't care if my driving makes others angry.	.02
N33. It is my duty to teach bad drivers a lesson.	.13*
N32. I am constantly on the lookout for incompetent drivers on the road who will slow me up.	.10

Table 6 continued

Items	IAS
N24. I view other drivers' aggressiveness as a personal challenge to best them.	.12*

Note. *p < .05. **p < .01.

Exploratory Factor Analysis. It was expected that an exploratory factor analysis (EFA) using a maximum likelihood factor extraction with an oblique rotation would extract two constructs that have a small negative significant correlation: Narcissistic Driving Motivations, and Rigid Driving Motivations. The first exploratory factor analysis showed three rigid items did not load onto either of the first two factors, so those three items were dropped – "I would never doubt or question the rules of the road," "I have difficulty understanding why people break traffic laws," and "Traffic laws are black and white; you're either following them or you're not." A second EFA was conducted, revealing two factors that are somewhat negatively correlated (r = -.22), see Table 7. The scree plot indicates that two or three factors should be interpreted (see Figure 1). Because of the ambiguity of the scree plot, a parallel analysis was used to determine the number of interpretable factors. The parallel analysis compares 1000 randomly generated datasets with the same number of variables and cases as the current dataset. The randomly generated eigenvalues were compared with the eigenvalues from the collected dataset, and only the factors that had eigenvalues greater than those generated were retained. The parallel analysis yielded a three factor structure. The pattern was mostly clear with the majority of rigid items loading on factor 1 and most narcissism items loading on factor 2, with the exception of N58 cross-loading negatively on the rigid factor. Factor 3 could be a negative wording factor. The last

four items do not fit as well with the rigid and narcissism factors, but associate more strongly with the negative wording factor.

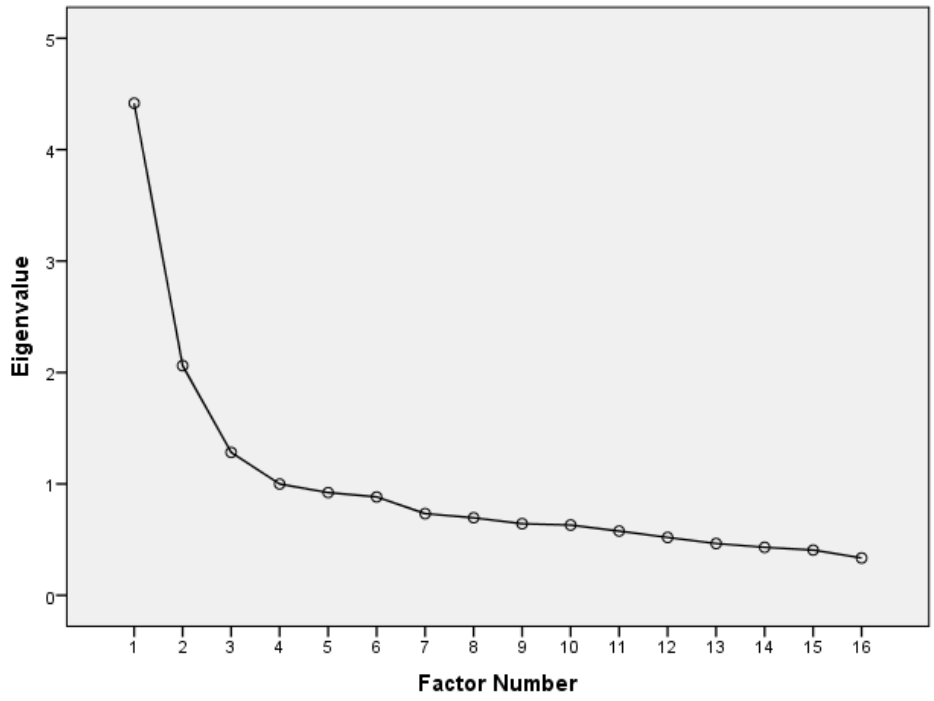

Figure 1. Scree Plot of Eigenvalues for Exploratory Factor Analysis

Table 7

Exploratory Factor Analysis Pattern Matrix, Oblique Rotation

Factor	1	2	3
R13. I don't like being around drivers who can't follow the rules.	.686	.194	-.213
R2. It is important for everyone to obey the rules of the road.	.658	-.084	-.160
R14. I don't like it when people drive unpredictably.	.602	.077	.007

Table 7 continued

Factor	1	2	3
R26. People should be ticketed if they don't follow the law.	.583	-.059	-.010
R5. I like knowing what to expect on the road.	.534	-.119	.197
R11. I don't like it when other drivers don't follow the rules.	.485	.111	-.228
R4. I feel safe when I'm following the rules of the road.	.479	-.193	.207
N58. It is okay to violate traffic laws.	-.413	.273	.328
N14. I see other cars as obstacles in my way that I need to get around.	-.137	.662	.057
N75. When someone cuts me off, I feel I should punish that driver.	-.081	.559	-.015
N18. I feel good when I can cut in at the front of a line of cars.	.025	.495	-.039
N32. I am constantly on the lookout for incompetent drivers on the road who will slow me up.	.061	.476	.123
N52. I have no problem exceeding the speed limit because I know I am a good driver.	-.088	.249	.655
R19. I feel uncomfortable when the rules of the road are not clear.	.288	-.002	-.377
N53. I am a more skillful driver than most other drivers on the road.	.137	.313	.325
N21. I don't care if my driving makes others angry.	-.116	.219	.316

Internal Consistency. For the finalized scales, Cronbach's alpha was estimated as an index of internal consistency. For the narcissism subscale α = .75, and for the rigid subscale α = .78, both acceptable values for the test construction phase (Nunnally, 1978). There were not any items in either subscale that lowered alpha if removed, so all 16 items were retained to maintain the breadth of the construct. The inter-item correlations are shown in Tables 8 and 9.

Table 8

Inter-item Correlations for the Narcissism Subscale

	1	2	3	4	5	6	7	8	9
1. Narcissism Subscale	-	.54**	.62**	.62**	.55**	.57**	.55**	.72**	.68**
2. N18		-	.25**	.13*	.17**	.21**	.13*	.38**	.21**
3. N75			-	.30**	.23**	.22**	.26**	.43**	.27**
4. N58				-	.23**	.22**	.33**	.39**	.50**
5. N53					-	.29**	.20**	.21**	.34**
6. N32						-	.13*	.38**	.27**
7. N21							-	.26**	.37**
8. N14								-	.37**
9. N52									-

*p < .05, **p < .01.

Table 9

Inter-item Correlations for the Rigid Subscale

	1	2	3	4	5	6	7	8	9
1. Rigid Subscale	-	.57**	.64**	.52**	.72**	.56**	.62**	.68**	.72**
2. R19		-	.40**	.08	.32**	.16**	.19**	.26**	.30**
3. R11			-	.21**	.39**	.21**	.26**	.34**	.38**
4. R4				-	.28**	.24**	.18**	.32**	.39**
5. R13					-	.26**	.46**	.42**	.52**
6. R5						-	.44*	.36**	.33**
7. R14							-	.27**	.37**
8. R26								-	.39**
9. R2									-

*p < .05, **p < .01.

Correlations

The correlations of the finalized subscales of Rigid Driving Motivations (RDM) and Narcissistic Driving Motivations (NDM) were with the rigid and narcissistic personality scales were calculated. It was predicted that the NDM subscale would have large positive correlations with the narcissism personality measures. Similarly, it was predicted that the RDM subscale

would have large positive correlations with the Personal Need for Structure Scale, Need for Closure Scale, and Intolerance for Ambiguity Scale measures. This pattern of correlations would give additional evidence for convergent validity. It was also predicted that the NDM subscale would not have significant positive correlations with the rigidity measures, and the RDM subscale would not have significant positive correlations with the narcissism measures. This pattern of correlations would give support for divergent validity, see Table 10. Means and standard deviations for all variables are also shown in Table 10.

Table 10

Correlations of Subscales with Personality, Control, and Driving Measures

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Narcissistic Driving Motivations	.75	.33**	.18**	.24**	-.38**	-.17**	-.05	.10	.31**	.35**	-.20*	.45**	.47**
2. Narcissistic Personality Inventory		.72	.18**	.31**	-.30**	-.22**	-.12*	.03	.33**	.07	-.12	.27**	.25**
3. Pathological Narcissism Scale			.95	.26**	.12*	.14*	.15*	.05	.44**	.34**	-.38**	.19**	.17**
4. Psychological Entitlement Scale				.88	-.20**	.03	.04	.28**	.25**	.25**	-.13	.22**	.18**
5. Rigid Driving Motivations					.78	.36**	.26**	-.13*	-.06	-.02	.11	-.32**	-.38**
6. Personal Need for Structure Scale						.82	.74**	.37**	.07	.14*	.26**	-.04	-.11
7. Need for Closure Scale							.79	.39**	.06	.17**	.24**	-.05	-.10
8. Intolerance for Ambiguity Scale								.52	.06	.14*	.12	.13*	.09
9. State Trait Anger Expression Inventory									.87	.43**	-.37**	.35**	.24**
10. Driving Anger Scale										.90	-.34**	.30**	.19**
11. Self-Control Scale											.81	-.20*	-.30**
12. Past Aggressive Driving Behaviors												.89	.66**
13. Past Risky Driving Behaviors													.88

*p < .05, **p < .01, α on diagonal

The correlations followed the expected pattern for Narcissistic Driving Motivations, demonstrating good convergent and divergent validity. However, Rigid Driving Motivations had some correlations that did not follow the predicted pattern, RDM with the Intolerance for Ambiguity Scale (r = -.13) and with the Pathological Narcissism Scale (r = .12). RDM appears to align most closely with the Personal Need for Structure (r = .36) and Need for Closure (r = .26), rather than Intolerance for Ambiguity. The IAS also had an unexpected positive correlation with the Entitlement scale (r = .28).

The Pathological Narcissism Scale positively correlated with the Personal Need for Structure Scale and Need for Closure Scale as well as with the RDM, indicating that the PNI scale may not be the best scale to use for validating these measures. It could be that the extended range of this scale spanning grandiose and vulnerable narcissism makes it more difficult to use to test validity. Looking at the subscales of the PNI seen in Table 11, the Exploitative subscale was negatively correlated with RDM as expected, while Contingent Self-Esteem, Self-Sacrificing Self-Enhancement, Hiding the Self, and Grandiose Fantasy were all positively correlated. RDM was not correlated with the Devaluing and Entitlement Rage subscales.

Table 11

Correlations of RDM with Pathological Narcissism Subscales

	Rigid Driving Motivations
Contingent Self-Esteem	.15**
Exploitative	-.16**
Self-Sacrificing Self-Enhancement	.23**

Table 11 continued

	Rigid Driving Motivations
Hiding the Self	.18**
Grandiose Fantasy	.16**
Devaluing	.05
Entitlement Rage	.00

*p < .05, **p < .01

Predictive Validity

To evaluate the predictive validity of the two subscale scores, a series of regression analyses were conducted with the subscales as the predictor variables and the summed aggressive driving behaviors from the Driving Behavior Questionnaire as the criterion variable with the State Trait Anger Expression Inventory, Driving Anger Scale, and self-control scales as control variables. A second set of regressions was performed with the summed risky driving behaviors as the criterion variable. Descriptive statistics for these variables, and statistics for past aggressive driving behavior items are shown in Tables 12, 13, and 14.

Table 12

Study 1: Descriptive Statistics (N = 299)

	Mean	*SD*
Narcissistic Driving Motivations	21.66	4.81
Narcissistic Personality Inventory	-.24	.19
Pathological Narcissism Scale	127.03	36.50
Psychological Entitlement Scale	19.01	9.49
Rigid Driving Motivations	31.18	4.11
Personal Need for Structure Scale	20.62	8.12
Need for Closure Scale	45.62	17.64
Intolerance for Ambiguity Scale	-2.85	6.52
State Trait Anger Expression Inventory	18.86	5.73
Driving Anger Scale	30.20	10.53
Self-Control Scale	-1.02	.70
Past Aggressive Driving Behaviors	10.38	11.53
Past Risky Driving Behaviors	14.45	12.40

Table 13

Study 1: Past Aggressive Driving Behavior Items (N = 299)

Variable	Mean	*SD*
Broken or damaged a part of a vehicle	.27	.79
Had an argument with a passenger while driving	.82	1.26
Had a verbal argument with the driver of another vehicle	.27	.80
Had a physical fight with the driver of another vehicle	.20	.72
Made an angry gesture at another driver or pedestrian	.82	1.35
Swore at or called another driver or pedestrian names	1.43	1.74
Flashed your headlights in anger	.47	1.07
Honked your horn in anger	.68	1.19
Yelled at another driver or pedestrian	1.01	1.50
Drove while being very angry	1.23	1.46
Lost control of your anger while driving	.54	1.12
Drove up close behind another driver in anger	1.00	1.44
Cut another driver off in anger	.48	1.02
Tailgated or followed another vehicle too closely	1.16	1.50

Table 14

Study 1: Past Risky Driving Behavior Items (N =299)

Variable	Mean	*SD*
Driven without using your seat belt	.79	1.50
Drank alcohol and driven	.36	.89
Been drunk and driven	.22	.68
Driven 10-20 mph over the limit	2.35	1.94
Driven 20+ mph over the limit	.75	1.34
Passed unsafely	.59	1.12
Changed lanes unsafely	.68	1.20
Drifted into another lane	.73	1.19
Switched lanes to speed through slower traffic	2.28	2.04
Gone out of turn at a red light or stop sign	.45	.99
Made an illegal turn	.57	1.08
Driven recklessly	.72	1.26
Run a red light or stop sign	.47	1.04
Entered an intersection when the light was turning red	.95	1.41
Used a cellular phone while you were driving	2.49	1.98

As hypothesized, the Narcissistic Driving Motivations subscale significantly predicted both past aggressive driving behavior and past risky driving behavior, so that the higher an individual's NDM score, the more likely they were to report past aggressive and risky driving behavior. The RDM negatively predicted past risky driving behavior, as expected. However, contrary to the hypothesis, the RDM subscale also negatively predicted past aggressive driving behavior. As seen in Tables 15 and 16, both subscales independently predict past aggressive and risky driving behavior. The correlations between the subscales and control variables (see Table 10) revealed that NDM was positively associated with driving anger and trait anger, and was negatively related to self-control, whereas RDM was not significantly associated with any of the control variables.

Table 15

Study 1: Summary of Hierarchical Regression Analysis for Variables Predicting Past Aggressive Driving Behavior (N = 145)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.12	.07	.14
STAXI	.62	.14	.37**
Self-Control	-.10	1.11	-.01
Step 2			
DAS	.09	.07	.11
STAXI	.48	.13	.29**
Self-Control	.31	1.03	.02
NDM	.52	.15	.27**
RDM	-.46	.17	-.20**

Note. R^2*=.20 for Step 1;* ΔR^2*=.12 for Step 2 (p <.001). *p < .05, **p<.01.*

All regressions throughout the three studies were also performed with standardized variables, but standardizing did not influence the direction or significance of the results, so the original variables were retained for regression analyses.

Table 16

Study 1: Summary of Hierarchical Regression Analysis for Variables Predicting Past Risky Driving Behavior (N = 145)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.05	.09	.06
STAXI	.43	.17	.22*
Self-Control	-3.23	1.32	-.21*
Step 2			
DAS	.02	.08	.02
STAXI	.25	.16	.13
Self-Control	-2.67	1.21	-.17*
NDM	.63	.18	.28**
RDM	-.66	.20	-.25**

Note. R^2*=.15 for Step 1;* ΔR^2*=.16 for Step 2 (p <.001). *p < .05, **p<.01.*

CHAPTER 4. STUDY 2: SCALE VALIDATION

The purpose of Study 2 was to cross validate the results from Study 1 and compile additional validity evidence for the two subscales of the Aggressive Driving Motivations Questionnaire. Specifically, confirmatory factor analyses (CFA) were performed to obtain further evidence concerning the factor structure established in Study 1.

Method

Participants

Two samples were used for Study 2, one sample of 319 participants from the Psychology Undergraduate Research pool through SONA online data collection, and one sample of 307 participants from an adult non-college population collected online through Amazon's M-Turk pool. Similar to previous studies, 43 participants (13.5%) were discarded from the student sample and 32 participants (10.4%) from the M-Turk sample due to their responses on the "lie" scale (Kruglanski, 2012), leaving 276 undergraduates, and 275 participants from M-Turk. The undergraduates received course credit in exchange for their participation, and the non-college population participants received $.75 for their participation.

Undergraduate participants had a mean age of 19.99 years, *SD* = 2.44. Undergraduates were 52% male, 48% female; 81% Caucasian, 7% Black, 4% Asian or Pacific Islander, 6% Hispanic, and 2% Other. On average, undergraduates drove 4.2 days per week, for an average of 75.0 miles, and had been driving for an average of 4.9 years, *SD* = 2.56. In the M-Turk sample, participants had a mean age of 38.23 years, *SD* = 11.68. Participants were 51% male, 49% female; 84% Caucasian, 5% Black, 7% Asian or Pacific Islander, 3% Hispanic, and 1% Other.

On average, participants drove 5.4 days per week, for an average of 124 miles, and had been driving for an average of 20.9 years, *SD* = 11.79.

Procedure

Participants completed the Aggressive Driving Motivations Questionnaire, the Driving Behavior Questionnaire, the "lie" scale, trait anger measures, self-control scale, and demographic items.

Measures

Self-Control Scale. Participants rated their agreement on 10 items using a 5-point Likert scale ranging from 1 (*not at all like me*) to (*very much like me*). Negative items were reverse scored so that higher scores indicate higher self-control, and an average score computed.

State Trait Anger Expression Inventory (STAXI). Participants rated their trait anger on 10 items with responses ranging from 1 (*almost never*) to 4 (*almost always*). Responses were summed to form a composite score.

Driving Anger Scale (DAS). Participants rated the extent to which 14 imagined incidents would provoke feelings of anger on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*very much*). A composite score was formed by summing across the items.

Driving History Questionnaire. Participants were asked to complete a 35 item survey of driving history adapted from Deffenbacher, Huff, Lynch, Oetting, and Salvatore (2000) assessing four types of driving outcomes. Most relevant to the hypotheses are the 14 items assessing aggressive driving behavior outcomes, and the 15 items relevant to risky driving behavior.

Participants responded by estimating the frequency they have engaged in the various outcomes in the past three months on a 0 to 5 or more scale.

Results

Descriptive Statistics

Comparing the two samples with independent sample *t*-tests, there were significant differences in the amount of past aggressive driving and risky driving behavior reported, along with differences in all of the other variables, see Table 17. On average, the student population reported almost twice as much aggressive and risky driving behavior, and the students also had a greater variability in amount reported. Individual behavior items means and standard deviations are reported in Tables 18 and 19. Correlations for control and outcome measures reported in Tables 20 and 21.

Table 17

Study 2: Descriptive Statistics for Student (N = 273) and M-Turk (N= 273) Samples

	Student Sample		M-Turk Sample				
Variable	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Past Aggressive Driving Behavior	10.73	11.17	5.20	7.08	6.92	548	<.001
Past Risky Driving Behavior	15.75	11.89	8.06	8.56	8.73	548	<.001
Driving Anger Scale	26.77	10.75	24.05	11.60	2.85	547	<.01
STAXI	18.62	5.77	15.66	5.24	6.30	549	<.001
Self-Control Scale	-.95	.66	-.35	.70	-10.32	548	<.001
RDM-3	19.83	2.49	21.28	2.54	-6.76	549	<.001
NDM-3	20.39	4.17	17.57	4.10	7.98	548	<.001
Law Subscale	-9.28	2.33	-11.35	2.17	10.79	548	<.001
Rigid Driving Motivations	31.52	3.74	34.44	3.89	-8.96	548	<.001
Narcissistic Driving Motivations	22.79	4.59	19.38	4.46	8.83	548	<.001

Table 18

Study 2: Past Aggressive Driving Items for Student (N = 273) and M-Turk (N= 273) Samples

	Student Sample		M-Turk Sample	
Variable	Mean	*SD*	Mean	*SD*
Broken or damaged a part of a vehicle	.17	.58	.03	.23
Had an argument with a passenger while driving	.86	1.21	.38	.87
Had a verbal argument with the driver of another vehicle	.23	.77	.08	.35
Had a physical fight with the driver of another vehicle	.10	.48	.02	.19
Made an angry gesture at another driver or pedestrian	1.08	1.50	.61	1.15
Swore at or called another driver or pedestrian names	1.72	1.92	.91	1.50
Flashed your headlights in anger	.39	.93	.24	.79
Honked your horn in anger	.84	1.38	.79	1.22
Yelled at another driver or pedestrian	1.08	1.67	.49	1.06
Drove while being very angry	1.29	1.53	.62	1.04
Lost control of your anger while driving	.48	1.05	.16	.54
Drove up close behind another driver in anger	.92	1.38	.31	.85
Cut another driver off in anger	.43	1.03	.15	.47
Tailgated or followed another vehicle too closely	1.16	1.54	.42	.99

Table 19

Study 2: Past Risky Driving Behavior Items for Student (N=276) and M-Turk (N=274) Samples

	Student Sample		M-Turk Sample	
Variable	Mean	*SD*	Mean	*SD*
Driven without using your seat belt	.75	1.43	.45	1.22
Drank alcohol and driven	.33	.85	.22	.73
Been drunk and driven	.23	.79	.09	.52
Driven 10-20 mph over the limit	2.61	1.84	1.88	1.94
Driven 20+ mph over the limit	.87	1.45	.44	1.15
Passed unsafely	.58	1.12	.18	.71
Changed lanes unsafely	.80	1.30	.24	.70
Drifted into another lane	.83	1.26	.41	.91
Switched lanes to speed through slower traffic	2.62	2.01	1.53	1.86
Gone out of turn at a red light or stop sign	.55	1.14	.15	.57
Made an illegal turn	.62	1.19	.20	.62
Driven recklessly	.71	1.22	.13	.53
Run a red light or stop sign	.40	.93	.16	.57
Entered an intersection when the light was turning red	.97	1.44	.60	1.08

Table 19 continued

	Student Sample		M-Turk Sample	
Variable	Mean	*SD*	Mean	*SD*
Used a cellular phone while you were driving	2.89	2.02	1.36	1.80

Table 20

Study 2: Correlations for Control and Outcome Variables for Student Sample

	1	2	3	4	5	6	7	Mean	*SD*
1. Driving Anger Scale	.88	.48**	-.27**	.31**	.31**	.05	.38**	26.77	10.75
2. State Trait Anger Expression Inventory		.88	-.42**	.42**	.45**	-.05	.40**	18.62	5.77
3. Self-Control Scale			.80	-.19**	-.30	.05	-.27**	-.95	.66
4. Past Aggressive Driving Behaviors				.87	.66**	-.18**	.38**	10.73	11.17
5. Past Risky Driving Behaviors					.86	-.19**	.43**	15.75	11.88
6. Rigid Driving Motivations						.76	-.26**	31.52	3.74
7. Narcissistic Driving Motivations							.74	22.79	4.59

*p < .05, **p < .01, α on diagonal

Table 21

Study 2: Correlations for Control and Outcome Variables for M-Turk Sample

	1	2	3	4	5	6	7	Mean	*SD*
1. Driving Anger Scale	.92	.56**	-.23**	.35**	.25**	.20**	.32**	24.05	11.60
2. State Trait Anger Expression Inventory		.89	-.38**	.31**	.27**	.21**	.34**	15.66	5.24
3. Self-Control Scale			.86	-.27**	-.28**	.10	-.22**	-.35	.69
4. Past Aggressive Driving Behaviors				.83	.54**	-.09	.49**	5.06	6.82
5. Past Risky Driving Behaviors					.81	-.14*	.40**	8.21	8.75
6. Rigid Driving Motivations						.82	-.17**	34.44	3.89
7. Narcissistic Driving Motivations							.67	19.38	4.46

*p < .05, **p < .01, α on diagonal

Confirmatory Factor Analysis Student Sample

A series of CFAs were conducted with each sample using maximum likelihood estimation to test if the factor structure found in Study 1 held in the new samples. Ideally a well-fitting model would have a small chi-square fit statistic and satisfactory global fit indices. The standardized root mean square residual (SRMR), the comparative fit index (CFI), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA) were examined. CFI and NNFI are both considered to show good fit if the value is greater than .95, SRMR shows good fit with a value less than .08, and RMSEA shows good fit with a value of less than .06 (Hu & Bentler, 1999). A change in CFI of greater than .002 is considered significant. The fit statistics for tested models are shown in Table 22.

The Correlated Two-Factor model had better fit indices and a significantly smaller chi-square than the Single Factor Model, indicating good discriminate validity. The Narcissism factor explained an average of 26% of the variance in the manifest variables, and the Rigid factor explained 31%. See Figure 2.

Table 22

Summary of Confirmatory Factor Analyses for Student Sample

Model	χ^2	*df*	*p*	$\Delta\chi^2$	Δdf	*p*	RMSEA	SRMR	CFI	ΔCFI	NNFI
Correlated Two-Factor Model	318.73	103	<.001				.087	.084	.866		.844
Single Factor Model	504.96	104	<.001	186.23	1	<.001	.118	.111	.751		.713
Uncorrelated Two-Factor Model	341.55	104	<.001	22.82	1	<.001	.091	.111	.853		.830
Bi-Factor Model	186.50	88	<.001				.064	.052	.939	.073	.917
Correlated Three-Factor Model	282.67	101	<.001	36.06	2	<.001	.081	.075	.887		.866

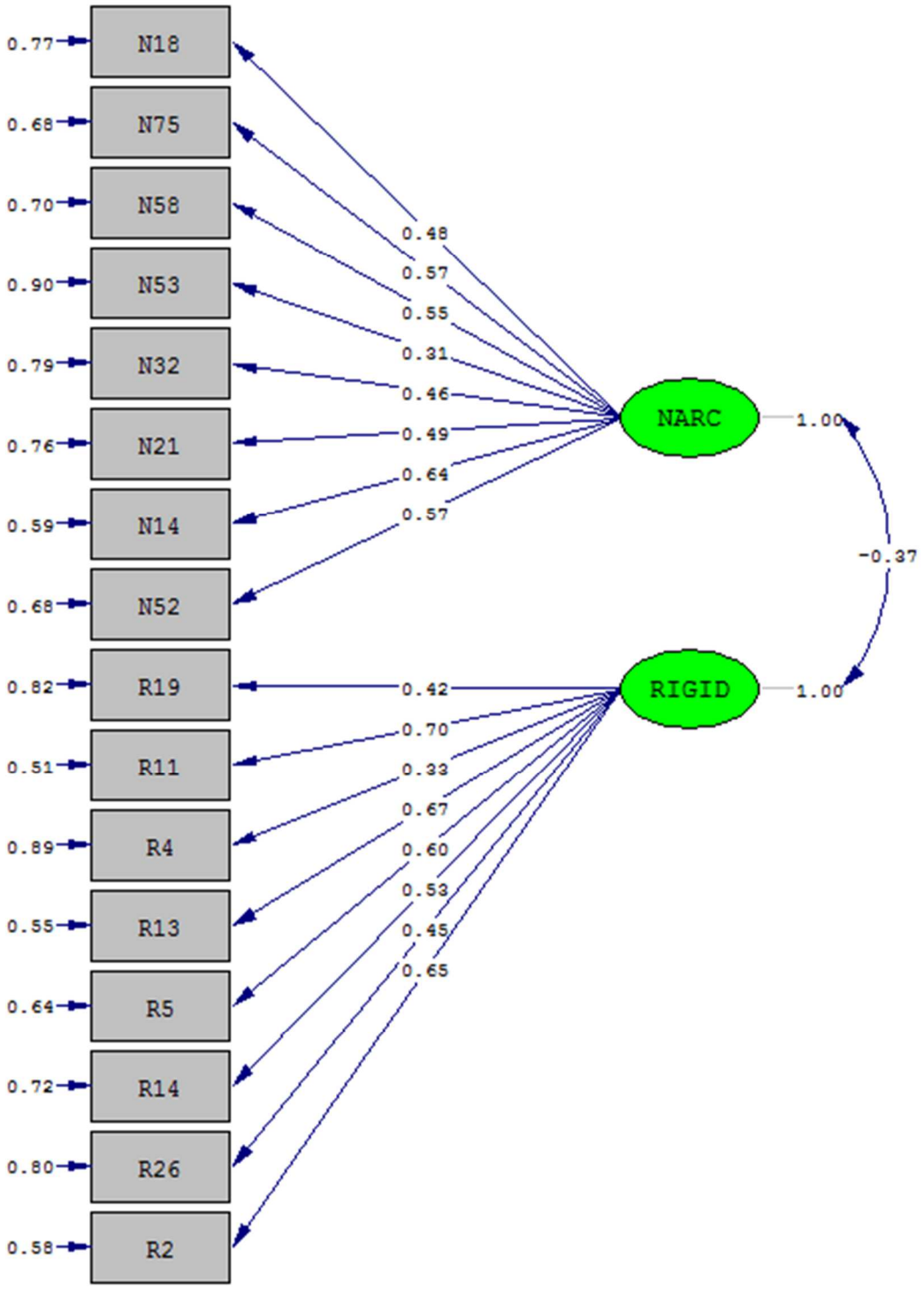

Figure 2. Path Diagram for Correlated Two-Factor Model, Student Sample

The Bi-Factor model was another alternative that was considered, and it had the best fit indices of the four tested models. Bi-Factor models are the most useful when investigating the factor structure of highly correlated variables. The Bi-Factor model would be appropriate if there is common variance among all of the items that is a function of a single general factor in addition to two group factors that explain covariation among items in the same group. Using the Bi-Factor model, the general factor explained an average of 14% of the variance of the manifest variables. The Narcissism factor explained an average of 21% of the variance, and the Rigid factor explained an average of 19%. See Figure 3. The change in CFI between the Correlated Two-Factor Model and the Bi-Factor Model indicates that the Bi-Factor model has the best fit.

Using the Bi-Factor Model, there were only a few items with high loadings on the general factor, which all had a similar theme of high disregard for the law (or negatively related, high regard for the law) – N58 “It is okay to violate traffic laws;” R11 “I don’t like it when other drivers don’t follow the rules;” R26 “People should be ticketed if they don’t follow the law;” and R2 “It is important for everyone to obey the rules of the road.” Therefore a Three-Factor Correlated Model was tested in which those four items were formed into a new factor. The Narcissism factor explained an average of 27% of the variance in the manifest variables, the Rigid factor explained 31%, and the Law factor explained 40%. See Figure 4. The Correlated Three-Factor Model had better fit than the Correlated Two-Factor Model. The Bi-Factor Model and Correlated Three Factor Model are not nested, and therefore are not directly comparable.

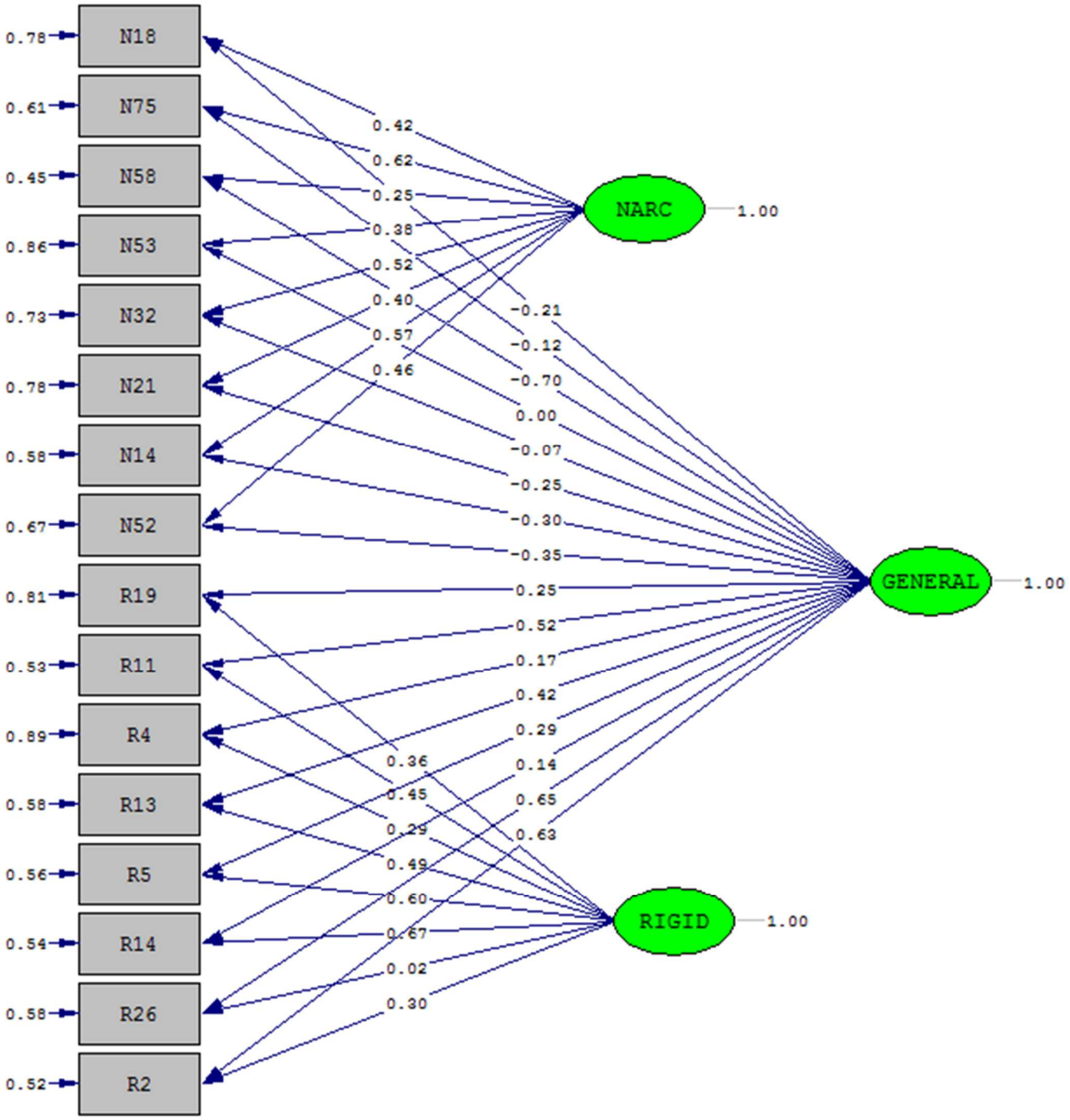

Figure 3. Path Diagram for Bi-Factor Model, Student Sample

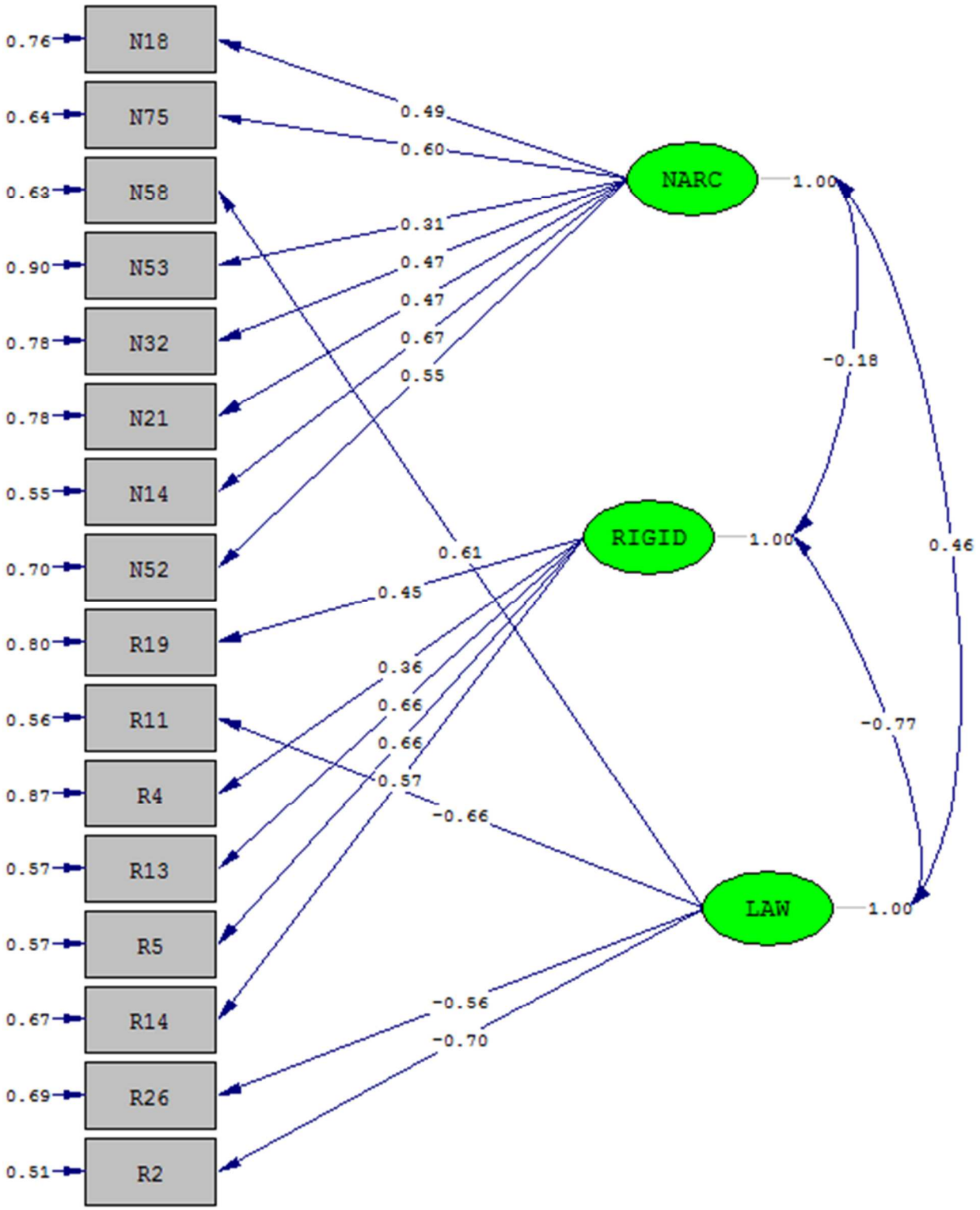

Figure 4. Path Diagram for Correlated Three-Factor Model, Student Sample

Confirmatory Factor Analysis M-Turk Sample

The same set of five models were tested in the M-Turk Sample, which rendered very similar results, seen in Table 23. The Correlated Two-Factor Model had better fit indices and a significantly smaller chi-square than the Single-Factor Model, indicating good discriminate validity. The Bi-Factor Model (Figure 6) had better fit indices than the Correlated Two-Factor Model (Figure 5), and the change in CFI indicated it is a better fitting model than the Correlated Two-Factor Model. However, the Correlated Three-Factor Model (Figure 7) explained the most variance: the Narcissism factor explained an average of 22% of the variance, the Rigid factor explained 35%, and the Law factor explained 48%.

Table 23

Summary of Confirmatory Factor Analyses for M-Turk Sample

Model	χ^2	*df*	*p*	$\Delta\chi^2$	Δdf	*p*	RMSEA	SRMR	CFI	ΔCFI	NNFI
Correlated Two-Factor Model	290.35	103	<.001				.081	.095	.914		.900
Single Factor Model	421.40	104	<.001	131.05	1	<.001	.105	.104	.854		.831
Uncorrelated Two-Factor Model	325.59	104	<.001	35.24	1	<.001	.088	.132	.898		.882
Bi-Factor Model	154.49	88	<.001				.052	.046	.969	.058	.958
Correlated Three-Factor Model	299.35	101	<.001	9.00	2	.011	.085	.100	.909		.892

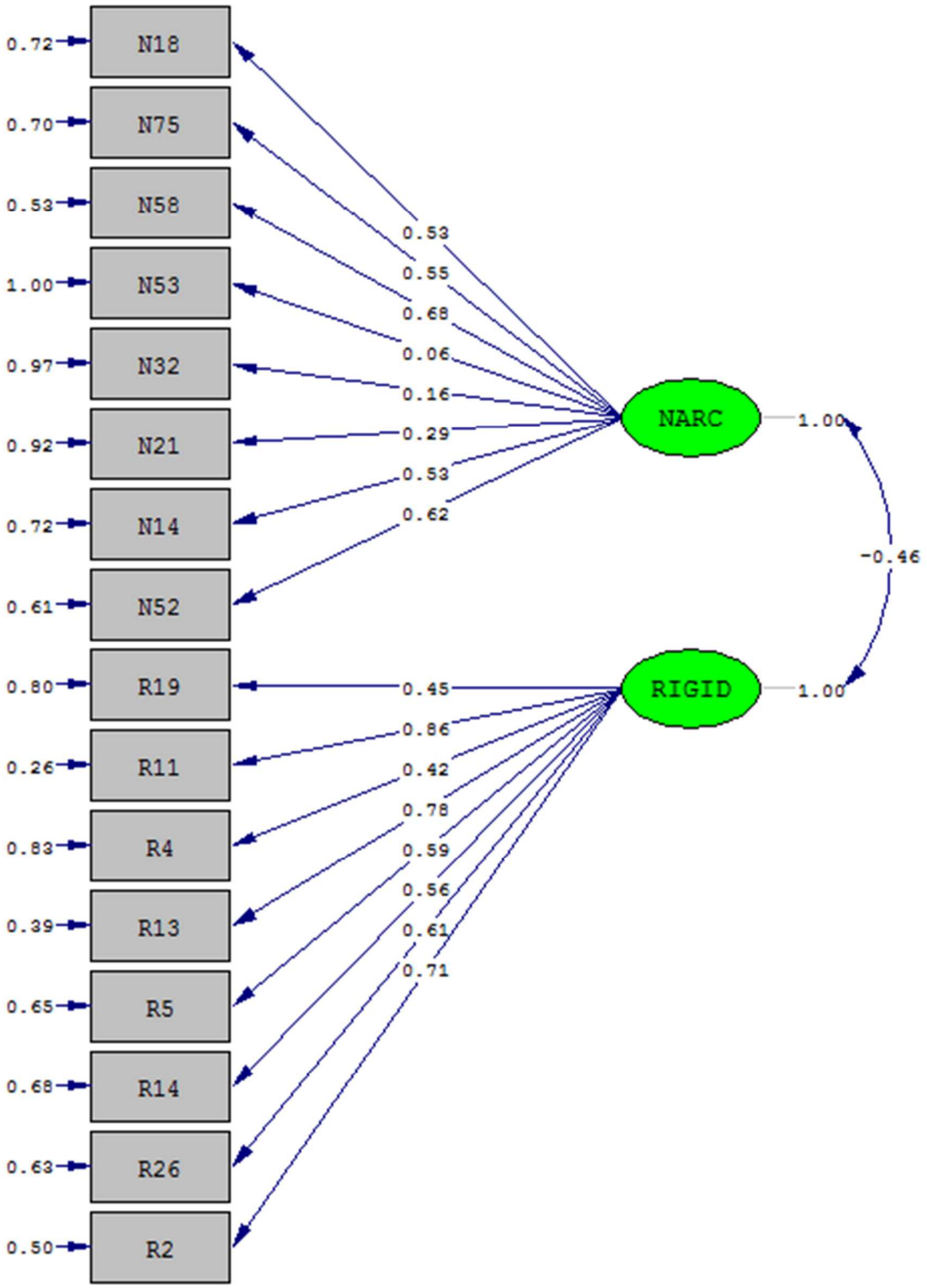

Figure 5. Path Diagram for Correlated Two-Factor Model, M-Turk Sample

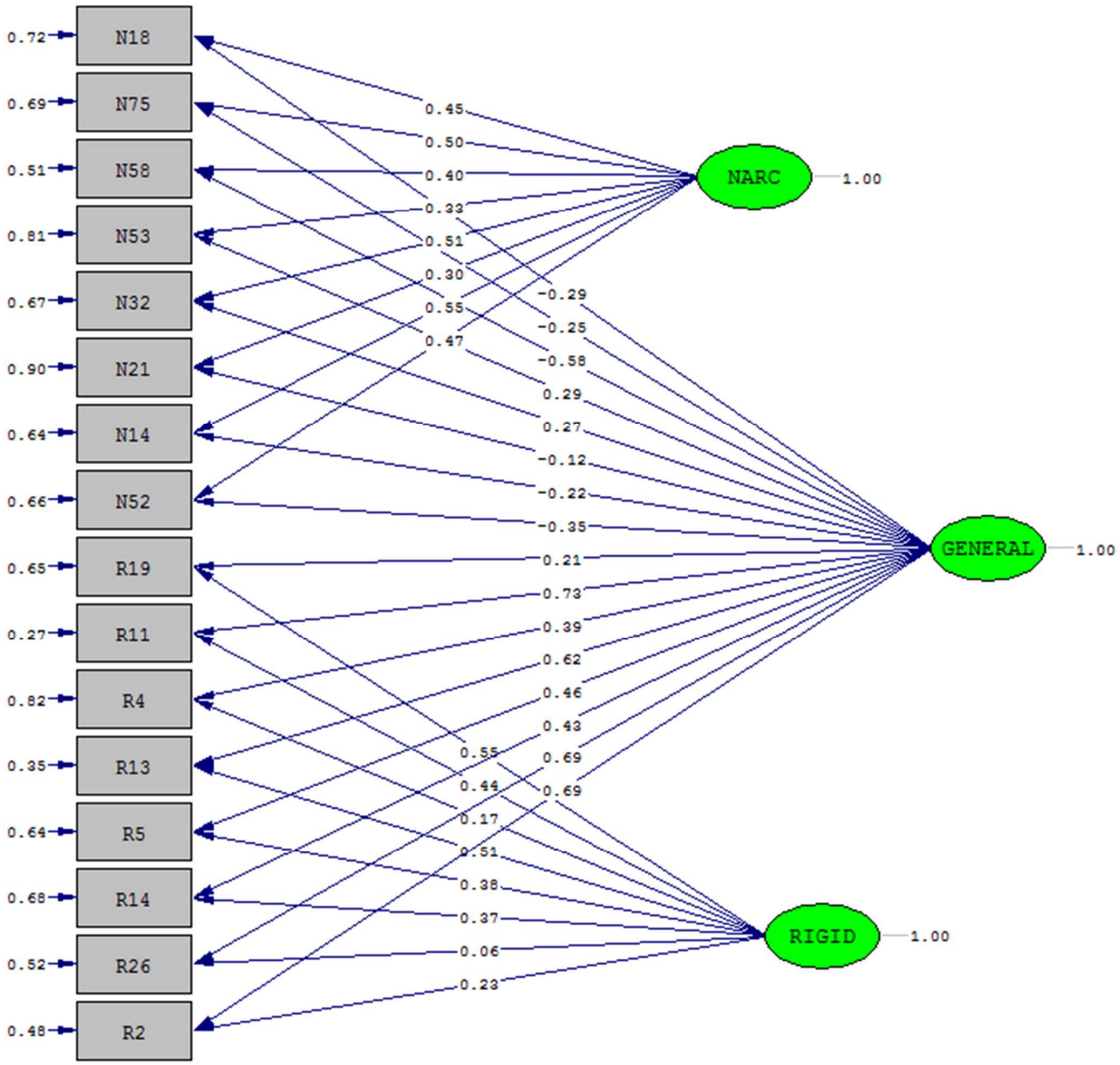

Figure 6. Path Diagram for Bi-Factor Model, M-Turk Sample

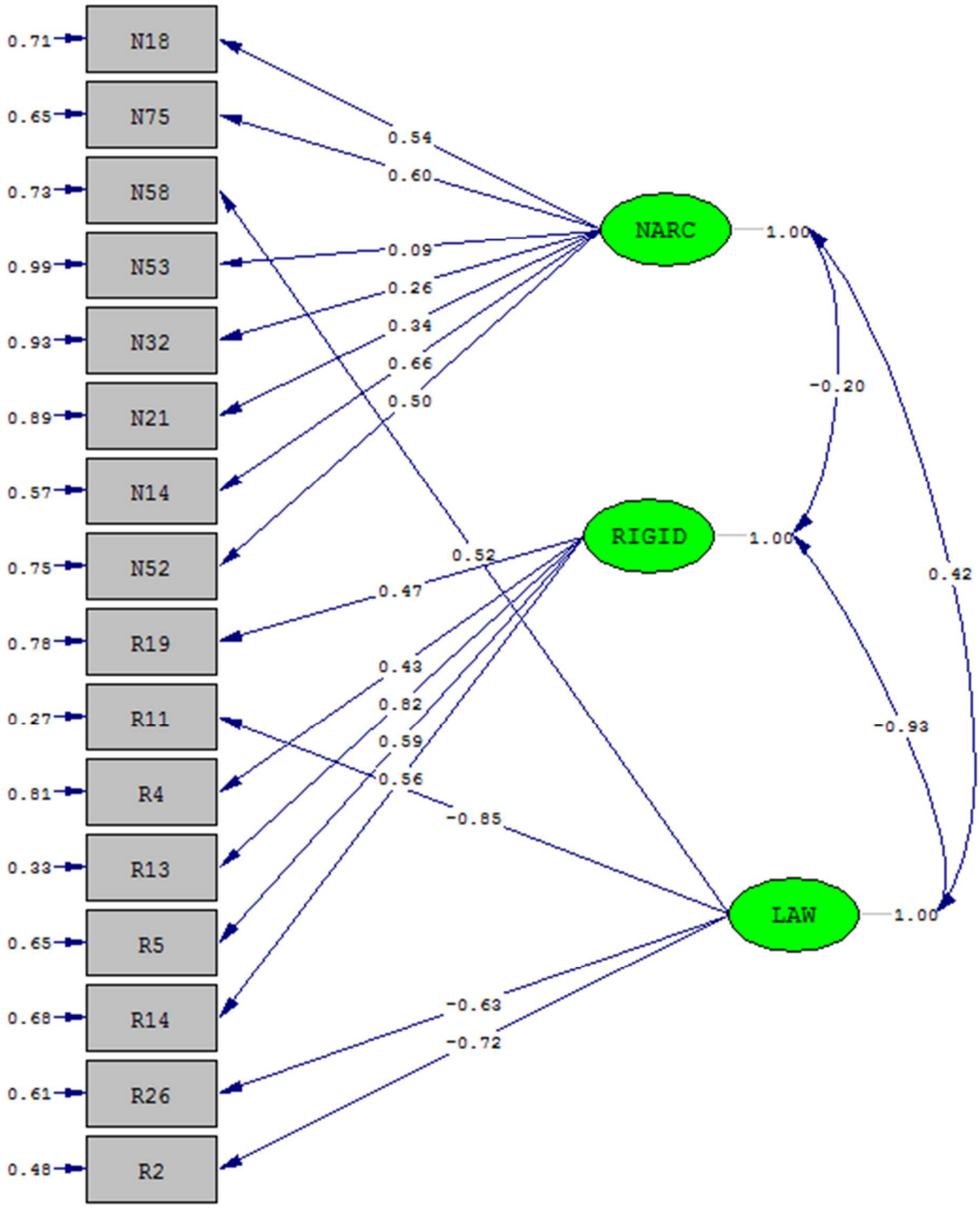

Figure 7. Path Diagram for Correlated Three-Factor Model, M-Turk Sample

Predictive Validity in Student Samples

Similar to Study 1, the new samples were used to examine the predictive validity of the two group factors using regression analyses. Three new factors from the Correlated-Three Factor Model were used for the predictor variables, and the summed aggressive driving behaviors and summed risky driving behaviors from the Driving Behavior Questionnaire were the criterion variables. In the student sample, only the new narcissism (NDM-3) and new rigid (RDM-3) subscales were significant predictors of aggressive driving behavior, see Table 24. Consistent with Study 1 results, individuals higher on NDM-3 were more likely to report past aggressive driving behavior, and individuals higher on RDM-3 were less likely to report past aggressive driving behavior, but the law subscale did not significantly contribute to the model. Predicting risky driving behavior, NDM-3 and the law subscale were both significant predictors, while RDM-3 was not significant, see Table 25.

Table 24

Summary of Hierarchical Regression Analysis for Three-Factor Model Predicting Past Aggressive Driving Behavior in Student Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.14	.06	.14*
STAXI	.69	.13	.35**
Self-Control	-.06	1.03	.00
Step 2			
DAS	.12	.07	.12
STAXI	.57	.13	.30**
Self-Control	.50	1.01	.03
NDM-3	.48	.17	.18**
RDM-3	-.59	.28	-.13*
Law	.16	.31	.03

Note. R^2*=.19 for Step 1;* ΔR^2*=.06 (p <.001). *p < .05, **p<.01.*

Table 25

Summary of Hierarchical Regression Analysis for Three-Factor Model Predicting Past Risky Driving Behavior in Student Sample (N = 273)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.13	.07	.11
STAXI	.71	.13	.34**
Self-Control	-2.32	1.06	-.13*
Step 2			
DAS	.09	.07	.08
STAXI	.58	.13	.28**
Self-Control	-1.86	1.03	-.10
NDM-3	.51	.18	.18**
RDM-3	-.19	.28	-.04
Law	.77	.32	.15*

Note. R^2*=.23 for Step 1;* ΔR^2*=.07 (p <.001). *p < .05, **p<.01.*

Because the law subscale did not significantly contribute to the aggressive driving model beyond the contribution of the other subscales for aggressive driving, the original two subscales were recombined in line with the Correlated Two-Factor Model and Bi-Factor Model. Using the original subscales, Narcissistic Driving Motivations and Rigid Driving Motivations both

significantly predicted past aggressive and risky driving behavior in the student sample, see Tables 26 and 27.

Table 26

Summary of Hierarchical Regression Analysis for Two-Factor Model Predicting Past Aggressive Driving Behavior in Student Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.14	.07	.14*
STAXI	.69	.13	.35**
Self-Control	-.06	1.03	.00
Step 2			
DAS	.12	.07	.11
STAXI	.57	.13	.30**
Self-Control	.47	1.01	.03
NDM	.47	.15	.19**
RDM	-.36	.17	-.12*

Note. R^2*=.19 for Step 1;* ΔR^2*=.06 for Step 2 (p <.001). *p < .05, **p<.01.*

Table 27

Summary of Hierarchical Regression Analysis for Two-Factor Model Predicting Past Risky Driving Behavior in Student Sample (N = 273)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.13	.07	.11
STAXI	.71	.13	.34**
Self-Control	-2.32	1.06	-.13*
Step 2			
DAS	.08	.07	.07
STAXI	.57	.13	.28**
Self-Control	-1.77	1.02	-.10
NDM	.62	.16	.24**
RDM	-.36	.17	-.11*

Note. R^2*=.23 for Step 1;* ΔR^2*=.07 for Step 2 (p <.001). *p < .05, **p<.01.*

Predictive Validity in M-Turk Sample

Using the Correlated Three-Factor model factors in the M-Turk sample, neither RDM-3 nor the law subscale predicted aggressive or risky driving behavior independently, see Tables 28 and 29. Using the Correlated Two-Factor Model factors, only Narcissistic Driving Motivations predicted both aggressive and risky driving, see Tables 30 and 31. Because the law subscale only contributed to the prediction of risky behavior in one analysis and did not predict aggressive behavior in any others, the more parsimonious model using the two main factors of Narcissistic

Driving Motivations and Rigid Driving Motivations from the Correlated Two-Factor Model will be used for future analyses.

Table 28

Summary of Hierarchical Regression Analysis for Three-Factor Model Predicting Past Aggressive Driving Behavior in M-Turk Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.15	.04	.24**
STAXI	.14	.10	.11
Self-Control	-1.79	.62	-.17**
Step 2			
DAS	.11	.04	.18**
STAXI	.08	.09	.06
Self-Control	-1.35	.58	-.13*
NDM-3	.66	.10	.38**
RDM-3	-.33	.19	-.12
Law	-.08	.23	-.03

Note. R^2*=.16 for Step 1;* ΔR^2*=.14 for Step 2 (p <.001). *p < .05, **p<.01.*

Table 29

Summary of Hierarchical Regression Analysis for Three-Factor Model Predicting Past Risky Driving Behavior in M-Turk Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.10	.05	.13
STAXI	.19	.12	.12
Self-Control	-2.53	.77	-.20**
Step 2			
DAS	.08	.05	.10
STAXI	.16	.12	.10
Self-Control	-1.89	.75	-.15*
NDM-3	.49	.13	.23**
RDM-3	-.29	.25	-.09
Law	.33	.29	.08

Note. R^2*=.12 for Step 1;* ΔR^2*=.08 for Step 2 (p <.001). *p < .05, **p<.01.*

Table 30

Summary of Hierarchical Regression Analysis for Two-Factor Model Predicting Past Aggressive Driving Behavior in M-Turk Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.15	.04	.24**
STAXI	.14	.10	.11
Self-Control	-1.79	.62	-.17**
Step 2			
DAS	.11	.04	.18**
STAXI	.06	.09	.04
Self-Control	-1.27	.58	-.12*
NDM	.61	.09	.38**
RDM	-.12	.10	-.06

Note. R^2*=.16 for Step 1;* ΔR^2*=.14 for Step 2 (p <.001). *p < .05, **p<.01.*

Table 31

Summary of Hierarchical Regression Analysis for Two-Factor Model Predicting Past Risky Driving Behavior in M-Turk Sample (N = 272)

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.10	.05	.13
STAXI	.19	.12	.12
Self-Control	-2.53	.77	-.20**
Step 2			
DAS	.07	.05	.09
STAXI	.13	.12	.08
Self-Control	-1.93	.75	-.16**
NDM	.55	.12	.28**
RDM	-.21	.13	-.10

Note. R^2*=.12 for Step 1;* ΔR^2*=.09 for Step 2 (p <.001). *p < .05, **p<.01.*

CHAPTER 5. STUDY 3: APPLICATION

The purpose of study 3 was to ascertain if narcissistic and rigid individuals differ in the driving situations that make them angry and the reasons they become angry. A situation sampling approach was utilized (Kitayama, Matsumoto, Markus, & Norasakkunki, 1997) in order to capture the full range of driving situations that could be self-generated by participants. Situation sampling increases the diversity of responses given by participants and reduces the chances that results would be limited to a certain set of circumstances. First, the Aggressive Driving Motivations Questionnaire (ADMQ) was given to a new sample identifying narcissistic and rigid drivers. Participants were then asked to generate past driving scenarios that provoked their anger responses and their reasons for becoming angry. Additionally, ten driving scenarios adapted from the Propensity for Angry Driving Scale (PADS, DePasquale et al., 2001) were presented to compare narcissistic and rigid drivers' responses to a standard set of scenarios. For each scenario, participants rated their anger and listed their reasons for becoming angry. The relationships between the ADMQ subscales were further examined, along with additional evidence concerning the validity of the subscale scores.

Method

Participants

One hundred ninety-three participants from the Psychology Undergraduate Research pool completed Study 3 through SONA online data collection. Using the same "lie" scale standard as in the previous studies (Kruglanski, 2012), 14 participants (7.3%) were discarded, leaving 179 undergraduates. Participants received course credit in exchange for their participation.

Participants had a mean age of 18.98 years, *SD* = 1.42. Participants were 29% male, 71% female; 90% Caucasian, 1% Black, 4% Asian or Pacific Islander, 2% Hispanic, and 3% Other. On average, participants drove 4.4 days per week, for an average of 92.9 miles, and had been driving for an average of 4.2 years, *SD* = 1.89.

Procedure & Measures

Participants completed the Aggressive Driving Motivations Questionnaire and then were asked to describe five different driving situations that they had personally encountered that made them angry. After they described the first situation, they were asked to rate how angry they were at the time the situation occurred on a scale ranging from 0 (*not at all*) to 4 (*very much*). After rating their anger for that situation, the participants were asked to list the reasons that specific situation made them angry. They repeated these questions for each of five situations they recalled. The generated driving scenarios were categorized by two independent coders into the following categories: concern for physical space/safety, concern for speed/time, communication from other driver, and not paying attention/lack of communication. Due to the complicated nature of these descriptions, participants' scenarios often fit into more than one category, and thus were given more than one category code if applicable. Coders discussed discrepancies until a consensus was reached for each scenario. Reasons the scenario provoked anger were categorized into five categories: Negative personality attribute of the other driver, breaking rules, dangerous, inconvenienced, and self-righteous. Again, more than one code was given if applicable and coders discussed and resolved all discrepancies. The number of reasons given for each scenario were also recorded. See the Appendix for examples of scenarios and reasons that fit into each category.

Next, the participants were presented with a series of driving scenarios and were asked to rate their anger again ranging from 0 (*not at all*) to 4 (*very much*), and to list the reasons that specific situation would make them angry. See Table 32 for the descriptions of presented scenarios that were selected from the Propensity for Angry Driving Scale (PADS, DePasquale et al., 2001). Each of these scenarios were chosen to have the best breadth of driving situations without fatiguing the participants. Reasons the scenario provoked anger were coded similarly as for the self-generated scenarios, along with number of reasons given. Lastly as in Study 2, participants completed the "lie" scale, the Driving Anger Scale, State Trait Anger Expression Inventory, Self-Control Scale, Driving Behavior Questionnaire, and demographic items.

Self-Control Scale. Participants rated their agreement on 10 items using a 5-point Likert scale ranging from 1 (*not at all like me*) to (*very much like me*). Negative items were reverse scored so that higher scores indicate higher self-control, and an average score computed.

State Trait Anger Expression Inventory (STAXI). Participants rated their trait anger on 10 items with responses ranging from 1 (*almost never*) to 4 (*almost always*). Responses were summed to form a composite score.

Driving Anger Scale (DAS). Participants rated the extent to which 14 imagined incidents would provoke feelings of anger on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*very much*). A composite score was formed by summing across the items.

Driving History Questionnaire. Participants were asked to complete a 35 item survey of driving history adapted from Deffenbacher, Huff, Lynch, Oetting, and Salvatore (2000) assessing four types of driving outcomes. Most relevant to the hypotheses are the 14 items assessing aggressive driving behavior outcomes, and the 15 items relevant to risky driving behavior.

Participants responded by estimating the frequency they have engaged in the various outcomes in the past three months on a 0 to 5 or more scale.

Table 32

Presented Driving Scenarios from the PADS

Scenario	Description
Single Lane Braking	You are driving on a single lane road. For no apparent reason the car in front of you is constantly braking and accelerating causing you to drive in the same manner.
Parking Lot Steal	You are in a full parking lot. You see a driver leaving and you put on your blinker to indicate you intend to take the parking space. As the other driver pulls out, a second driver cuts in front of you from the other side and takes the parking space.
Traffic Jam Squeeze	You are driving your vehicle in a traffic jam in the far right hand lane. Out of nowhere, a car comes up from behind on the shoulder and attempts to squeeze in front of you.
Being Tailgated	You are driving in the passing lane at 75 mph. The speed limit is 55 mph. A car comes up behind you very quickly. Soon the other vehicle is right on your bumper and the driver flashes his/her headlights and honks the horn.

Table 32 continued

Bumped in Traffic Jam	You have been sitting in your car in a traffic jam for over 20 minutes. Suddenly, a car lightly bumps you from behind.
No Pass Allowed	You are driving on the interstate. One of the cars in front of you keeps switching lanes preventing other cars from passing efficiently. Thus traffic is being slowed.
Pedestrian Danger	You are driving on a city street. Without warning, a pedestrian suddenly runs in front of your car nearly causing you to hit him/her.
Failed Exit	You are trying to exit off the highway. However, a car coming on to the highway has failed to acknowledge a yield sign and their behavior has caused you to miss the exit.
Hogging Passing Lane	You are driving on the highway in the passing lane. You come up behind another car in the passing lane. You flash your headlights as an indicator for the other car to move over. Instead of moving over, you see the driver in the other car give you the finger and remain in the passing lane.
Missed Green Arrow	You are in the left-hand lane behind another vehicle. When the left turn light is given, the vehicle does not move because the driver is not paying attention. You tap on your horn to get his/her attention and he/she gives you the middle finger in her rearview mirror.

Results

Descriptive Statistics

Overall, the means and standard deviations for past aggressive driving behavior, covariates, and sub-scales of the Aggressive Driving Motivations Questionnaire were very similar to the student sample in Study 2, shown in Table 33. However, the Driving Anger Scale mean score was significantly higher than in the Study 2 sample, $t(450) = 7.32$, $p < .001$. Past aggressive driving items and past risky driving items were very similar across samples, shown in Tables 34 and 35. Correlations for study 3 measures are shown in Table 36.

Table 33

Descriptive Statistics Study 3 (N = 179) and Study 2 Student Sample (N =273)

	Study 3		Study 2 Student Sample	
Variable	Mean	*SD*	Mean	*SD*
Past Aggressive Driving Behavior	11.01	10.23	10.73	11.17
Past Risky Driving Behavior	16.27	11.47	15.75	11.89
DAS	33.96	9.34	26.77	10.75
STAXI	20.81	6.02	18.62	5.77
Self-Control Scale	-.96	.72	-.95	.66
RDM	32.88	3.77	31.52	3.74
NDM	23.15	4.67	22.79	4.59

Table 34

Past Aggressive Driving Items Study 3 (N = 179) and Study 2 Student Sample (N =273)

	Study 3		Study 2	
Variable	Mean	*SD*	Mean	*SD*
Broken or damaged a part of a vehicle	.20	.65	.17	.58
Had an argument with a passenger while driving	.90	1.20	.86	1.21
Had a verbal argument with the driver of another vehicle	.21	.74	.23	.77
Had a physical fight with the driver of another vehicle	.03	.28	.10	.48
Made an angry gesture at another driver or pedestrian	.78	1.38	1.08	1.50
Swore at or called another driver or pedestrian names	1.46	1.82	1.72	1.92
Flashed your headlights in anger	.31	.88	.39	.93
Honked your horn in anger	.73	1.24	.84	1.38
Yelled at another driver or pedestrian	1.11	1.70	1.08	1.67
Drove while being very angry	1.68	1.60	1.29	1.53
Lost control of your anger while driving	.47	1.15	.48	1.05
Drove up close behind another driver in anger	1.20	1.57	.92	1.38
Cut another driver off in anger	.56	1.15	.43	1.03
Tailgated or followed another vehicle too closely	1.36	1.63	1.16	1.54

Table 35

Past Risky Driving Items Study 3 (N = 179) and Study 2 Student Sample (N =273)

	Study 3		Study 2	
Variable	Mean	*SD*	Mean	*SD*
Driven without using your seat belt	.91	1.68	.75	1.43
Drank alcohol and driven	.41	1.03	.33	.85
Been drunk and driven	.14	.61	.23	.79
Driven 10-20 mph over the limit	2.93	1.82	2.61	1.84
Driven 20+ mph over the limit	1.00	1.60	.87	1.45
Passed unsafely	.58	1.14	.58	1.12
Changed lanes unsafely	.77	1.32	.80	1.30
Drifted into another lane	.97	1.29	.83	1.26
Switched lanes to speed through slower traffic	2.59	1.94	2.62	2.01
Gone out of turn at a red light or stop sign	.54	1.05	.55	1.14
Made an illegal turn	.43	.97	.62	1.19
Driven recklessly	.62	1.18	.71	1.22
Run a red light or stop sign	.45	1.09	.40	.93
Entered an intersection when the light was turning red	1.11	1.47	.97	1.44

Table 35 continued

	Study 3		Study 2	
Variable	Mean	*SD*	Mean	*SD*
Used a cellular phone while you were driving	2.82	2.04	2.89	2.02

Table 36

Correlations for Study 3 Variables

	1	2	3	4	5	6	7	8	9	10	Mean	*SD*
1. Narcissistic Driving Motivations	.71	-.27**	.45**	.36**	-.28**	-.26**	.27**	.27**	.57**	.51**	23.15	4.67
2. Rigid Driving Motivations		.75	.06	.14	.07	.10	.20**	.23**	-.15*	-.30**	32.88	3.77
3. State Trait Anger Expression Inventory			.87	.53**	-.44**	-.02	.44**	.44**	.43**	.15	20.81	6.02
4. Driving Anger Scale				.86	-.27**	.13	.45**	.69**	.31**	.09	33.96	9.34
5. Self-Control Scale					.82	.01	-.12	-.08	-.32**	-.34**	-.96	.72
6. Gender						-	.03	.23**	-.05	-.16*	.72	.45
7. Total Anger – Generated Scenarios							.65	.53**	.35**	.02	14.47	3.23
8. Total Anger – Presented Scenarios								.78	.30**	.10	28.12	6.70
9. Past Aggressive Driving Behaviors									.82	.53**	11.01	10.23
10. Past Risky Driving Behaviors										.84	16.27	11.47

*p < .05, **p < .01, Gender (0 = Male, 1 = Female), α on diagonal

Scenario Categories Self-Generated by Participants

First, the frequencies of type of scenario category generated by the participants were examined. Concern for physical space or safety accounted for 570 (52%) responses, concern for speed or time accounted for 246 (22%) responses, communication from other driver was 66 (6%) responses, not paying attention or lack of communication was 161 (15%) responses, and 52 (5%) responses were categorized as "other," see Figure 8.

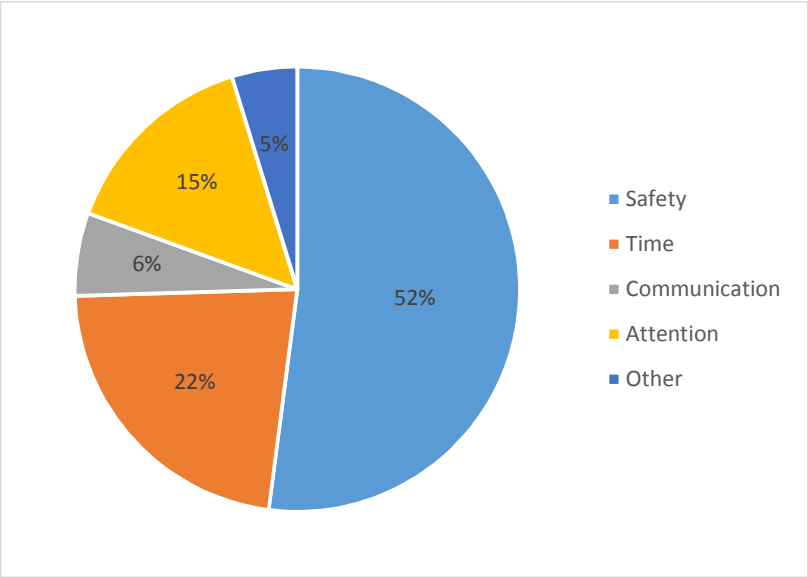

Figure 8. Type of Self-Generated Driving Scenarios

The proportional response was calculated across each of the five scenarios generated by participants. A series of regressions were performed to determine whether the narcissism (NDM) and rigidity (RDM) sub-scores predicted the proportion of each category type across the five scenarios generated by participants. Neither Narcissistic Driving Motivations nor Rigid Driving Motivations were significant predictors of any of the proportion dependent variables for the five categories, so there was no relationship found between what type of angry driving scenario comes to mind and these measures of driving motivations.

Anger across Self-Generated Scenarios

A total anger score across the five generated scenarios was computed. A regression analysis revealed that total anger was not significantly predicted by any of the proportional self-generated driving scenario categories, $F(4, 165) = .42$, $p = .80$. Therefore, category of generated scenario was not related to participants' total anger response. A second regression analysis revealed that both Rigid Driving Motivations and Narcissistic Driving Motivations had a significant effect on total anger across the five generated scenarios, $F(2, 174) = 14.73$, $p < .001$; see Table 37.

Table 37

Regression Analysis of NDM and RDM Predicting Total Anger across Generated Scenarios

Variables	*B*	*SE B*	*β*	*p*
Narcissistic Driving Motivations	.23	.05	.33	<.001
Rigid Driving Motivations	.25	.06	.28	<.001

Anger Reason Categories in Self-Generated Scenarios

Combining across the five self-generated driving scenarios, the frequencies of reasons made angry were as follows: 320 (24%) responses were categorized as a negative personality trait of the other driver, 312 (23%) responses were categorized as breaking rules, 391 (29%) responses were categorized as dangerous, 238 (18%) responses were categorized as inconvenienced, and 79 (6%) responses were categorized as self-righteous. See Figure 9 for reasons generated by all participants. The majority of participants listed multiple reasons for their

provoked anger; the average total number of reasons across the five generated scenarios was 8.53 (*SD* = 2.60). The proportional response for category of anger reason in a self-generated driving scenario was calculated and used as the dependent variable in a series of regression analyses, with Narcissistic Driving Motivations and Rigid Driving Motivations as predictors. Again, neither NDM nor RDM were significant predictors of the proportional category of reasons made angry in any of the analyses. Therefore, neither had a significant effect on the anger reasons of participants' self-generated driving scenarios.

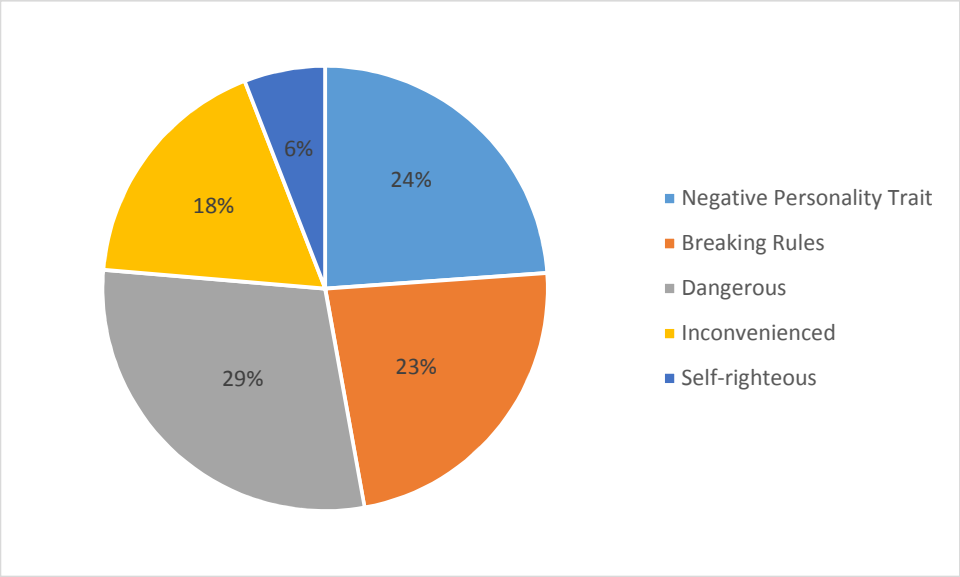

Figure 9. Type of Anger Reasons in Self-Generated Scenarios

Anger in Presented Scenarios

A series of regressions examined the influence of Rigid Driving Motivations and Narcissistic Driving Motivations on anger responses in each of the presented scenarios. In almost all of the analyses, both RDM and NDM predicted higher anger responses; only three of the presented scenarios had one or the other of the predictors as non-significant: Being Tailgated (NDM), Failed Exit (NDM), and Hogging Passing Lane (RDM). A total anger score was

computed across the presented scenarios, and a regression analysis showed both NDM and RDM had significant positive relationships with total anger across presented scenarios, indicating that overall, those scoring higher in NDM and RDM had greater anger across all scenarios, $F(6, 172) = 35.09$, $p < .001$. See Table 38 for regression coefficients.

Table 38

Regressions Predicting Anger in Scenarios with NDM and RDM (N=179)

Single Lane Braking	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.06	.02	.27	<.01
	Rigid Driving Motivations	.06	.02	.21	.01
Parking Lot Steal	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.07	.02	.30	<.01
	Rigid Driving Motivations	.05	.02	.16	.03
Traffic Jam Squeeze	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.05	.02	.21	.01
	Rigid Driving Motivations	.09	.02	.27	<.01
Being Tailgated	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.03	.02	.09	.26
	Rigid Driving Motivations	.08	.03	.21	.01

Table 38 continued

Bumped in Traffic Jam	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.06	.02	.26	<.01
	Rigid Driving Motivations	.05	.02	.18	.02
No Pass Allowed	**Variables**	***B***	***SE B***	***β***	***p***
	Narcissistic Driving Motivations	.07	.02	.32	<.01
	Rigid Driving Motivations	.06	.02	.21	.01
Pedestrian Danger	**Variables**	***B***	***SE B***	***β***	***p***
	Narcissistic Driving Motivations	.04	.02	.16	.04
	Rigid Driving Motivations	.07	.02	.23	<.01
Failed Exit	**Variables**	***B***	***SE B***	***β***	***p***
	Narcissistic Driving Motivations	.03	.02	.13	.09
	Rigid Driving Motivations	.07	.02	.23	<.01
Hogging Passing Lane	**Variables**	***B***	***SE B***	***β***	***p***
	Narcissistic Driving Motivations	.05	.02	.19	.02
	Rigid Driving Motivations	.01	.03	.03	.71

Table 38 continued

Missed Green Arrow	Variables	*B*	*SE B*	*β*	*p*
	Narcissistic Driving Motivations	.06	.02	.22	<.01
	Rigid Driving Motivations	.07	.02	.20	.01
Total Anger	**Variables**	***B***	***SE B***	***β***	***p***
	Narcissistic Driving Motivations	.52	.10	.36	<.01
	Rigid Driving Motivations	.59	.13	.33	<.01

Anger Reason Categories in Presented Scenarios

Participants gave multiple reasons they would become angry in each of the 10 presented scenarios, so these responses were transformed to a set of binary variables, one variable for each reason category. For example, if a participant gave a reason categorized as a negative personality trait, it was scored as a one. If it was not in that category, it was scored as a zero for that variable, and so forth, so that each scenario had a total of five binary reason variables for each participant. A series of direct logistic regressions examined Rigid Driving Motivations and Narcissistic Driving Motivations predicting the binary category variables. Only regression coefficients for analyses with significant full model chi-squares are presented in Tables 39-44.

In the single lane breaking scenario, individuals higher on Narcissistic Driving Motivations were more likely to report a negative personality trait ($\chi^2(2, N = 177) = 11.26, p < .01$) and breaking rules ($\chi^2(2, N = 177) = 6.08, p = .05$) as reasons to become angry.

Table 39

Single Lane Breaking: Logistic Regressions Predicting Anger Reasons

Personality Trait	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	.12	.04	10.20	<.01	1.13
	Rigid Driving Motivations	.05	.05	1.44	.23	1.06
Breaking Rules	**Variables**	***B***	***SE***	**Wald χ^2**	***p***	**Odds Ratio**
	Narcissistic Driving Motivations	.08	.04	5.09	.02	1.09
	Rigid Driving Motivations	.07	.05	2.05	.15	1.07

In the parking lot steal scenario, individuals higher on Rigid Driving Motivations were more likely to report breaking rules ($\chi^2(2, N = 178) = 6.87, p = .03$), dangerous ($\chi^2(2, N = 178) = 6.11, p = .05$), and self-righteous ($\chi^2(2, N = 178) = 9.89, p < .01$) reasons to become angry.

Table 40

Parking Lot Steal: Logistic Regressions Predicting Anger Reasons

Breaking Rules	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	.02	.03	.36	.55	1.02
	Rigid Driving Motivations	.11	.04	6.44	.01	1.12
Dangerous	**Variables**	***B***	***SE***	**Wald χ^2**	***p***	**Odds Ratio**
	Narcissistic Driving Motivations	-.05	.07	.40	.53	.96
	Rigid Driving Motivations	.24	.12	4.47	.04	1.28
Self-Righteous	**Variables**	***B***	***SE***	**Wald χ^2**	***p***	**Odds Ratio**
	Narcissistic Driving Motivations	.08	.04	3.33	.07	1.08
	Rigid Driving Motivations	.15	.06	7.53	<.01	1.17

In the traffic jam squeeze scenario, individuals higher on Rigid Driving Motivations were more likely to report breaking rules ($\chi^2(2, N = 176) = 6.84, p = .03$) and dangerous ($\chi^2(2, N = 176) = 10.00, p < .01$) as reasons for becoming angry.

Table 41

Traffic Jam Squeeze: Logistic Regressions Predicting Anger Reasons

Breaking Rules	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	.05	.04	1.34	.25	1.05
	Rigid Driving Motivations	.12	.05	6.33	.01	1.13
Dangerous	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	-.03	.05	.46	.50	.97
	Rigid Driving Motivations	.18	.07	7.53	.01	1.20

In the being tailgated scenario, individuals higher on Rigid Driving Motivations were more likely to report a negative personality trait of the other driver ($\chi^2(2, N = 178) = 9.38, p < .01$) as a reason for becoming angry.

Table 42

Being Tailgated: Logistic Regressions Predicting Anger Reasons

Personality Trait	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	-.06	.04	2.17	.14	.94
	Rigid Driving Motivations	.12	.05	4.85	.03	1.13

In the bumped in traffic jam scenario, individuals higher on Narcissistic Driving Motivations were less likely to report a negative personality trait of the other driver as a reason for becoming angry ($\chi^2(2, N = 177) = 9.17, p = .01$). Individuals higher on Rigid Driving Motivations were more likely to report dangerous as a reason for becoming angry ($\chi^2(2, N = 177) = 6.17, p = .05$).

Table 43

Bumped in Traffic Jam: Logistic Regressions Predicting Anger Reasons

Personality Trait	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	-.11	.04	8.15	<.01	.90
	Rigid Driving Motivations	-.01	.05	.09	.76	.99
Dangerous	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	.07	.04	3.50	.06	1.07
	Rigid Driving Motivations	.09	.04	4.05	.04	1.09

In the missed green arrow scenario, individuals higher on Rigid Driving Motivations were more likely to report a negative personality trait of the other driver as a reason to become angry ($\chi^2(2, N = 178) = 7.64, p = .02$).

Table 44

Missed Green Arrow: Logistic Regressions Predicting Anger Reasons

Personality Trait	Variables	*B*	*SE*	Wald χ^2	*p*	Odds Ratio
	Narcissistic Driving Motivations	-.01	.04	.02	.88	1.00
	Rigid Driving Motivations	.12	.05	6.45	.01	1.12

Across the scenarios, two patterns emerged. Individuals higher on Rigid Driving Motivations were more likely to report danger (three scenarios) and negative personality traits (two scenarios) as a reasons they would become angry. Individuals higher on Narcissistic Driving Motivations were less likely to report a negative personality trait as a reason in one scenario and more likely to report a negative personality trait in one scenario. Individuals high on RDM were likely to report breaking rules as a reason to become angry in two scenarios, and individuals high on NDM were likely to report breaking rules as a reason in one scenario. High RDM individuals were also more likely to report self-righteous reasons for becoming angry in one scenario. Using the proportional dependent variables, individuals high on RDM were more likely to report a lower proportion of negative personality traits across the ten presented scenarios ($F(2, 173) = 4.46$, $p = .01$, $B = -.22$, $p < .01$). All other categories were non-significant.

Predictive Validity

The final set of analyses examined the predictive validity of the Rigid Driving Motivations and Narcissistic Driving Motivations scores using regression analyses. Similar to Study 2, only NDM significantly predicted past aggressive driving behavior, indicating that individuals higher on NDM were more likely to report past aggressive driving behavior. See Table 45 for regression coefficients. Using past risky driving behavior as the outcome variable, again only NDM was significant predictor, although RDM was marginally significant (p = .06). Higher scores on NDM predicted more risky driving, and higher scores on RDM predicted marginally less risky driving. See Table 46 for regression coefficients.

Table 45

Study 3: Summary of Hierarchical Regression Analysis Predicting Past Aggressive Driving Behavior

Variable	*B*	*SE B*	*β*
Step 1			
DAS	.10	.09	.10
STAXI	.54	.14	.32**
Self-Control	-2.19	1.06	-.15*
Step 2			
DAS	.03	.08	.03
STAXI	.30	.14	.18*
Self-Control	-1.55	.96	-.11
NDM	.96	.16	.44**
RDM	-.10	.18	-.04

Note. R^2*=.21 for Step 1;* ΔR^2*=.16 for Step 2; (ps <.001). *p < .05, **p<.01.*

Table 46

Study 3: Summary of Hierarchical Regression Analysis Predicting Past Risky Driving Behavior

Variable	*B*	*SE B*	*β*
Step 1			
DAS	-.01	.10	-.01
STAXI	.00	.17	.00
Self-Control	-5.53	1.26	-.35**
Step 2			
DAS	-.09	.09	-.07
STAXI	-.30	.15	-.16*
Self-Control	-4.54	1.09	-.28**
NDM	1.22	.18	.50**
RDM	-.38	.20	-.12

Note. R^2*=.12 for Step 1;* ΔR^2*=.24 for Step 2; (ps <.001). *p < .05, **p<.01.*

CHAPTER 6: DISCUSSION

The primary goal of the present research was to create a valid measure of rigid and narcissistic aggressive driving motivations. The Aggressive Driving Motivations Questionnaire scores evidenced good reliability, and the assessment of content and construct validity was satisfactory. From the pilot studies and Study 1, 16 items were selected based on correlations with the personality measures that followed the hypothesized direction. Overall, the pilot studies and Study 1 showed correlations of the expected size and direction with the associated personality measures, giving support for convergent and discriminant validity. The exploratory factor analysis in Study 1 indicated the hypothesized two factors reflecting the proposed domains of rigidity and narcissism with a small negative correlation, and the confirmatory factor analysis in Study 2 confirmed the hypothesized factor structure in both the student and adult non-college samples. The non-college population in Study 2 provided additional validity evidence, and therefore it is reasonable to expect that this measure is generalizable beyond the college student population.

Predictive Validity

The predictive validity findings were more complex. The regression analyses in Study 1 demonstrated that Narcissistic Driving Motivations and Rigid Driving Motivations independently predicted past aggressive driving behavior and past risky driving behavior. Consistent with the hypothesis, RDM predicted less risky driving behavior but unexpectedly, RDM's influence was in the negative direction for past aggressive driving; individuals who scored higher on RDM had less past aggressive driving behavior. This same pattern was also found in the student sample of Study 2, however in the M-Turk sample of Study 2, RDM predicted neither past aggressive nor risky driving behavior, and in Study 3, RDM only

marginally predicted less risky driving behavior. Across all analyses, NDM predicted both more aggressive and risky driving behavior as expected.

One noteworthy difference between the samples was in the amount of past aggressive driving reported. The M-Turk sample reported only half as much aggressive driving behavior compared with the student samples, and also had a much smaller standard deviation. It is possible that the range of the dependent variable was too restricted for Rigid Driving Motivations to successfully predict less aggressive driving behavior in that sample. In the Study 3 sample, the Driving Anger Scale scores were significantly higher than in all the other samples. Both the DAS and the past behavior items were completed after generating scenarios and responding to the presented scenarios, so it could be that participants were in a heightened state of awareness of their anger in driving situations. It still is unexplained why RDM failed to predict less aggressive driving behavior in Study 3, and was only marginally significant to predict less risky driving behavior in Study 3.

Scenario and Reason Categories

Study 3 was somewhat exploratory, but it used a rigorous methodology with both situation sampling of generated scenarios and measurement of participant's responses to standardized scenarios. It was expected that specific driving situations would be found that produced differing anger levels for rigid and narcissistic individuals, and that those groups would also differ in the reasons that they become angry in those driving situations. The situations generated by participants were highly variable, and almost all were compound scenarios that fit into more than one category of safety, time, communication, or attention, and so they were very challenging to tease apart. The large variability in these responses could have contributed to the

difficulty in discerning a pattern using Rigid Driving Motivations and Narcissistic Driving Motivations.

There was also great variability within the reasons categories such that one reason given by a participant could fit into several categories. Additionally, the extremeness of responses varied considerably. Some participants recalled incidents that made them extremely angry, whereas others recalled incidents in which they were only mildly provoked. Ratings of the aggressiveness or severity of generated situations and reasons made angry may be a useful variable to code for in future research. The aggressive response of high RDM individuals might be better captured by this kind of dependent variable rather than a measure of past behavior which must be recalled accurately and quantified. A diary study where participants track incidents as they occur over a period of time and give their ratings of anger and reasons they are angry as the incidents are occurring would give a more accurate picture of participants' aggressive driving behavior. Researchers could also have participants determine for themselves what category a given situation belongs to, which would further lessen any coding error by researchers.

One aspect of Study 3 that was highly consistent was Rigid Driving Motivations and Narcissistic Driving Motivations' prediction of anger responses in the presented scenarios. In almost all of the scenarios, both RDM and NDM predicted higher levels of anger, but the three scenarios that lacked one or the other as a significant predictor may be of interest to examine. For example, in the Being Tailgated scenario, high RDM individuals were more likely to become angry, but high NDM individuals were not. Perhaps rigid individuals are sensitive to others who are trying to force them to drive in a certain way that they perceive to be more dangerous, whereas a narcissist might settle into their speed and even taunt the tailgater with their inability

to go faster, but not necessarily become angry because their need for vengeance is already being satisfied. The opposite pattern occurred in the Hogging Passing Lane scenario where the rigid individuals were not angered, but the narcissistic individuals were. In this scenario, the driver's right of way is being impeded and their signal is being ignored, so it make sense that a narcissist's ego would be threatened, whereas a rigid individual may be more likely to accept the flow of traffic as the rule.

In the presented scenarios, Rigid Driving Motivations and Narcissistic Driving Motivations significantly predicted reasons categories, but there was not a consistent pattern across the scenarios. It was expected that RDM would predict rules broken as a reason to become angry in every presented scenario, but that was only the case in two scenarios. Within the category of breaking rules, the breaking of etiquette or norms was conflated with breaking legal rules. There may be a difference where high NDM individuals are made angrier by others breaking social norms because they feel insulted, but high RDM individuals may be angrier for both kinds of rule breaking. Future studies could use both specific categories of rule breaking to differentiate between reasons made angry for high RDM and NDM individuals.

The danger category is another category that would benefit from more differentiation. High RDM individuals were more likely to report danger as a reason to become angry in three scenarios, but the danger category included both danger to persons and risk of damage to a vehicle. Previous research has shown that drivers often view their vehicles like an extension of themselves, a valuable part of their personal space or territory that should be defended if threatened (Marsh & Collett, 1987). It could be that high NDM individuals would be more likely to be angry about damage to their vehicle rather than damage to persons due to a feeling of "threat to self," so it would be interesting to separate those sub-categories. There was also one

scenario that did not work well and should be edited for future use: many participants commented on the being tailgated scenario that "I would never drive 20 miles over the speed limit," and so they found the whole scenario unrelatable. A range of only 5-10 miles over the speed limit would make the scenario more applicable to all participants.

Future Directions

Defining Aggressive Driving

The current research has the potential to contribute to the discussion of how aggressive driving is operationally defined. Across the definitions offered by researchers thus far, the intent of the driver to cause harm is the determining factor that defines a driving behavior as aggressive (Deffenbacher, 1999; Dula & Geller, 2003; Ellison-Potter et al., 2001; Galovski & Blanchard, 2002; Hauber, 1980; Hennessy & Wiesenthal, 2005; Tasca, 2000). The current research used a list of specific behaviors in line with Tasca's (2000) catalog to define aggressive driving: tailgating, weaving in and out of traffic, improper passing or lane changes, failure to yield, preventing other drivers from passing, unwillingness to merge or change lanes, excessive speeding, and running stop signs or red lights. Also included in this list were displays of annoyance or hostility or annoyance meant to intimidate or irritate other drivers: flashing headlights, horn-honking, glaring at other drivers to show disapproval, yelling, or gesturing. Included in the list of risky driving behaviors were those that could place others in danger, but lack the motivation of intent to harm. Across all samples, high NDM individuals were more likely to report both more past aggressive and risky driving behavior than low NDM individuals. The results for RDM were more inconsistent but in general, high RDM individuals were more likely to report both less risky and less aggressive driving behavior than low RDM individuals. These results are evidence that the categories of aggressive driving and risky driving are

correctly defined because different motives of narcissism and rigidity differentially predict these categories of driving behavior. It may also be the case that differences in high NDM and high RDM individuals correspond to differences in intent to cause harm. Perhaps high NDM individuals are more willful in their intent to cause harm while driving, leading to a greater incidence of aggressive driving. High RDM individuals may have a lower intent to cause harm, and therefore exhibit less aggressive driving behavior. Future research should continue to use these operational definitions and examine other motives that may differentiate between aggressive and risky driving.

Rigid Motivations

A worthwhile line of research for future studies would be to examine the suppression of the relationship between anger and aggressive driving behavior for high RDM individuals. The hypothesized causal chain was that a provoking event would create anger, which would lead to retaliation for both high NDM and RDM individuals. It was hypothesized that rigid individuals would become angry in situations where the rules of the road are being violated or because they feel out of control. It was predicted that even though rigid individuals do not like to break rules, if they become angry enough, their need to retaliate would override their own need to follow the rules. It was expected that higher scores on RDM would therefore predict more aggressive driving, but this was not the case. As seen in Study 3, high rigid individuals were more likely to report high levels of anger across the scenarios, but for some reason their anger did not translate into more aggressive driving behavior. It may be that there is another unmeasured mechanism that is responsible for the suppression of anger before it causes retaliation. One suppression mechanism could originate from the rigid person's sense of self as a rule-follower, thus preventing follow-through in aggressive behavior.

Because of these inconsistent predictive findings, rigid motivations do not seem to be a helpful tool in explaining aggressive driving behavior. Rigidity is a very broad concept, spanning the domains of attitudes, intellectual development, perception, personality, belief systems, problem solving, and social cognition. But there has not been any quantity of research connecting the concept of rigidity to aggressive behavior. The relationship between a rigid person's anger and aggressive behavior was all but absent in the literature, which should have indicated that this causal chain would not hold for rigid individuals. Perhaps there are other personality variables that have established relationships with aggressive behavior, like sensation-seeking, that would be beneficial in differentiating the motivations of aggressive drivers.

Narcissistic Motivations

The causal chain of provoking event to anger to aggressive behavior was confirmed for high narcissistic individuals. It was hypothesized that narcissistic individuals would become angry because of a threat to self, or because they feel like they are being slighted. This hypothesis was supported, as shown in Study 3: high NDM individuals were more likely to report anger in the scenarios and also more likely to report past aggressive driving behavior. These findings are consistent with the literature examining the relationship between narcissism and driving aggression, specifically, that narcissists are more likely to respond with more anger and aggression when they encounter a provoking driving scenario (Lustman, et al., 2010). Because narcissists are hypersensitive to potential insults or challenges to their inflated self-views (Raskin & Terry, 1988), they may have an increased tendency to react with retaliation when they feel another driver has acted inconsiderately or in a purposely provocative way, whereas an individual low on narcissism may not perceive these same situations as threatening or may not even notice the event had occurred. Many of the motivations exhibited by narcissists

that can lead to aggressive driving - competitiveness, exhibitionism, manipulation, asserting superiority, ego-defensiveness, and entitlement - are successfully measured by the NDM in the driving context. Future research can use this subscale to further identify the specific situations that trigger these motivations, but would perhaps have better results using a different methodology than was used in this research, like a diary study, peer report, or measuring physiological reactions.

A tangential hypothesis posited that both vulnerable and grandiose narcissists would be prone to aggressive driving. In the two samples where Pathological Narcissism Scale was measured, the two types of narcissism were highly correlated: in Pilot Study 1 $r = .78$, and in Study 1 $r = .71$. Two hierarchical regressions using the combined samples revealed that indeed both grandiose and vulnerable narcissism predicted driving anger independently, but only grandiose narcissism predicted aggressive driving independently. See Tables 47 and 48. A regression analysis using all seven PNI subscales to predict aggressive driving revealed that only the subscale of entitlement rage positively predicted aggressive driving, $F(7, 583) = 8.19$, $p < .001$; $B = .32$, $p < .001$, while contingent self-esteem predicted less aggressive driving, $B = -.15$, $p = .01$. Entitlement rage should be considered a key factor influencing the aggressive response of grandiose narcissists. It may also be useful to further investigate the specific motivations within the narcissistic personality disposition to see which motivations are the compelling force behind aggressive behavior. Additionally, because narcissists are not the only individuals who are aggressive drivers, it may be profitable to investigate these sub-motivations which could extend the prediction of aggressive driving behavior to the general population.

Table 47

Summary of Hierarchical Regression Analysis Predicting DAS

Variable	*B*	*SE B*	*β*
Step 1			
Vulnerable	.16	.02	.33**
Step 2			
Vulnerable	.05	.03	.11*
Grandiose	.16	.03	.29**

Note. R^2*=.11 for Step 1;* ΔR^2*=.04 for Step 2; (ps<.001). *p < .05, **p<.01.*

Table 48

Summary of Hierarchical Regression Analysis Predicting Aggressive Driving Behavior

Variable	*B*	*SE B*	*β*
Step 1			
Vulnerable	.08	.02	.15**
Step 2			
Vulnerable	.01	.03	.02
Grandiose	.10	.04	.18**

Note. R^2*=.02 for Step 1;* ΔR^2*=.01 for Step 2; (p <.001, p = .003). *p < .05, **p<.01.*

Vengeance

Although not examined in the current research, the motive of vengeance could potentially mediate the relationship between narcissism and aggressive driving behavior. The driving environment is apt to create situations in which vengeance motives emerge. In the literature, vengeful acts have been described as pursuing at least one of three sub-goals: (1) to get even with the offending party; (2) to teach the offender a lesson; or (3) to "save face" or make oneself look more worthy of respect in the eyes of the offender or other witnesses (McCullough, Bellah, Kilpatrick, & Johnson, 2001). All of these sub-goals are in line with the characteristics of individuals high in narcissism. In Wickens, Wiesenthal, and Roseborough's 2015 study, narcissism was found to be a significant predictor of driving vengeance as measured by the Driver Vengeance Questionnaire (Wiesenthal, Hennessy, & Gibson, 2000), so it is sensible to investigate whether vengeance mediates the relationship between narcissism and aggressive driving. If an individual has a narcissistic disposition that is prone to become angry in various driving situations, the desire for vengeance may be what fuels their aggressive response. Especially for grandiose narcissists, who are particularly on alert to defend any threat to their ego, vengeance may provide an opportunity to restore any lost respect or perceived loss of power.

Persuasive Matching

The goal of successfully identifying the specific motives behind aggressive driving behavior is that it would allow researchers to match the motives of types of drivers to messages that would be particularly effective in persuading them to reduce their aggressive driving. The evidence of the three current studies indicate that a persuasive campaign based on narcissistic motives would be effective for persuading those individuals to reduce their aggressive driving,

but there is not enough evidence that rigid motives lead to aggressive driving, and therefore it does not make sense to design a persuasive campaign using them.

Entitlement seems to be a key factor in the aggressive response of narcissistic drivers. Public officials aiming to reduce aggressive driving could design a public service announcement that is directed specifically toward the idea that everyone has rights on the road. Many persuasive messages would need to be tested, but having the starting point of the motive of entitlement gives researchers the domain in which their messages should be crafted. Additionally, using the results of a diary study may provide insight into what scenarios are particularly apt to trigger narcissistic motivations for aggressive driving. The current research indicates that the scenario Hogging Passing Lane would be one specific scenario that narcissistic individuals respond to with anger, and thus persuasive appeals addressed to that particular situation may be profitable. Drivers with other motivations yet to be identified would need messages that are focused specifically on the motives that they would find persuasive. Not all aggressive drivers can be persuaded using the same messages, so identifying the situations in which they are triggered and the messages that apply specifically to their motives will be the best solution for reducing aggressive driving. A program tailored to drivers who have a past record of aggressive driving could successfully coordinate with state programs giving remedial driving classes and target these persuasive messages at those individuals who most need to change their behavior.

Limitations

The current research was a good first step in investigating the relationship between the personality motivations of narcissistic individuals and aggressive driving behavior, but it needs to be replicated with both student and non-student samples. If there true differences between aggressive driving behavior in college-age students and older adults, perhaps aggressive driving

persuasive appeals should be aimed at the younger audience. Future research could examine the differences between these two groups that contribute to the differing amounts of aggressive driving behavior. Study 2 showed that the older adults had lower driving anger, lower trait anger, and higher self-control than their younger counterparts. This could simply be evidence of greater maturity, but perhaps as drivers grow older they develop better ways to cope with their anger in driving situations, and thus commit fewer acts of aggressive driving. Investigating these possible coping mechanisms may lead to fruitful results in combating the aggressive driving of the younger generation.

All four of the current samples were limited in their underrepresentation of non-Caucasian populations. Additionally, three out of four samples were from the same college population. It is possible that all of the variables studied – rigidity, narcissism, driving anger, trait anger, risky and aggressive driving – differ greatly in other populations. College students lack the driving experience of older adults and thus may react more impulsively or be angered in different ways from those who have encountered a broader range of scenarios on the road. On the other hand, college students may have less hesitation in reporting their aggressive driving, seeing it as more socially acceptable than older drivers. The influence of cultural norms should not be discounted either. Even within the different cultural regions of the United States, driving behavior that is considered acceptable in one region may be considered rude and anger provoking in another region. These differences are likely to be even more pronounced in the driving behavior and expectations around the world. Future research would benefit from more diverse samples for the sake of generalizability.

Conclusion

In summary, the present research contributed to the body of aggressive driving literature by creating an instrument that assesses some of the motivations that fuel aggressive driving behavior. Although only one of the subscales was useful in predicting aggressive driving behavior, it is still important to differentiate between different kinds of motivations because it enables researchers to more accurately address the causes of this dangerous behavior. The profile of the aggressive driver is not unidimensional, and more work needs to be done to differentiate the motivations behind aggressive driving. Personality motivations influence not only the way a person drives, but also how they respond to different provoking driving situations. If researchers can identify specific situations in which motivations are triggered, they can then create persuasive appeals matched specifically to those scenarios and have a greater persuasive effect in reducing aggressive driving. Reducing aggressive driving should be a high public health priority, and the Narcissistic Driving Motivations subscale of the Aggressive Driving Motivations Questionnaire has the potential to be a useful tool to be used toward meeting that end.

REFERENCES

AAA Foundation for Traffic Safety. (2009). *Aggressive driving: Research update.* Retrieved May 26, 2015 from http://www.aaafoundation.org/sites/default/files/ AggressiveDrivingResearchUpdate 2009.pdf

Agrawal, N., & Maheswaran, D. (2005). The effects of self-construal and commitment on persuasion. *Journal of Consumer Research, 31,* 841-849.

Ames, D. R., Rose, P., & Anderson, C. P. (2006). The NPI-16 as a short measure of narcissism. *Journal of Research in Personality, 40,* 440-450.

Andersen, S. M., Moskowitz, G. B., Blair, I. V., & Nosek, B. A. (2007). Automatic thought. In A. W. Kruglanski, & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 138–175). New York: The Guilford Press.

Anderson, J. C., & Gerbing, D. W. (1991). Predicting the performance of measures in a confirmatory factor analysis with a pretest assessment of their substantive validities. *Journal of Applied Psychology, 76,* 732-740.

Aronson, E. (1980). *The social animal* (3rd ed.). San Francisco, CA: Freeman and Company.

Baron, R. A., & Richardson, D. R. (1994). *Human aggression.* New York, NY: Plenum.

Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology, 44*, 1-26.

Baumeister, R. F., Bushman, B. J., & Campbell, W. K. (2000). Self-esteem, narcissism, and aggression: Does violence result from low self-esteem or from threatened egotism? *Current Directions in Psychological Science, 9,* 26-29.

Beer, J. (1989). Learning effects while passively viewing the Necker cube. *Perceptual and Motor Skills, 69,* 1391–1394.

Biaggio, M. K. (1980). Anger arousal and personality characteristics. *Journal of Personality and Social Psychology, 39,* 352-356.

Bower, G. H., & Forgas, J. P. (2000). Affect, memory, and social cognition. In E. Eich, J. F. Kihlstrom, G. H. Bower, J. P. Forgas, & P. M. Niedenthal (Eds.)*, Cognition and emotion.* Oxford, UK: Oxford University Press.

Brunstein, J. C., Schultheiss, O. C., & Grässmann, R. (1998). Personal goals and emotional well-being: The moderating role of motive dispositions. *Journal of Personality and Social Psychology, 75,* 494–508.

Budner, S. (1962). Intolerance of ambiguity as a personality variable. *Journal of Personality, 30,* 29–50.

Bushman, B. J., & Baumeister, R. F. (1998). Threatened egotism, narcissism, self-esteem, and direct and displaced aggression: Does self-love or self-hate lead to violence? *Journal of Personality and Social Psychology, 75,* 219-229.

Cain, N. M, Pincus, A. L., & Ansell, E. B. (2008). Narcissism at the crossroads: Phenotypic description of pathological narcissism across clinical theory, social/personality psychology, and psychiatric diagnosis. *Clinical Psychology Review, 28,* 638-656.

Campbell, W. K., Bonacci, A. M., Shelton, J., Exline, J. J., & Bushman, B. J. (2004). Psychological entitlement: Interpersonal consequences and validation of a self-report measure. *Journal of Personality Assessment, 83,* 29-45.

Crowson, H. M. (2009). Are all conservatives alike? A study of the psychological correlates of cultural and economic conservatism. *The Journal of Psychology, 143,* 449-463.

Cunningham, D. M., Ridley, S. E., & Campbell, A. (1988). Performance of field-independent and dependent college students, and their fixed and mobile subtypes on two formats of a cognitive task. *Perceptual and Motor Skills, 66,* 311–317.

Daly, M., & Wilson, M. (1988). *Homicide*. New York: Aldine de Gruyter.

Deffenbacher, J. L. (1999). Cognitive-behavioral conceptualization and treatment of anger. *Journal of Clinical Psychology. Special Issue: Treating Anger in Psychotherapy, 55*, 295-309.

Deffenbacher, J. L., Huff, M. E., Lynch, R. S., Oetting, E. R., & Salvatore, N. F. (2000). Characteristics and treatment of high-anger drivers. *Journal of Counseling Psychology, 47,* 5–17.

Deffenbacher, J. L., Oetting, E. R., Lynch, R. S. (1994). Development of a driving anger scale. *Psychological Reports, 74,* 83–91.

DePasquale, J. P., Geller, E. S., Clarke, S. W., & Littleton, L. C. (2001). Measuring road rage: Development of the propensity for angry driving scale. *Journal of Safety Research, 32,* 1-16.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41*, 417-440.

Dula, C., & Ballard, M.E. (2003). Development and evaluation of a measure of dangerous, aggressive, negative, emotional, and risky driving. *Journal of Applied Social Psychology, 33,* 263-282.

Dula, C. S., & Geller, E. S. (2003). Risky, aggressive, or emotional driving: Addressing the need for consistent communication in research. *Journal of Safety Research, 34,* 559-566.

Edwards, B. D., Warren, C. R., Tubré, T. C., Zyphur, M. J., & Hoffner-Prillaman, R. (2013). The validity of narcissism and driving anger in predicting aggressive driving in a sample of young drivers. *Human Performance, 26,* 191-210.

Ellison-Potter, P., Bell, P., & Deffenbacher, J. (2001). The effects of trait driving anger, anonymity, and aggressive stimuli on aggressive driving behavior. *Journal of Applied Social Psychology, 31,* 431-443.

Galovski, T., & Blanchard, E. B. (2002). Road rage: A domain for psychological intervention? *Aggression and Violent Behavior, 275,* 1-23.

Galovski, T. E., Malta, L. S., & Blanchard, E. B. (2006). *Road rage: Assessment and treatment of the angry, aggressive driver.* Washington, DC: American Psychological Association.

Glover, N., Miller, J. D., & Lynam, D. R. (2012). The Five-Factor Narcissism Inventory: A five-factor measure of narcissistic personality traits. *Journal of Personality Assessment, 5*, 500-512.

Goranson, R. E. (1970). *Observed violence and aggressive behavior: The effects of negative outcomes to the observed violence* Available from PsycINFO. (615701410; 1971-04116-

001). Retrieved from https://search-proquest-com.proxy.lib.iastate.edu/docview/615701410?accountid=10906

Gulian, E., Matthews, G., Glendon, A. I., Davies, D. R., & Debney, L. M. (1989). Dimensions of driver stress. *Ergonomics, 32,* 585-602.

Hauber, A. R. (1980). The social psychology of driving behavior and the traffic environment: Research on aggressive behavior in traffic. *International Review of Applied Psychology, 29,* 461-474.

Hennessy, D. A., & Wiesenthal, D. L. (1999). Traffic congestion, driver stress, and driver aggression. *Aggressive Behavior, 25,* 409-423.

Hennessy, D. A., & Wiesenthal, D. L. (2001). Further validation of the Driving Vengeance Questionnaire. *Violence and Victims, 16,* 565-573.

Hennessy, D. A., & Wiesenthal, D. L. (2005). Driving vengeance and willful violations: Clustering of problem driving attitudes. *Journal of Applied Social Psychology, 35,* 61-79.

Heyman, S. R. (1977). Dogmatism, aggression, and gender roles. *Journal of Clinical Psychology, 33,* 694-698.

Ho, R., & Gee, R. Y. (2008). Young men driving dangerously: Development of the motives for dangerous driving scale (MDDS). *Australian Journal of Psychology, 60,* 91-100.

Hu, L. & Bentler, P. (1999). Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

James, L., & Nahl, D. (2000). *Road rage and aggressive driving: Steering clear of highway warfare.* Amherst, NY: Prometheus Books.

Kitayama, S., Matsumoto, H., Markus, H. R., & Norasakkunkit, V. (1997). Individual and collective processes in the construction of the self: Self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology, 72,* 1245-1267.

Konrath, S., Bushman, B. J., & Campbell, W. K. (2006). Attenuating the link between threatened egotism and aggression. *Psychological Science, 17,* 995-1001.

Krizan, Z., & Johar, O. (2012). Envy divides the two faces of narcissism. *Journal of Personality, 80,* 1415-1451.

Krizan, Z., & Johar, O. (2015). Narcissistic rage revisited. *Journal of Personality and Social Psychology, 108,* 784-801.

Kruglanski, A. W. (2012). NFC Scale. Retrieved May 8, 2015, from http://terpconnect.umd.edu/~hannahk/NFC_Scale.html

Kruglanski, A. W., Webster, D. M., Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology, 65,* 861-876.

Levy, B. R. (2008). Rigidity as a predictor of older persons' aging stereotypes and aging self-perceptions. *Social Behavior and Personality, 36,* 559-570.

Luchins, A. S. (1942). Mechanization in problem solving. *Psychological Monographs, 54,* 6 (Whole No. 248).

Lustman, M., Wiesenthal, D. L., & Flett, G. L. (2010). Narcissism and aggressive driving: is an inflated view of the self a road hazard? *Journal of Applied Social Psychology, 40,* 1423-1449.

Malkin, M. L., Zeigler-Hill, V., Barry, C. T., & Southard, A. C. (2013). The view from the looking glass: How are narcissistic individuals perceived by others? *Journal of Personality, 81,* 1-15.

Maltby, J., & Lewis, C. (1996). An examination of the reliability and validity of the Breskin Rigidity Scale. *Perceptual and Motor Skills, 82,* 195–198.

Marsh, P., & Collett P. (1987). The car as weapon. *Et Cetera, 44,* 146-151.

Mayer, J. D., Gaschke, Y. N., Braverman, D. L., & Evans, T. W. (1992). Mood-congruent judgment is a general effect. *Journal of Personality and Social Psychology, 63,* 119-132.

McCrae, R. (1996). Social consequences of experiential openness. *Psychological Bulletin, 120,* 323–337.

McCrae, R. R., & Costa, P. T., Jr. (1996). Conceptions and correlates of Openness to Experience. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 825–847). New York: Academic Press.

McCullough, M. E., Bellah, C. G., Kilpatrick, S. D., & Johnson, J. L. (2001). Vengefulness: Relationships with forgiveness, rumination, well-being, and the Big Five. *Personality and Social Psychology Bulletin, 27,* 601-610.

Miller, J. D., & Campbell, W. K. (2008). Comparing clinical and social-personality conceptualizations of narcissism. *Journal of Personality*, *76*, 449-476.

Miller, J. D., Hoffman, B. J., Gaughan, E. T., Gentile, B., Maples, J., & Campbell, W. K. (2011). Grandiose and vulnerable narcissism: A nomological network analysis. *Journal of Personality, 79,* 1013-1042.

National Highway Traffic Safety Administration. (1999). *Aggressive driving and the law: a symposium.* Retrieved May 28, 2015, from http://www.nhtsa.gov/people/injury/aggressive/symposium/.

National Highway Traffic Safety Administration. (2008). *Traffic Safety Facts 2008*. Washington, DC: National Center for Statistics & Analysis.

National Highway Traffic Safety Administration. (2014). *Traffic Safety Fact Sheet 2012*. Washington, DC: National Center for Statistics & Analysis.

Neuberg, S. L., Judice, T. N., & West, S. G. (1997). What the need for closure scale measures and what it does not: Toward differentiating among related epistemic motives. *Journal of Personality and Social Psychology, 72,* 1396-1412.

Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simple structure. *Journal of Personality and Social Psychology, 65,* 113-131.

Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2,* 175-220.

Nunnally, J. C. (1978). *Psychometric theory.* New York: McGraw-Hill.

Okada, R. (2010). The relationship between vulnerable narcissism and aggression in Japanese undergraduate students. *Personality and Individual Differences, 49,* 113-118.

Paleti, R., Eluru, E., & Bhat, C. R. (2010). Examining the influence of aggressive driving behavior on driver injury severity in traffic crashes. *Accident Analysis & Prevention, 42,* 1839-1854.

Pincus, A. L., Ansell, E. B., Pimentel, C. A., Cain, N. M., Wright, A. G. C., & Levy, K. N. (2009). Initial construction and validation of the pathological narcissism inventory. *Psychological Assessment, 21,* 365-379.

Pincus, A. L., & Lukowitsky, M. R. (2010). Pathological narcissism and Narcissistic Personality Disorder. *Annual Review of Clinical Psychology, 6*, 421-426.

Raskin, R., & Terry, H. (1988). A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validation. *Journal of Personality and Social Psychology, 54,* 890-902.

Rathvon, N., & Holmstrom, R.W. (1996). An mmpi-2 portrait of narcissism. *Journal of Personality Assessment*, *66*, 1-19.

Reidy, D. E., Foster, J. D., & Zeichner, A. (2010). Narcissism and unprovoked aggression. *Aggressive Behavior, 36,* 414-422.

Reidy, D. E., Zeichner, A., Foster, J. D., & Martinez, M. A. (2008). Effects of narcissistic entitlement and exploitativeness on human physical aggression. *Personality and Individual Differences, 44,* 865-875.

Rhodewalt, F., & Morf, C. C. (1995). Self and interpersonal correlates of the Narcissistic Personality Inventory: A review and new findings. *Journal of Research in Personality, 29,* 1-23.

Ronningstam, E. (2005). Narcissistic personality disorder: A review. In M. Maj, H. S. Akiskal, J. E. Mezzich, & A. Okasha (Eds.), *Evidence and experience in psychiatry: Volume 8 personality disorders* (pp. 277–327). New York: Wiley.

Schaie, K. W. (1994). The course of adult intellectual development. *American Psychologist, 49,* 304–313.

Schreer, G. (2002). Narcissism and aggression: Is inflated self-esteem related to aggressive driving? *North American Journal of Psychology, 4,* 333-342.

Schultz, P. W., & Searleman, A. (2002). Rigidity of thought and behavior: 100 years of research. *Genetic, Social, and General Psychology Monographs, 128,* 165-207.

Snyder, M., & DeBono, K. G. (1985). Appeals to image and claims about quality: Understanding the psychology of advertising. *Journal of Personality and Social Psychology, 49,* 586-597.

Spielberger, C. D. (1996). *State-Trait Anger Expression Inventory.* Odessa, FL: Psychological Assessment Resources.

Steinmetz, J., Loarer, E., & Houssemand, C. (2011). Rigidity of attitudes and behaviors: A study on the validity of the concept. *Individual Differences Research, 9,* 84-106.

Stewin, L. (1983). The concept of rigidity: An enigma. *International Journal for the Advancement of Counselling, 6,* 227-232.

Stone, D. L., Kemmerer, B., & Guetutal, H. G. (1984). Relationship between rigidity, self-esteem, and attitudes about computer-based information systems. *Psychological Reports, 55,* 991-998.

Stuckless, N., & Goranson, R. (1992). The vengeance scale: Development of a measure of attitudes toward revenge. *Journal of Social Behavior & Personality, 7,* 25-42.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18,* 643–662.

Stucke, T. S., & Sporer, S. L. (2002). When a grandiose self-image is threatened: Narcissism and self-concept clarity as predictors of negative emotions and aggression following ego-threat. *Journal of Personality, 70,* 509-532.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72,* 271-322.

Tasca, L. (2000). *A review of the literature on aggressive driving research. Aggressive Driving Issues Conference.* Retrieved May 26, 2015, from http://www.stopandgo.org/ research/aggressive/tasca.pdf

Tillman, W. A., & Hobbs, G. E. (1949). The accident-prone driver. *American Journal of Psychiatry, 106,* 321-331.

Toner, K., Leary, M. R., Asher, M. W., & Jongman-Sereno, K. P. (2013). Feeling superior is a bipartisan issue: Extremity (not direction) of political views predicts perceived belief superiority. *Psychological Science, 24,* 2454-2462.

Twenge, J., & Campbell, W. (2003). "Isn't it fun to get the respect that we're going to deserve?" Narcissism, social rejection, and aggression. *Personality and Social Psychology Bulletin, 29,* 261-272.

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67,* 181-195.

Westen, D. (1990). The relations among narcissism, egocentrism, self-concept, and self-esteem. *Psychoanalysis and Contemporary Thought*, *13*, 185-241.

Wickens, C. M., Wiesenthal, D. L., & Roseborough, J. E. W. (2015). Personality predictors of driver vengeance. *Violence and Victims, 30,* 148-155.

Wiesenthal, D. L., Hennessy, D. A., & Gibson, P. (2000). The Driving Vengeance Questionnaire (DVQ): The development of a scale to measure deviant drivers' attitudes. *Violence and Victims, 15,* 115-136.

Wink, P. (1991). Two faces of narcissism. *Journal of Personality and Social Psychology*, *61*, 590-597.

APPENDIX: SURVEY INSTRUMENTS

Narcissistic Personality Inventory – (NPI)

For this part of the study, we are interested in how you identify with pairs of statements. Choose the statement that is closest to your feelings about yourself.

1. A When people compliment me I sometimes get embarrassed.
   B I know that I am good because everybody keeps telling me so.

2. A I prefer to blend in with the crowd.
   B I like to be the center of attention.

3. A I am no better or no worse than most people.
   B I think I am a special person.

4. A I like having authority over people.
   B I don't mind following orders.

5. A I find it easy to manipulate people.
   B I don't like it when I find myself manipulating people.

6. A I insist upon getting the respect that is due me.
   B I usually get the respect that I deserve.

7. A I try not to be a show off.
   B I am apt to show off if I get the chance.

8. A I always know what I am doing.
   B Sometimes I'm not sure of what I'm doing.

9. A Sometimes I tell good stories.
   B Everybody likes to hear my stories.

10. A I expect a great deal from other people.
    B I like to do things for other people.

11. A I really like to be the center of attention.
    B It makes me uncomfortable to be the center of attention.

12. A Being an authority doesn't mean that much to me.
    B People always seem to recognize my authority.

13. A I am going to be a great person.
    B I hope I am going to be successful.

14. A People sometimes believe what I tell them.
    B I can make anybody believe anything I want them to.

15. A I am more capable than other people.
    B There is a lot that I can learn from other people.

16. A I am much like everybody else.
    B I am an extraordinary person.

Pathological Narcissism Scale (PNI)

0	1	2	3	4	5
not at all like me					very much like me

1. I often fantasize about being admired and respected.
2. My self-esteem fluctuates a lot.
3. I sometimes feel ashamed about my expectations of others when they disappoint me.
4. I can usually talk my way out of anything.
5. It's hard to feel good about myself when I'm alone.
6. I can make myself feel good by caring for others.
7. I hate asking for help.
8. When people don't notice me, I start to feel bad about myself.
9. I often hide my needs for fear that others will see me as needy and dependent.
10. I can make anyone believe anything I want them to.
11. I get mad when people don't notice all that I do for them.
12. I get annoyed by people who are not interested in what I say or do.
13. I wouldn't disclose all my intimate thoughts and feelings to someone I didn't admire.
14. I often fantasize about having a huge impact on the world around me.
15. I find it easy to manipulate people.
16. When others don't notice me, I start to feel worthless.
17. Sometimes I avoid people because I'm concerned that they'll disappoint me.
18. I typically get very angry when I'm unable to get what I want from others.
19. I sometimes need important others in my life to reassure me of my self-worth.
20. When others don't meet my expectations, I often feel ashamed about what I wanted.
21. When I do things for other people, I expect them to do things for me.
22. I feel important when others rely on me.
23. I can read people like a book.
24. When others disappoint me, I often get angry at myself.
25. Sacrificing for others makes me the better person.
26. I often fantasize about accomplishing things that are probably beyond my means.
27. Sometimes I avoid people because I'm afraid they won't do what I want them to.
28. It's hard to show others the weaknesses I fell inside.
29. I get angry when criticized.
30. It's hard to feel good about myself unless I know other people admire me.
31. I often fantasize about being rewarded for my efforts.
32. I am preoccupied with thoughts and concerns that most people are not interested in me.
33. I like to have friends who rely on me because it makes me feel important.
34. Sometimes I avoid people because I'm concerned they won't acknowledge what I do for them.
35. Everybody likes to hear my stories.
36. It's hard for me to feel good about myself unless I know other people like me.
37. It irritates me when people don't notice how good a person I am.
38. I will never be satisfied until I get all that I deserve.

39. I try to show what a good person I am through my sacrifices.
40. I am disappointed when people don't notice me.
41. I often find myself envying others' accomplishments.
42. I often fantasize about performing heroic deeds.
43. I help others in order to prove I'm a good person.
44. It's important to show people I can do it on my own, even if I have some doubts inside.
45. I often fantasize about being recognized for my accomplishments.
46. I can't stand relying on other people because it makes me feel weak.
47. When others don't respond to me the way that I would like them to, it is hard for me to still feel ok with myself.
48. I need others to acknowledge me.
49. I want to amount to something in the eyes of the world.
50. When others get a glimpse of my needs, I feel anxious and ashamed.
51. Sometimes it's easier to be alone than to face not getting everything I want from other people.
52. I can get pretty angry when others disagree with me.

Psychological Entitlement Scale (PES)

Please respond to the following items using the number that best reflects your own beliefs.

1	2	3	4	5	6	7
strong disagreement	moderate disagreement	slight disagreement	neither agreement nor disagreement	slight agreement	moderate agreement	strong agreement

1. I honestly feel I'm just more deserving than others.
2. Great things should come to me.
3. If I were on the Titanic, I would deserve to be on the first lifeboat.
4. I demand the best because I'm worth it.
5. I do not necessarily deserve special treatment.
6. I deserve more things in my life.
7. People like me deserve an extra break now and then.
8. Things should go my way.
9. I feel entitled to more of everything.

Personal Need for Structure Scale (PNS)

Read each of the following statements and decide how much you agree with each according to your attitudes, beliefs, and experiences. It is important for you to realize that there are no “right” or “wrong” answers to these questions. People are different, and we are interested in how you feel. Please respond according to the following 6–point scale:

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1. It upsets me to go into a situation without knowing what I can expect from it.
2. I'm not bothered by things that interrupt my daily routine.
3. I enjoy having a clear and structured mode of life.
4. I like to have a place for everything and everything in its place.
5. ***I enjoy being spontaneous.
6. I find that a well-ordered life with regular hours makes my life tedious.
7. I don't like situations that are uncertain.
8. I hate to change my plans at the last minute.
9. I hate to be with people who are unpredictable.
10. I find that a consistent routine enables me to enjoy life more.
11. I enjoy the exhilaration of being in unpredictable situations.
12. I become uncomfortable when the rules in a situation are not clear.

Need for Closure Scale (NFCS)

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1. I think that having clear rules and order at work is essential for success.
2. Even after I've made up my mind about something, I am always eager to consider a different opinion.
3. I don't like situations that are uncertain.
4. I dislike questions which could be answered in many different ways.
5. I like to have friends who are unpredictable.
6. I find that a well ordered life with regular hours suits my temperament.
7. When dining out, I like to go to places where I have been before so that I know what to expect.
8. I feel uncomfortable when I don't understand the reason why an event occurred in my life.
9. I feel irritated when one person disagrees with what everyone else in a group believes.
10. I hate to change my plans at the last minute.
11. I don't like to go into a situation without knowing what I can expect from it.
12. When I go shopping, I have difficulty deciding exactly what it is that I want.
13. When faced with a problem I usually see the one best solution very quickly.
14. When I am confused about an important issue, I feel very upset.
15. I tend to put off making important decisions until the last possible moment.
16. I usually make important decisions quickly and confidently.
17. I would describe myself as indecisive.
18. I think it is fun to change my plans at the last moment.
19. I enjoy the uncertainty of going into a new situation without knowing what might happen.
20. My personal space is usually messy and disorganized.
21. In most social conflicts, I can easily see which side is right and which is wrong.
22. I tend to struggle with most decisions.
23. I believe that orderliness and organization are among the most important characteristics of a good student.
24. When considering most conflict situations, I can usually see how both sides could be right.
25. I don't like to be with people who are capable of unexpected actions.
26. I prefer to socialize with familiar friends because I know what to expect from them.
27. I think that I would learn best in a class that lacks clearly stated objectives and requirements.
28. When thinking about a problem, I consider as many different opinions on the issue as possible.
29. I like to know what people are thinking all the time.

30. I dislike it when a person's statement could mean many different things.
31. It's annoying to listen to someone who cannot seem to make up his or her mind.
32. I find that establishing a consistent routine enables me to enjoy life more.
33. I enjoy having a clear and structured mode of life.
34. I prefer interacting with people whose opinions are very different from my own.
35. I like to have a place for everything and everything in its place.
36. I feel uncomfortable when someone's meaning or intention is unclear to me.
37. When trying to solve a problem I often see so many possible options that it's confusing.
38. I always see many possible solutions to problems I face.
39. I'd rather know bad news than stay in a state of uncertainty.
40. I do not usually consult many different opinions before forming my own view.
41. I dislike unpredictable situations.
42. I dislike the routine aspects of my work (studies).

Openness Scale

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

1. I enjoy concentrating on a fantasy or daydream and exploring all its possibilities, let it grow and develop.
2. I think it's interesting to learn and develop new hobbies.
3. I am intrigued by the patterns I find in art and nature.
4. I believe letting students hear controversial speakers can only confuse and mislead them.
5. Poetry has little or no effect on me.
6. I would have difficulty just letting my mind wander without control or guidance.
7. I seldom notice the moods or feelings that different environments produce.
8. I experience a wide range of emotions or feelings.
9. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.
10. I have little interest in speculating on the nature of the universe or the human condition.
11. I have a lot of intellectual curiosity.
12. I often enjoy playing with theories or abstract ideas.

Intolerance for Ambiguity Scale

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

Positive Items:

1. An expert who doesn't come up with a definite answer probably doesn't know too much.

2. There is really no such thing as a problem that can't be solved.

3. A good job is one where what is to be done and how it is to be done are always clear.

4. In the long run it is possible to get more done by tackling small, simple problems rather than large and complicated ones.

5. What we are used to is always preferable to what is unfamiliar.

6. A person who leads an even, regular life in which few surprises or unexpected happenings arise, really has a lot to be grateful for.

7. I like parties where I know most of the people more than ones where all or most of the people are complete strangers.

8. The sooner we all acquire similar values and ideals the better.

Negative Items (reverse coded):

9. I would like to live in a foreign country for a while.

10. People who fit their lives to a schedule probably miss most of the joy of living.

11. It is more fun to tackle a complicated problem than to solve a simple one.

12. Often the most interesting and stimulating people are those who don't mmd being different and original.

13. People who insist upon a yes or no answer just don't know how complicated things really are.

14. Many of our most important decisions are based upon insufficient information.

15. Teachers or supervisors who hand out vague assignments give a chance for one to show initiative and originality.

16. A good teacher is one who makes you wonder about your way of looking at things.

Aggressive Driving Motivations Questionnaire (ADMQ) – Pilot Study 1 Items

Please respond to the following items using the number that best reflects your attitude.

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

Items adapted from James & Nahl:

1. Getting out of a tailgater's way only encourages that behavior.
2. You need to retaliate against aggressive drivers in order to maintain law and order on highways.
3. It's justified to resist bad drivers by scaring them a little so they don't think others are unaware or powerless.
4. If I see a driver making a stupid, dangerous mistake, it's my right and duty to teach that driver a lesson.
5. Sometimes I think of bad things I can do to some of the idiot drivers that endanger everyone's lives by being too aggressive.
6. Some drivers are so foolish and selfish that they need to be taught a lesson by drivers who look out for the public good.
7. I would use tailgating only as a last resort, when a stubborn or selfish driver simply refuses to let me pass.
8. I insist on driving at the speed limit in the passing lane because it's the law.
9. It's no big deal to hold up a long line of drivers on a one-lane road. I'll go the speed I want.
10. I repeatedly tap the brakes or slow way down to retaliate against a tailgater.
11. I take my time entering and leaving parking spaces, especially when someone is waiting for me.
12. I make gestures and facial expressions to myself to show my disapproval of pushy drivers.
13. I hate sitting in traffic, wasting my time.
14. I see other cars as obstacles in my way that I need to get around.
15. I really hate it when traffic is congested and I can't get ahead of others because I feel like I'm losing.
16. I can force my way into any lane by being pushy.
17. The most aggressive drivers end up getting their way.
18. I feel good when I can cut in at the front of a line of cars.
19. Other drivers intentionally try to slow me down or block my way.
20. I feel best when I'm way out in front of other vehicles.
21. I don't care if my driving makes others angry.

Newly created items:

22. When a faster vehicle comes up behind me, I am reluctant to let them pass.
23. I'm often annoyed by other drivers who don't follow the rules of the road.
24. I view other drivers' aggressiveness as a personal challenge to best them.
25. If I give into another driver's pushiness, the other driver wins.
26. Driving is a contest of wills.
27. Drivers who don't follow the rules infuriate me.
28. When I see a merge sign, I get over as soon as I can because that's the correct way to drive.
29. When I see a merge sign, I pass all of those suckers waiting in line and cut to the front.
30. Stupid drivers need to stay off the road.
31. I have a right to be angry at drivers who inconvenience me.
32. I am constantly on the lookout for incompetent drivers on the road who will slow me up.
33. It is my duty to teach bad drivers a lesson.
34. I like to give aggressive drivers "a taste of their own medicine."
35. I'd like to give the other driver a piece of my mind.
36. Reckless driving is intentionally aimed at me.
37. People who drive recklessly intentionally try to endanger others.
38. Bad drivers are bad people.
39. I can't let other drivers get away with dangerous behavior.
40. Most traffic laws could be considered to be suggestions.
41. I think there are too many traffic laws.
42. Driving makes me feel powerful.
43. Other drivers need to get out of my way because I am the most important driver on the road.
44. Drivers should be fined for going too slow.
45. I am a cautious driver.
46. If I was in charge of the road, it would be a much safer place.
47. I'm not worried about speeding, I can talk my way out of a ticket.
48. I am more skilled than the average driver.
49. I feel safe when I'm following the rules of the road.
50. It's easy to get my way when I'm driving.
51. Traffic laws are black and white; you're either following them or you're not.
61. Other drivers need to respect my rights.
62. I like to show off my driving skills to my passengers.
63. I can drive any way I want to.
64. Other drivers recognize that they need to get out of my way.
65. I like knowing what to expect on the road.
66. It is important for everyone to obey the rules of the road.
67. If everyone just drove how they wanted, it would be chaotic.
68. Unpredictable drivers cause most traffic accidents.

69. Unexpected delays make me really angry.
70. Following the rules makes me a better driver.

Items from Motives for Dangerous Driving Scale:

52. I have no problems exceeding the speed limit because I know I am a good driver.
53. I am a more skillful driver than most other drivers on the road.
54. I am always in control of my driving.
55. My driving skills allow me to negotiate traffic hazards safely.
56. Exceeding the speed limit by 10 mph is no big deal.
57. It is highly unlikely that my driving will ever cause an accident.
58. It is okay to violate traffic laws.

Items from Dula Dangerous Driving Index:

59. I consider the actions of other drivers to be inappropriate or stupid.
60. I deliberately use my vehicle to block drivers who tailgate me.
71. I "drag race" other drivers at stop lights to get out front.
72. I will illegally pass a car/truck that is going too slowly.
73. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me.
74. I like to weave in and out of slower traffic.
75. When someone cuts me off, I feel I should punish that driver.
76. I feel it is my right to get where I need to go as quickly as possible.
77. I feel that passive drivers should learn how to drive or stay home.
78. I feel that most traffic laws could be considered as suggestions.

New Rigid Items for ADMQ – Pilot Study 2

Please respond to the following items using the number that best reflects your attitude.

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

Items re-tested from Pilot Study 1:

1. Traffic laws are black and white; you're either following them or you're not.
2. It is important for everyone to obey the rules of the road.
3. Following the rules makes me a better driver.
4. I feel safe when I'm following the rules of the road.
5. I like knowing what to expect on the road.
6. I'm often annoyed by other drivers who don't follow the rules of the road.
7. Drivers who don't follow the rules infuriate me.
8. I am a cautious driver.

New Rigid Items:

9. Traffic laws exist for a reason and they should be followed by everyone.
10. I feel comfortable driving because traffic laws exist.
11. I don't like it when other drivers don't follow the rules.
12. I have difficulty understanding why people break traffic laws.
13. I don't like being around drivers who can't follow the rules.
14. I don't like it when people drive unpredictably.
15. I would never doubt (or question) the rules of the road.
16. When it comes to traffic accidents, the driver not following the rules is always at fault.
17. **Rules of the road should only be followed when they help you get there as quickly as possible.**
18. A driver who doesn't follow the rules is a bad driver.
19. I feel uncomfortable when the rules of the road are not clear.
20. **I'm not bothered when my driving routine is interrupted.**
21. **It excites me to be around unpredictable drivers.**
22. I feel uncomfortable when I don't understand why another person is driving aggressively.
23. Everyone should drive cautiously.
24. **There are many styles of driving that are equally safe.**
25. I feel uncomfortable when it's not clear who is at fault.
26. People should be ticketed if they don't follow the law.
27. I always follow traffic laws.

*Bolded items are reverse scored.

Driving Anger Scale (DAS)

Directions: Below are several situations you may encounter when you are driving. Try to imagine the incident described is actually happening to you, then indicate the extent to which it would anger or provoke you.

0	1	2	3	4
not at all	a little	some	much	very much

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

State Trait Anger Expression Inventory (STAXI)

Part 1: Read each statement and then choose the answer corresponding to how you feel *right now*. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe your *present* feelings.

1	2	3	4
Not at all	Somewhat	Moderately so	Very much so

1. I am furious.
2. I feel irritated.
3. I feel angry.
4. I feel like yelling at somebody.
5. I feel like breaking things.
6. I am mad.
7. I feel like banging on the table.
8. I feel like hitting someone.
9. I am burned up.
10. I feel like swearing.

Part 2: Read each statement and then choose the answer corresponding to how you *generally* feel. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe how you *generally* feel.

1	2	3	4
Almost never	Sometimes	Often	Almost always

11. I am quick tempered.
12. I have a fiery temper.
13. I am a hotheaded person.
14. I get angry when I'm slowed down by others' mistakes.
15. I feel annoyed when I am not given recognition for doing good work.
16. I fly off the handle.
17. When I get mad, I say nasty things.
18. It makes me furious when I am criticized in front of others.
19. When I get frustrated, I feel like hitting someone.
20. I feel infuriated when I do a good job and get a poor evaluation.

Part 3: Everyone feels angry or furious from time to time, but people differ in ways that they react when they are angry. A number of statements are listed below which people use to describe their reactions when they feel angry or furious. Read each statement and then choose the answer that corresponds to how often you generally react or behave in the manner described when you are feeling angry or furious. Remember that there are no right or wrong answers. Do not spend too much time on any one statement.

1	2	3	4
Almost never	Sometimes	Often	Almost always

21. I control my temper.
22. I express my anger.
23. I keep things in.
24. I am patient with others.
25. I pout or sulk.
26. I withdraw from people.
27. I make sarcastic remarks to others.
28. I keep my cool.
29. I do things like slam doors.
30. I boil inside, but I don't show it.
31. I control my behavior.
32. I argue with others.
33. I tend to harbor grudges that I don't tell anyone about.
34. I strike out at whatever infuriates me.
35. I can stop myself from losing my temper.
36. I am secretly quite critical of others.
37. I am angrier than I am willing to admit.
38. I calm down faster than most other people.
39. I say nasty things.
40. I try to be tolerant and understanding.
41. I'm irritated a great deal more than people are aware of.
42. I lose my temper.
43. If someone annoys me, I'm apt to tell him or her how I feel.
44. I control my angry feelings.

Driving Behavior Questionnaire (DBQ)

The next series of questions ask about things that have happened to you or you have done in the LAST THREE MONTHS. Please choose the number reflecting how many times you have done or experienced the item. If it has happened more than five times, choose the 5+ option.

0	1	2	3	4	5+

In the LAST THREE MONTHS, how many times have you…

1. Lost concentration while driving (daydreaming, thinking of something else, etc.)?
2. Had a minor loss of control of a vehicle you were driving (such as having your vehicle drift into another lane or onto the shoulder?
3. Had a "close call" but were not actually in an accident?

1. Broken or damaged a part of a vehicle (e.g., pulled knob off the radio, kicked a fender)?
2. Had an argument with a passenger while you were driving?
3. Had a verbal argument with the driver of another vehicle?
4. Had a physical fight with the driver of another vehicle?
5. Made an angry gesture at another driver or pedestrian?
6. Swore at or called another driver or pedestrian names?
7. Flashed your headlights in anger?
8. Honked your horn in anger?
9. Yelled at another driver or pedestrian?
10. Drove while being very angry?
11. Lost control of your anger while driving?
12. Drove up close behind another driver in anger?
13. Cut another driver off in anger?

1. Driven without using your seat belt?
2. Drank alcohol and driven?
3. Been drunk and driven?
4. Driven 10-20 mph over the limit?
5. Driven 20+ miles over the limit?
6. Passed unsafely?
7. Tailgated or followed another vehicle too closely?
8. Changed lanes unsafely?
9. Drifted into another lane?
10. Switched lanes to speed through slower traffic?
11. Gone out of turn at a red light or stop sign?
12. Made an illegal turn (e.g., illegal right turn on red light)?
13. Driven recklessly?
14. Run a red light or stop sign?

15. Entered an intersection when the light was turning red?
16. Used a cellular phone while you were driving?

The next series of 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 choose the answer reflecting how many times you have done or experienced the item. If it has happened more than five times, choose the 5+ option.

In your LIFETIME of driving, how many times have you…

1. Gotten moving (non-parking) tickets?
2. Had a minor accident (such as a fender bender)?
3. Had a major accident?

Kruglanski's (2012) "Lie" scale from NFC online version

1.....strongly disagree
2....moderately disagree
3.....slightly disagree
4.....slightly agree
5.....moderately agree
6.....strongly agree

I have never been late for an appointment or work.
I have never known someone I did not like.
I believe that one should never engage in leisure activities.
I feel that there is no such thing as an honest mistake.
I have never hurt another person's feelings.

Demographic Questionnaire

We would like to know a little about you for our records. Please keep in mind this information will be kept confidential.

What is your gender?

Male Female

What is your class standing?

Freshman Sophomore Junior Senior

What is your age?

_____

What is your race or ethnicity (select one)?

Asian or Pacific Islander Black/African American Caucasian/White Hispanic Other

Is English your native language?

Yes No

How many days a week do you drive?

_____

How many miles do you drive in an average week?

_____

How many years have you been driving?

_____

Debriefing Questionnaire

Now that you have finished the study, we would like you to answer some questions about your responses. Please give your honest answers.

How honest were you in your responses?

1	2	3	4	5	6	7	8	9
Not at all honest								Very honest

How true/valid were your responses?

1	2	3	4	5	6	7	8	9
Not at all true/valid								Very true/valid

How distracted were you while completing the survey?

1	2	3	4	5	6	7	8	9
Not at all distracted								Very distracted

Were you doing anything else (e.g. homework, watching television, etc.) while completing the survey?

No Yes

How much effort did you put into completing the survey?

1	2	3	4	5	6	7	8	9
No effort at all								A lot of effort

For this section, please select a number that indicates how much you agree or disagree with that statement.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Partially Disagree	Neutral	Partially Agree	Agree	Strongly Agree

1. I knew what the researchers were investigating in this research.
2. I wasn't sure what the researchers were trying to demonstrate in this research.
3. I had a good idea about what the hypotheses were in this research.
4. I was unclear about exactly what the researchers were aiming to prove in this research.

APPENDIX: CODING RUBRIC

Coding Rubric for Type of Driving Scenario

1. Concern for physical space/safety

A. Cut me off
B. Merged in front of me
C. Pulled out in front of me
D. Failed to yield
E. Made incomplete stop
F. Pulled up next to me
G. Took my parking space/too close
H. Caused me to brake suddenly
I. Tailgated me
J. Bumped me from behind
K. Nearly or did cause an accident
L. Driving too fast
M. Won't let me over
N. Swerving
O. Deer hit
P. Passed on the right
Q. Lights off
R. Park too close

2. Speed/Concern for time

A. Driving too slow
B. Made me miss my exit
C. Switching lanes preventing me from passing
D. Not using cruise control
E. Not able to pass or go
F. Waiting on other driver
G. Roadwork/construction
H. Holding up traffic
I. Biker in the way

3. Communication from other driver

A. Flashing headlights at me
B. Honked horn at me
C. Obscene gesture
D. Yelled at/glared at me

4. Not paying attention (separate from causing an accident)/lack of communication

A. Other driver ignored your signal or honk
B. Other driver didn't use signal
C. Lack of signs
D. Cellphone use/texting
E. Pedestrian crossing without looking
F. Threw trash out window
G. Leaving on high beams/lights off

5. Other

-99. Missing

Coding Rubric for Reasons Made Angry

1. Negative Personality Trait
    a. inconsiderate, irresponsible, rude, reckless, impatient, discourteous, selfish
    b. intends harm
    c. ignoring me, inattentive
    d. other driver lacks knowledge of how to drive, bad driver, should not be allowed to drive, new driver, doesn't know how to use…, playing a game, incompetent, ignorant, stupid, childish

2. Breaking the Rules
    a. other driver not following rules/law – drivers should do …, drivers are supposed to …, I expect drivers to …, incorrect driving,
    b. not acceptable, for no reason, unfair, unnecessary, illogical
    c. I was there first, It was my turn, not their turn

3. Dangerous
    a. accident, hit, crash; impaired my ability to drive, reckless
    b. damage to vehicle
    c. damage to persons

4. Inconvenienced
    a. other driver was in my way, hard to pass them, can't get around, won't let me pass, not enough room
    b. made me late, wasted my time, slowed me down, I was in a rush/hurry, delayed me
    c. had to take off cruise control, they forced me to…, didn't allow me to…
    d. backed up traffic, inefficient

5. Self-righteous
    a. I was right, it was the other driver's fault, not my fault, I was following the rules
    b. other driver's actions made me look bad, made it seem as if I was at fault, I was embarrassed, they blamed me, they tried to get me in trouble

6. Other

7. Participant repeated description of situation, but didn't give any reasons

-99. Missing

APPENDIX: IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 4/2/2015

To: Ashley Buller
W112 Lagomarcino

CC: Dr. Kevin Blankenship
W112 Lagomarcino

From: Office for Responsible Research

Title: Driving Attitudes

IRB ID: 15-140

Approval Date: 4/2/2015 **Date for Continuing Review:** 4/1/2017

Submission Type: New **Review Type:** Expedited

-

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, **including the recruitment materials and informed consent documents that have the IRB approval stamp**.
- **Retain signed informed consent documents for 3 years after the close of the study**, when documented consent is required.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- **Immediately inform the IRB of** (1) **all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems involving risks** to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. **Approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **IRB approval in no way implies or guarantees that permission from these other entities will be granted.**

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.