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Driving Anger, Sensation Seeking, Narcissism, and Driver's Angry Thoughts in the Prediction of Unsafe Driving

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by

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Abstract of a Dissertation
Submitted to the Graduate Studies Office
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in Partial Fulfillment of the Requirements
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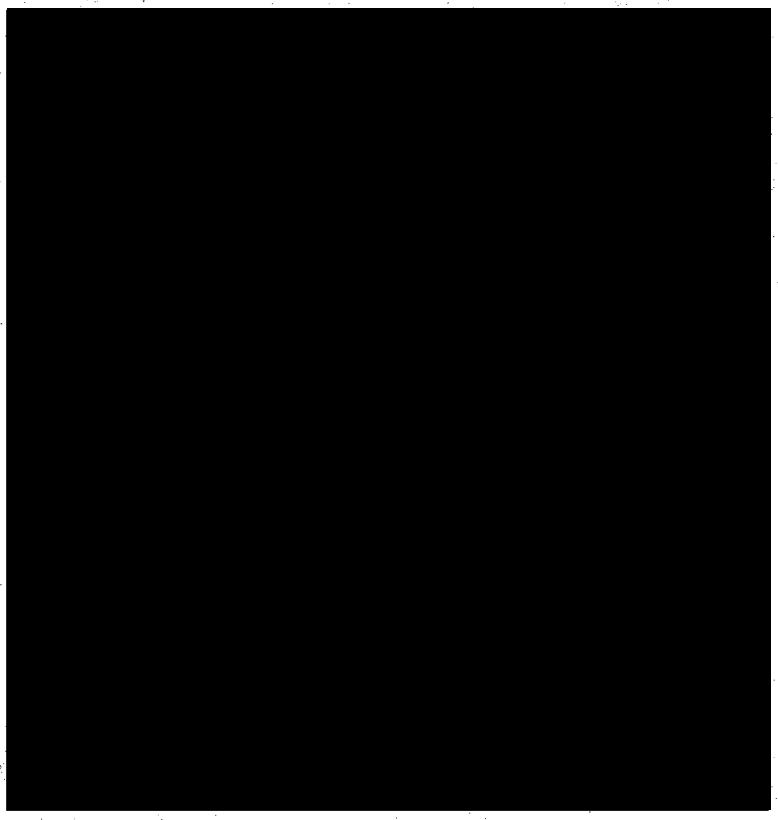

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ABSTRACT

DRIVING ANGER, SENSATION SEEKING, AND NARCISSISM IN THE PREDICTION OF UNSAFE DRIVING

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The present study expanded the previous research on multivariate prediction of unsafe driving behaviors. Specifically, the utility of combining driving anger, sensation seeking, narcissism, and driver's angry thoughts variables in the prediction of various unsafe driving behaviors and driving anger expression were assessed. In addition the present study sought to explore the predictive utility of driving anger and sensation seeking in a non-college sample. Three hundred and forty-nine college students completed measures of driving anger, sensation seeking, narcissism, driver's angry thoughts, unsafe driving behavior, and driving anger expression. Ninety eight non-college participants completed a subset of the previously mentioned measures. Hierarchical multiple regressions controlling for age, gender, and average miles driven per week supported the predictive utility of driving anger, sensation seeking, and driver's angry thoughts. Results demonstrated significant improvements in the prediction of various unsafe driving behaviors through the use of combining driving anger, sensation seeking, and driver's angry thoughts. Exploratory analyses also found differences with regard to retrospective and prospective data collection and between college and non-college participants on many variables.

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CHAPTER I

INTRODUCTION

Traffic accidents and roadway fatalities pose a significant social and public health problem in the United States. According to the National Highway Traffic Safety Administration, over 5.9 million motor vehicle accidents were reported in the United States during 2006 (NHTSA, 2007). Consequently, almost 1.8 million people were injured as a direct result of vehicular accidents. Furthermore, in 2005 an individual died every 12 minutes in an automobile accident, resulting in 39,189 deaths. Finally, for individuals between the ages of 2 and 34 years motor vehicle accidents were the leading cause of death (NHTSA, 2007).

In addition to the appalling number of injuries and deaths related to motor vehicle accidents, these incidents also have a high financial cost for the United States. Based on a number of factors (i.e., travel delay, productivity losses, cost to employers, legal and court costs, property damage, emergency services, medical costs, rehabilitation costs, and insurance administration), the total economic cost of motor vehicle accidents in 2000 was calculated as $230.6 billion for the United States (NHTSA, 2002). This estimate equates to a cost of over $800 per person living in the United States. In addition, public revenues paid for approximately 9% of all expenses due to motor vehicle crashes in 2000, which cost taxpayers $21 billion as a whole. This translated into a real world cost of over $200 in added taxes for each household in the United States in 2000 (NHTSA, 2002).

Researchers have began the process of identifying the many factors that are involved in motor vehicle accidents and an assortment of risky driving behaviors which have been linked to accident outcomes (e.g., speeding, tailgating, running red lights).

Overall, most researchers agree that automobile accidents, traffic violations, and risky driving behaviors result from a combination of human and situational factors (NHTSA, 2007; United States General Accounting Office, 2003). At the broadest level, vehicle factors, roadway factors, and human factors compose the main categories that have been identified as major contributors to motor vehicle accidents and accident-related behaviors (GAO, 2003).

Vehicular factors include anything related to the design and maintenance of a vehicle or something existing on the vehicle (e.g., tires, break pads, child restraints etc.). Such factors contribute to accidents much less than the others due in part to the incessant efforts of the NHTSA to make vehicles safer. In their efforts, the NHTSA requires that automobile makers adhere to strict and constantly refined standards for vehicle design. Further, the NHTSA has conducted numerous studies in which the safety of various automobile-related products has been tested. Due to these efforts, millions of unsafe products have been recalled. Thus, vehicles have become increasingly safer and now account for much less of the variance in vehicular accidents than human or roadway factors (GAO, 2003).

The second largest group of accident contributors is composed of the roadway/environmental category (GAO, 2003). This category includes all of the factors that are external to the vehicle and its driver (e.g., roadway design, roadside hazards, and roadway conditions). There are several roadway design features that have been found to correlate with increased rates of accidents. For example, accidents are more common at intersections. In addition, rural roads, roads without medians, narrow roads, roads with narrow shoulders, and curvy roads have all been found to have higher accident rates

(GAO, 2003; Harwood, Council, Hauer, Hughes, & Vogt, 2000). Similarly, it has been found that the likelihood of an accident tends to increase when the distance between the actual road and roadside hazards (i.e., a physical feature that a vehicle could hit if it leaves the road) decreases (GAO, 2003; Lee & Mannering, 1999). Certain road surface conditions such as standing water, ice, oil, holes, ruts, or worn surfaces increase the probability of a motor vehicle accident (GAO, 2003; Knapp, Kroeger, & Giese, 2000). Similarly, conditions that reduce visibility (e.g., darkness, snow, fog, or rain) have been found to contribute to accident involvement (GAO, 2003). In an effort to reduce the number of accidents that result from roadway and environmental factors the American Association of State Highway and Transportation Officials are continually developing new standards for roadway design (American Association of State Highway and Transportation Officials, 2004).

Clearly, most of the factors discussed thus far are not under the control of the driver of a vehicle. However, human factors, those that are directly related to the driver of a vehicle, account for more variance in vehicle accident rates than the other two factors combined (Evans, 1991; GAO, 2003). For example, human factors such as speeding, violating traffic laws, being affected by substances, inattention, decision errors, and demographic variables such as age and gender have all been found to directly contribute to the majority of motor vehicle accidents that occur (GAO, 2003; NHTSA, 2007). To illustrate, speeding was a major contributor in 31 percent of all fatal crashes in 2006, a loss of 13,543 lives. In addition, alcohol use contributed to 17,602 vehicular deaths (NHTSA, 2007).

Researchers have devoted a great deal of attention to the study of various human factors as they relate to accident involvement. First, as noted, human factors account for more variance in motor vehicle accidents than vehicular and roadway or environmental factors (Evans, 1991; GAO, 2003). Second, most efforts to deter risky driving behaviors (e.g., speeding, failing to use safety belts, reckless driving) through educational and legal measures have been mostly unsuccessful (Ross, 1985; Whitehead, 1975). Finally, it could be argued that human factors are much more amenable to control than environmental or design factors. For example, it would be easier to change one's typical driving speed or seatbelt use than it would be to change the weather.

The human factors that have received the most attention in accident analysis fall into two categories. The first includes demographic variables such as age, gender, and miles driven (Hemenway & Solnick, 1993; Jonah, 1986; Trimpop & Kirkcaldy, 1997). The other consists of personality related factors, such as sensation seeking, trait driving anger, and narcissistic traits (Arnett, Offer, & Fine, 1997; Deffenbacher, 2000a; Deffenbacher, Oetting, & Lynch, 1994; Jonah, 1997; Schreer, 2002). A review of some of the most highly studied factors, with regard to motor vehicle accidents and accident-related behavior in both categories will follow.

Demographic Factors

Age

One demographic variable that has received support repeatedly as a predictor of driving behavior is age. Drivers under the age of 30 have been found to be involved in more vehicular accidents than other drivers even after controlling for the amount driving and driving experience (Hemenway & Solnick, 1993; Jonah, 1986). Further, drivers

under the age of 25 were found to be the age group with the highest rate of fatal accidents, based on population size, in 2006 (NHTSA, 2007). Similarly, drivers in the teenage range are nearly twice as likely to be fatally injured in vehicular accident than drivers between ages 25 and 65 years (NHTSA, 2007).

Common explanations for the relationship of age and accident rates include increased frequencies of risk-taking, alcohol impaired driving, and anger/aggression among younger drivers. Drivers under the age of 30 tend to take more risks than those of other age ranges (Arnett, 1994; Hemenway & Solnick, 1993; Jonah, 1986). Younger drivers obtain higher scores on measures of sensation seeking (i.e., the degree to which a person seeks out novelty and intensity of experience), a factor known to contribute to accident involvement (Arnett, 1996; Arnett et al., 1997; Jonah, 1986). Similarly, it has been found that drivers under 30 seem to view themselves as somewhat invulnerable to the driving-related dangers they perceive their peers facing (Glendon, Dorn, Davies, Matthews, & Taylor, 1996; Mathews & Moran, 1986). In addition, young drivers report driving under the influence of alcohol more often than any other age group (Anda, Remington, Dodson, DeGuire, Forman, & Gunn, 1987; Bradstock, Marks, Forman, Gentry, Hogelin, Binkin, & Trowbridge, 1987; Hemenway & Solnick, 1993; Jonah, 1986). Additionally, age effects have been noted in both driving anger and aggression, two factors that contribute to one's likelihood of engaging in dangerous driving behaviors (Lajunen & Parker, 2001).

Very little research has focused on older drivers. However, it has been found that drivers over 65 years of age tend to take fewer risks than other drivers (Hemenway & Solnick, 1993; Sivak, Soler, Trankle, 1989). In addition, older drivers typically report that

they drive less often and are in involved in fewer accidents than drivers under 30 years of age. However, they tend to have the same frequency of accident involvement as middle-aged drivers when the number of miles driven is adjusted (Cooper, 1990; Hemenway & Solnick, 1993).

Given the well-established relationship between age and driving behavior, it is recommended that researchers account for the possible effects of age when assessing the predictive utility of other variables with regard to driving behavior (Clement & Jonah, 1984).

Gender

There also appears to be evidence of gender differences in at least some forms of driving behavior. Men are more likely to be involved in motor vehicle accidents than women (Begg, Langley, & Williams, 1999; Beirness & Simpson, 1988; Hemenway & Solnick, 1993). In fact, men were almost three times as likely to be involved in a fatal accident than women (NHTSA, 2007). Common explanations for differential accident rates focus on driving frequency, risky and aggressive driving behavior, the experience of anger while driving, and the manner in which driving-related anger is expressed (Arnett, Offer, & Fine, 1997; Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000b; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003a; Ellison-Potter, Bell, & Deffenbacher, 2001; Galin, 1981; Hemenway & Solnick 1993; Smith & Heckert, 1998).

On average, men drive more often than women (Hemenway & Solnick 1993; Hyman, 1968; McGuire, 1976), suggesting that their increased driving time may expose them to a larger number of potential hazards. However, several prior studies have documented that gender differences in driving behavior persist after controlling for miles

driven. For example, men generally obtain higher scores on measures of risk-taking than women (Arnett, Offer, & Fine, 1997; Smith & Heckert, 1998) and engage in certain risky and aggressive driving behaviors more often than women (Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003a). Similarly, male drivers report using their seatbelts less frequently (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000b) and tend to drive faster in driving simulators than female drivers (Ellison-Potter, Bell, & Deffenbacher, 2001; Galin, 1981). In addition, men in one study received over six times as many speeding tickets as the women (i.e., 25 total speeding tickets for men versus 4 for women) over their life time (Smith & Heckert, 1998).

Younger men between 18 and 30 are especially likely to underestimate their own vulnerability while driving and overestimate their driving ability when asked to compare themselves to their peers more so than do young women (Glendon et al., 1996; Mathews & Moran, 1986). For instance, young men estimated that their peers were 69.7% more likely to be involved in an accident than they were. However, young women reported expecting that their peers' risk of accident involvement was 31.3% greater (Glendon et al., 1996). In addition, men report a tendency to drive while under the influence of alcohol much more frequently (Anda et al., 1987; Bradstock et al., 1987; Hemenway & Solnick, 1993; Richman, 1985) and have more tolerance for such behaviors among others than do women (Deffenbacher, Huff, Lynch, Oetting, & Salvatore, 2000b).

It has also been found that men report engaging in more aggressive driving behavior than women. For example, several studies have found that male drivers typically rate themselves as more aggressive and report engaging in more aggressive behaviors while driving than female drivers (Deffenbacher et al., 2000b; Deffenbacher, Lynch,

Filetti, Dahlen, & Oetting, 2003a; Doob & Gross, 1968; Hemenway & Solnick, 1993). Some evidence also suggests that women and men are differentially angered as a result of different driving situations. For example, men tend to become more angry at slow and discourteous drivers and at the presence of an authority figure (e.g., police on the road) than women. On the other hand, women typically become angrier at illegal driving and traffic obstructions (Deffenbacher, Oetting, & Lynch, 1994). However, more recent studies have produced divergent results. For example, while the finding that men were more angered by slow drivers has been replicated in one study (Deffenbacher et al., 2000b) it did not receive support in a later study (Deffenbacher et al., 2003a). In addition, evidence suggesting that men and women were similar in their reactions to discourteous drivers, illegal driving, and traffic obstructions was found (Deffenbacher et al., 2000b; Deffenbacher et al., 2003a). As a result of the latter findings, it has been suggested that males and females have a great deal more in common than previously thought with respect to situations that anger them. Overall, these researchers concluded that many more insignificant than important differences exist between males and females and that most of the gender differences with regard to angering situations canceled each other out (Deffenbacher et al., 2000b).

Despite some questions over gender differences in the experience of anger while driving, it is fairly clear that there are gender differences in driving anger expression. For example, women are more likely to report expressing driving-related anger indirectly through displaced aggression, focused attention/problem solving, cognitive reframing/acceptance, and cognitive distraction. On the other hand, men typically express their anger while driving in more direct aggressive and hostile ways (e.g., aggressive use

of lights, expressing anger through physical aggression, aggressive endangerment, and hostile gestures). In addition, men also report more occurrences of non-accident-related damage to vehicles than women, which may relate to their more frequent expression of anger through physical means (Deffenbacher et al., 2000b; Deffenbacher et al., 2003a).

Taken together, these findings suggest that gender is a variable which should be considered in research on driving behavior. Not only do accident rates differ predictably by gender, but many of the driver variables assumed to predict accidents show gender differences.

Miles Driven

The number of miles one typically drives during a particular timeframe is another factor that could potentially increase the likelihood of engaging in risky driving behaviors or being involved in an accident. Consequently, the relationship between the number of miles driven and accident involvement has been of interest to several researchers.

Some researchers have found that the number of miles driven is positively correlated with rate of accident involvement, especially with younger drivers (Hemenway & Solnick, 1993). However, others have found that the number of miles one has driven is unrelated to accident involvement among company car drivers in the U.K. (Cartwright, Cooper, and Barron, 1993) and young Canadian drivers (Trimpop & Kirkcaldy, 1997). Thus, the relationship between miles driven and accident involvement remains unclear.

Other studies have focused on the potential relationship between miles driven and mood, another variable found to impact one's driving behavior. One study involving employees at various industrial firms found that negative mood (i.e., tense, irritable, nervous, and impatient) was positively related to impedance (i.e., the distance traveled

between origin and destination and time spent in transit between these points) (Novaco et al., 1979). On the other hand, other studies have found that miles driven are not related to the experience of anger while driving (Deffenbacher et al., 2000b, 2003a; Deffenbacher, Deffenbacher, Lynch, & Richards, 2003b; Deffenbacher, Lynch, Deffenbacher, & Oetting, 2001).

Overall, it seems that there are no straightforward answers with regard to the relationship between the number of miles driven and driving behaviors and accident involvement. One study even found a negative relationship between driving aggression among women and the number of miles they drove per year (Lajunen & Parker, 2001). However, considering its possible effects, some authors recommend controlling for the number of miles driven when assessing the utility of any potential driving behavior predictors (Clement & Jonah, 1984; Donovan, 1993).

Personality Factors

While the relationships among demographic variables and driving behavior inform the identification of high risk drivers, researchers interested in accident prevention and/or treatment of dangerous drivers focus on identifying the personality traits of the "bad driver" (Arthur & Graziano, 1996; Donovan, Queisser, Salzberg, & Umlauf, 1985; Furnham, & Saipe, 1993; Signori & Bowman, 1974). It is commonly suggested that a person's actions while driving directly result from his/her choices while driving, which in turn are a result of his/her personality make up (Arthur & Graziano, 1996; Elander, West, & French, 1993). Simply stated, certain personality traits are assumed to predispose one to exhibit certain behaviors while driving that could increase his/her likelihood of accident involvement (Arthur & Graziano, 1996). In addition, some researchers have

focused their attention on the study of personality and driving to assist in the identification of traits that may predict risky driving behaviors because they may be more amenable to change and tend to result in accident involvement much more often than environmental or vehicle related factors (Evans, 1991; GAO, 2003).

Of the many personality-related variables that have been studied, two have received a great deal of support as predictors of dangerous driving behaviors: sensation seeking and driving anger. However, with the exception of a few recent studies (Dahlen, Martin, Ragan, & Kuhlman, 2004; Dahlen & White, 2006) these variables have been studied independently of each other.

Sensation Seeking

The construct of sensation seeking has garnered a great deal of support in the prediction of risky driving. Zuckerman (1994) described sensation seeking as "a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experiences" (p. 27). Further, he suggested that one of the most important components of sensation seeking is "the optimistic tendency to approach novel stimuli and explore the environment" (p. 384). Individuals who are high in sensation seeking are more aware of their internal sensations and try to amplify them through their interactions with the environment (Zuckerman, 1979). As a result, people who are high sensation seekers may drive more recklessly because those behaviors could likely provide the kind of stimulation for which they are searching for. Accordingly, there is a substantial amount of evidence suggesting that individuals high in sensation seeking tend to engage in risky

driving behaviors, which could result in an accident, more often than those low in sensation seeking.

Some of the most compelling support for high sensation seeking as a predictor of risky driving was reported by Jonah (1997). Jonah reviewed 40 studies investigating the relationship between sensation seeking and various risky driving behaviors among drivers from the United States, Canada, Great Britain, the Netherlands, Sweden, Norway, and Finland (Jonah, 1997). Overall, the results suggest that there is a positive relationship between sensation seeking and risky driving (r = .30 - .40), depending on how gender and sensation seeking were measured. In fact, while 40 studies were reviewed, only four did not find a relationship between sensation seeking and some form of risky driving behavior.

In accordance, there has been a great deal of research amassed in support of a relationship between sensation seeking and driving behavior across several age groups. For example, sensation seeking has been found to play a role in the driving behavior of the youngest drivers, those in high school. Specifically, it has been found that several forms of risky driving behaviors (i.e., driven while intoxicated, driven over 80 mph, driven greater than 20 mph over the limit, raced a car, passed in a no-passing zone) were positively correlated with sensation seeking in two studies involving high school samples (Arnett et al., 1996, 1997). In addition, one of the studies also found that high sensation seekers who completed a diary describing their driving behaviors for 10 days also reported driving over the speed limit more often than low sensation seekers (Arnett et al., 1997).

In another study with high school students, Arnett (1990) found that individuals high in sensation seeking reported that they expected to be able to drive drunk more times before being involved in a motor vehicle accident or getting a ticket than the students who scored low on sensation seeking. Further, the high sensation seeking students also reported actually driving while intoxicated more often and believing that such behaviors were less likely to result in an accident or traffic citation than the low sensation seeking students.

Several researchers have also studied sensation seeking and driving in undergraduate populations. For example, Clement and Jonah (1984) found that driving speed and sensation seeking were positively related in an undergraduate population, even after controlling for age, distance traveled, and driving experience. Additionally, this study found that sensation seeking was negatively correlated with seatbelt use for females.

In another study involving undergraduate drivers, those who scored high on sensation seeking reported speeding more often, not wear seat belts as much, driving faster on wet roads, drinking more frequently, and driving under the influence of alcohol more often than those low in sensation seeking (Jonah, Thiessen & Au-Yeung, 2001). High sensation seekers also reported perceiving less of a risk of being detected when driving impaired and believing that they could drink a greater amount of beer before being impaired than those who scored low on sensation seeking. Similarly, individuals who scored higher on sensation seeking reported that they would be more inclined to drive after drinking if they were driving a vehicle with anti-lock breaks. Similarly, in a study with young males (ages 16 to 29) it was found that individuals who scored low on

sensation seeking tended to report receiving fewer citations and being involved in fewer motor vehicle accidents (Trimpop & Kirkcaldy, 1997).

Finally, sensation seeking has been found to be related to several dangerous driving behaviors in adult populations. To illustrate, in a study that compared two groups of adult male drivers (mean age of 36), one whose members were arrested for driving while intoxicated and another group composed of high-risk drivers (i.e., drivers with multiple accidents or violations) similar sensation seeking scores for both groups was found (Donovan et al., 1985). In addition, members of the two groups tended to score higher on sensation seeking than the average person. Similarly, in another study involving male DWI arrestees, with an average age of 36 years, cluster analytic techniques were used to identify two groups of drivers who posed even more of a risk to themselves and others than when compared to typical DWI arrestees (Donovan & Marlatt, 1982). Interestingly, the study found that one of the highly risky groups was characterized in part by elevated levels of sensation seeking. In addition, this group also reported being involved in more accidents per year, receiving more citations per year, and having higher indices of driving risk in general than other arrestees.

Clearly, there is a great deal of evidence supporting the relationship between sensation seeking and various risky driving behaviors across many demographic variables. Generally, the evidence suggests that high sensation seekers are more likely to speed, not wear seatbelts, drive after drinking alcohol, perceive less risk while driving, receive more citations, and be involved more accidents than people who are low in sensation seeking. Hence, sensation seeking appears to be a strong predictor of various risky driving behaviors and consequences. However, the majority of the previous

research regarding sensation seeking has focused on young drivers. While there is some research regarding adult males, the role of sensation seeking in adult samples has not been adequately defined.

Driving Anger

Trait driving anger, a mood-related factor, is another construct that has received a great deal of support with regard to predicting driving behavior and accident involvement (Arnett, Offer, & Fine, 1997; Blanchard, Barton, & Malta, 2000; Deffenbacher et al., 1994, 2000b, 2001, 2003a, 2003b; Deffenbacher, Lynch, Oetting, & Swaim, 2002; Knee, Neighbors, & Vietor, 2001; Lajunen, Parker, & Stradling, 1998; Lynch, Deffenbacher, Oetting, & Yingling, 1995; Underwood, Chapman, Wright, & Crundall, 1999). Deffenbacher, Oetting, & Lynch (1994) proposed that some people are more apt to engage in dangerous driving behaviors because of trait driving anger. These authors view trait driving anger as a personality trait that is similar to general trait anger yet more specific and related specifically to driving. Trait anger, as proposed by Spielberg (1999) is thought to be a broad predisposition that some individuals have, which causes them to experience anger more often and intensely across all situations. Similarly, yet more limited, trait driving anger is conceived to be a tendency to become angry when engaged in the specific behavior of operating a motor vehicle (Deffenbacher, Oetting, & Lynch, 1994). Driving anger has been found to correlate positively with reported frequency and intensity general trait anger (Lynch et al., 1995). However, due to its situational nature driving anger should prove to have greater utility in the prediction of behaviors within the context of driving.

Accordingly, through the use of Deffenbacher et al.'s (1994) Driving Anger Scale (DAS) to measure driving anger, a great deal of evidence has been amassed in support of it as a useful construct for the prediction of various risky driving behaviors and driving related aggression (Blanchard, Barton, & Malta, 2000; Deffenbacher et al., 1994, 2000b, 2001, 2003a, 2003b; Knee, Neighbors, & Vietor, 2001; Lajunen & Parker, 2001; Underwood et al., 1999). In addition, DAS scores have been found to correlate with aggressive and non-aggressive traffic violations in adult British samples (Lajunen, Parker, & Stradling, 1998; Underwood et al., 1999).

In one study undergraduate students were separated into two groups as a result of their DAS scores and whether they believed they had a driving anger problem or not (Deffenbacher et al., 2000b). The first group was composed of undergraduates who in addition to admitting that they had anger problems while driving also scored in the upper quartile on the DAS. This group was termed the high-anger problem (HAP) group. A second group consisted of undergraduates who not only reported no driving anger problems but also scored in the lower quartile of the DAS who were termed the low-anger no problem (LANP) group. Despite having similar ranges in miles driven and frequency of driving, when the two groups were compared it was found that members of the HAP group reported experiencing anger more often in frequently occurring situations (e.g., day-to-day driving), stressful situations, (e.g., rush hour), and conflict-laden situations (e.g., being yelled at) than the LANP group. In fact, the HAP group reported a frequency and intensity of driving anger in day-to-day driving situations that was approximately three times greater than LANP drivers. Further, the HAP drivers had more frequent close calls within the past year and a greater number of minor and major

accidents over their lifetime. Additionally, the HAP group indicated that they experienced higher rates of losing control of their vehicle and driving in risky and/or aggressive manner during the last three months. Accordingly, individuals in the HAP group were also less likely to use a seatbelt and reported more frequent vehicular damage and injury to themselves that was anger related. To illustrate the importance of these differences the authors estimated the frequency of anger episodes and risky and aggressive driving each group would experience over the course of one year. Assuming an average of 300 driving days they approximated that drivers in the LANP group would experience 210 anger episodes, 142 aggressive behaviors, and 492 risky behaviors. Drivers in the HAP group, on the other hand, would experience 678 anger episodes, 604 aggressive behaviors, and 1,164 risky behaviors.

In similar study, undergraduates were again identified as having either high anger or low anger, but to guard against expectancy effects the participants were not asked to indicate whether or not they had a problem with driving anger (Deffenbacher et al. 2003b). In agreement with the previous findings, high anger drivers again reported experiencing more frequent and intense anger and aggression. In addition, they reported greater use of aggressive and less adaptive ways of expressing anger. High anger drivers also indicated that they engaged in risky driving behaviors in normal driving conditions, had close calls, and received citations more often, even though they did not differ from the low anger drivers with regard to driving frequency or number of miles driven. High anger drivers in this study also drove at faster speeds during low impedance simulations on a driving simulator. During high impedance simulations, the high anger drivers

indicated greater levels of state anger, verbal and physical aggression, and were two times as likely to have wreck.

Expanding on their previous research the authors conducted another study comparing HAP and LANP drivers to a third group of students who scored in the upper quartile of the DAS yet denied having driving anger problems (HANP). The results indicated that the two high anger groups reported that they were more aggressive and angry drivers than the low anger group. The high anger drivers also indicated that they became angered by more driving situations and engaged in more risky behaviors (e.g., e.g., passed unsafely, driven recklessly, run a red light or stop sign, etc) and crash-related behaviors (i.e., losing concentration, loss of vehicular control, close calls, etc.) than the LANP group. In addition, the HANP group tended to rate themselves as less safe drivers and tanking more risks than the other two groups.

Overall, the results from this line of research suggested that some drivers are more apt to become angry while driving in typical daily driving conditions. Accordingly, such individuals may engage in aggressive and risky driving behaviors more often than others, which in turn may lead them to engage in altercations more often with others, receive more traffic citations, and be involved in accidents more frequently. Furthermore, the behavior of such individuals may put others at risk both directly and indirectly (e.g., an angry person who is driving aggressively might elicit similar driving behaviors from others).

Narcissistic personality traits

While they have received little attention as possible predictors of driving behavior, narcissistic personality traits have been consistently associated with general

aggression (Baumeister, Smart, & Boden, 1996; Bushman & Baumeister, 1998; Rhondewalt & Morf, 1998; Schreer, 2002). As a result, such traits may prove useful in predicting aggressive and other dangerous forms of driving behavior.

Individuals with narcissistic personality traits are often characterized as having grandiose notions of self-importance, fantasies of personal greatness, a sense of entitlement, and low empathy toward others (DSM IV-TR; American Psychiatric Association, 2000). In being part of ones personality, these traits also tend to be exhibited in a variety of settings. In addition, some authors suggest that individuals with such traits often struggle to maintain a grandiose but fragile self-image (Rhodewalt & Morf, 1998) which in turn could lead to higher levels of anger and aggression (Baumeister, Bushman, & Campbell, 2000; Baumeister, Smart, & Boden, 1996; McCann & Biaggio, 1989; Papps & O'Carroll, 1998).

The most widely used measure of narcissistic personality traits is the Narcissism Personality Inventory (NPI; Raskin & Terry, 1988). While it was constructed according to DSM-III criteria for narcissism, the NPI was developed in order to assess for narcissistic traits in non-clinical populations (Raskin & Hall, 1979). Despite its popularity, the NPI is not without critics. Although Raskin and Terry (1988) identified seven subscales (i.e., Authority, Self-Sufficiency, Superiority, Exhibitionism, Exploitionism, Entitlement, and Vanity), not all of these subscales were sufficiently reliable, leading some authors to reanalyze the measure. For instance, Kubarych, Deary, and Austin (2004) found evidence for three subscales that they termed Power, Exhibitionism, and Special Person. They concluded that only the Power and Exhibitionism subscales were acceptably reliable, suggesting that the Special Person

factor could be useful with some revision of the measure. Finally, del Rosario and White (2005) examined the test-retest reliabilities of the NPI and subscales as defined by Raskin et al. (1998). They found that only the full-scale and Authority subscale produced adequate reliabilities. Despite these imperfections, the NPI is the only measure of narcissistic traits that has been utilized in the previous research studying such traits. In addition, the full-scale NPI has repeatedly shown adequate reliability (del Rosario & White, 2005; Kubarych, Deary, & Austin, 2004; Raskin & Terry, 1988) and is the most widely used measure of narcissistic traits in the current literature.

Traditionally, it was assumed that aggressive persons had relatively low self-esteem and that this factor may at times prompt aggressive behavior (Baumeister, Bushman, & Campbell, 2000; Baumeister, Smart, & Boden, 1996). Alternatively, some authors suggest that aggressive individuals may have average or even somewhat inflated self-esteem and that they may engage in aggressive behavior when their sense of self or ego is threatened (Baumeister, Bushman, & Campbell, 2000). Thus, it is hypothesized that individuals with narcissistic traits may act out in aggressive ways as a defense if they encounter someone who they believe has disputed their inflated views of self (Baumeister, Bushman, & Campbell, 2000; Baumeister, Smart, & Boden, 1996). In accordance with this theory Baumeister, Smart, and Boden (1996) found a great deal of evidence, through a review of previous literature, suggesting that perpetrators' inflated self-regard was linked to several violent acts including: murders, rapes, domestic violence, violent gang activity, political terror, and even genocide.

In a study of narcissistic traits among undergraduates, participants were offered the opportunity to act aggressively (via a blast of noise) toward someone that had

previously insulted or praised them by allegedly criticizing or praising an essay they had written. This study found that people who scored high on narcissistic traits exhibited higher levels of aggression toward someone who they perceived had insulted them (Bushman & Baumeister, 1998). In addition, Papps and O'Carroll (1998) found that higher education students who scored high on the NPI were more likely to experience general trait anger and aggressive anger expression than those who scored low. The results of a similar study involving undergraduates with high NPI scores reported greater levels of anger arousal and verbal anger expression than low scorers (McCann & Biaggio, 1989). In addition, male participants high in narcissistic traits reported more physical aggression than low scoring men.

There is also some evidence suggesting that individuals with narcissistic traits tend to base their emotional labiality on failures rather than successes. For example, in one study participants were required to complete a series of tasks in which they were told that they either succeeded or failed. This study found that people who scored high on the NPI made more self-aggrandizing statements about their abilities when they succeeded and attributed the success to their own behavior than did low scores. In addition high scores on the NPI tended to exhibit more extreme anger responses when they failed, especially after previously succeeding (Rhondewalt & Morf, 1998).

Taken together, there appears to be some research suggesting that individuals high in narcissistic traits may engage in more risky and aggressive behaviors and experience more anger after a perceived failure than those low in narcissistic traits. Further, it seems that these individuals are especially at risk for exhibiting risky or aggressive behaviors when they encounter someone or something that possibly threatens their positive view of

themselves. It is possible that a person high in narcissistic traits may be likely to perceive typical encounters on the road (e.g., getting cut off, getting passed, another person failing to yield) as personal insults to his/her view of self. In addition, according to one calculation drivers may be subjected to hundreds of risky and aggressive driving episodes per year (Deffenbacher et al., 2000b). Thus, daily driving appears to be a likely situation in which someone high in narcissistic traits could perceive that his/her self view or personal safety has been threatened or feel as if he/she has failed to drive correctly. As a result, drivers high in narcissistic traits may be more likely to act in aggressive or risky ways (e.g., cutting others off, honking, tailgating, etc.) in order to defend their strongly held beliefs about themselves.

To date, only one study has examined the relationship between narcissistic traits and driving behavior (Schreer, 2002). Exhibitionism but not total NPI score was associated with aggressive driving. Results also supported gender differences in the predictive utility of the NPI. Specifically, aggressive driving was predicted by higher scores on Exhibitionism for females and to a lesser extent, lower scores on Superiority and Vanity. However, aggressive driving behaviors were predicted only by high Entitlement scores for males. Thus the authors concluded that aggressive driving in males was associated with a sense of entitlement, whereas aggressive driving in females was related to a need for admiration by others.

Overall, these findings suggest that individuals high in particular facets of narcissistic traits may engage in more aggressive driving behaviors than those who score low. However, the predictive utility of the NPI may have been hindered by a small sample size in the previously mentioned study. In other words, ninety one participants

(63 female, 28 male) may have been insufficient to establish reliable and conclusive evidence regarding the potential role of narcissistic traits in driving behavior. Thus, it is possible that narcissistic traits could be a stronger predictor of driving behaviors than is exhibited by the findings of this study. In addition, the authors only studied the relationship between narcissistic traits and aggressive driving. It is possible that narcissistic traits may also be predictive of other accident-related driving behaviors that, while not clearly aggressive, nevertheless lead to accident involvement. Thus, continued investigation of the potential role of narcissistic traits in predicting driving behavior appears to be warranted.

Cognitive Processing

Deffenbacher, Petrilli, Lynch, Oetting, and Swaim (2003c) have posited that the way in which a person codes and interprets driving related events may impact his/her behavioral and emotional reactions while driving. These authors suggested that several drivers may encounter the same driving situations (e.g., getting stuck in traffic, being honked at), but each may think differently about it. For example, one driver may believe that he/she has been insulted when another driver honks his/her horn. If the perception of insult is accompanied by the conviction that one should not let other drivers get away with such behavior, the driver may engage in various retaliatory behaviors (e.g., deliberately slowing down or making hostile gestures). However, another driver who experiences the same situation may believe the other driver is simply a bad driver and may avoid confrontation, focusing his/her attention on driving safely. Thus, two drivers who have the same experience may perceive it differently and consequently experience different emotional and behavioral responses. Therefore, driving-related thoughts may be

important in emotional reactions and driving safety for the driver as well as those around him/her.

As a result of this thinking, Deffenbacher and colleagues developed the Driver's Angry Thoughts measure (DATQ; Deffenbacher et al., 2003c), which assesses anger-related cognitions one may experience while driving. Five forms of driving-related angry thoughts were identified, with the first four involving angry forms of thinking and the last involving adaptive/coping thoughts. The first three, thinking of verbally abusing others (i.e., Pejorative Labeling/Verbally Aggressive Thinking), thinking about physically aggressive behavior (i.e., Physically Aggressive Thinking), and thinking about revenge or retaliation (i.e., Revengeful/Retaliatory Thinking) are considered to be aggressive forms of thinking. The fourth form involved judging other drivers negatively and disbelieving or discounting their actions (i.e., Judgmental/Disbelieving Thinking) and was considered to be less aggressive. The final form involved calming and problem-oriented thinking patterns (i.e., Coping Self-Instruction).

The first three aggressive forms of thinking were found to correlate positively with each other. In addition, they were associated with reported aggression on the road over the last 3 months, general aggression, and risky driving behavior. Each of the angry driving related thoughts were positively correlated with trait driving anger, general trait anger, verbally aggressive expression of anger, personal physical aggressive expression of anger, and use of the vehicle to express anger. Specifically it was found that Pejorative Labeling/Verbally Aggressive Thinking was the best predictor of verbal anger expression while Judgmental/Disbelieving and Revengeful/Retaliatory Thinking were second. Revengeful/Retaliatory and Physically Aggressive Thinking were associated with

personal physical aggressive expression. The use of a vehicle to express anger was correlated with Revengeful/Retaliatory, Pejorative Labeling/Verbally Aggressive, and Physically Aggressive Thinking.

Of the three aggressive forms of thinking Revengeful/Retaliatory Thinking was found to be the best predictor of using the vehicle to express anger, which could easily result in injury or death. In addition, this type of thinking also accounted for the greatest amount of variance in risky and aggressive behaviors. Coping/Self-Instruction was found to be strongly associated with adaptive anger expression and negative correlated with physical anger expression, expression of anger through the use of a vehicle, risky driving, and aggressive driving.

Thus, there seems to be some evidence suggesting that driver's angry thoughts may offer great utility in the prediction of various risky and aggressive driving behaviors.

Multivariate Prediction

It has been suggested that a combination of predictors may account for more variance in unsafe driving than one single risk factor (Peck, 1993). Despite a wealth of literature supporting the predictive utility of the previously discussed variables, only a few studies have attempted to combine any of them in an effort to strengthen the prediction of motor vehicle accidents and accident-related driving behaviors.

Recognizing that the combined utility of two of the most often replicated predictors of driver behavior, trait driving anger and sensation seeking, had not been studied, Dahlen et al. (2004) assessed their combined predictive value. The results of this study supported the utility of combining these variables in the prediction of dangerous driving behaviors. Specifically, they found that while driving anger accounted for the

most variance in aggressive and risky driving, sensation seeking added significant power to the prediction of these behaviors. Thus, the combination of driving anger and sensation seeking explained more variance in accident-related driving behaviors than either predictor in isolation.

Dahlen and White (2006) conducted a similar study in order to replicate and extend this line of research. After holding constant the possible effects of gender, age, and miles driven/week, results again supported the added predictive value of a multivariate model. Driving anger was one of the best predictors of unsafe driving, accounting for 8% to 17% of the unique variance in aggressive driving, risky driving, and driving anger expression. Angry drivers reported more incidents of losing vehicular control and engaging in risky and aggressive driving behaviors than other drivers. In addition, they were less likely to utilize adaptive methods of anger expression while driving and reported more verbal aggression. Moreover, generally angry drivers were more likely to engage in some of the most extreme forms of aggressive driving, involving physical aggression (e.g., attempting to force another vehicle off the road, getting out of one's car to fight with another driver, etc.) and using one's vehicle to express anger (e.g., flashing one's headlights, purposefully tailgating, blocking other drivers, etc.). Sensation seeking also proved to be a useful predictor, contributing to the prediction of aggressive and risky driving, losses of concentration while driving, moving citations, minor accidents, and major accidents. Finally, Dahlen and White's (2006) inclusion of the Driver's Angry Thoughts Questionnaire on an exploratory basis revealed that various subscales captured additional variance in risky and aggressive driving behaviors above driving anger, sensation seeking, gender, age, and miles driven/week.

Overall, there is some evidence demonstrating that the prediction of unsafe driving could be improved by combining measures of driver personality. In particular, measures of driving anger, sensation seeking, and driver's angry thoughts appear particularly useful (Dahlen et al., 2004; Dahlen & White, 2006). Thus, further study of combining predictors to increase the accuracy of predicting risky driving is clearly justified.

The Present Study

Drawing on previous research on trait driving anger (e.g., Deffenbacher, et al., 2000b, 2001, 2002, 2003a, 2003b; Lynch et al., 1995; Underwood et al., 1999) and sensation seeking (e.g., Arnett et al., 1996, 1997, 1990; Clement & Jonah, 1984; Donovan et al., 1982, 1985; Jonah, et al., 1997, 2001; Trimpop & Kirkcaldy, 1997), the present study represented an attempt to extend the meager research which has combined these predictors in the investigation of driving behavior.

The first component of this extension involved the addition of narcissistic personality traits as a potential predictor. Despite the availability of only one study of narcissistic traits in a driving context (i.e., Schreer, 2002), narcissism has shown consistent relationships with general aggression (Baumeister, Bushman, & Campbell, 2000; Baumeister, Smart, & Boden, 1996; McCann & Biaggio, 1989; Papps & O'Carroll, 1998; Rhondewalt & Morf, 1998). Thus, the present study included the NPI to measure narcissistic traits in order to evaluate the potential role of narcissistic traits in predicting aggressive and risky driving behaviors.

The second way in which the present study sought to extend previous research involved the inclusion of driver's angry thoughts as a potential predictor. With the

exception of Dahlen and White's (2006) exploratory use, driver's angry thoughts had only been studied along with driving anger (Deffenbacher et al., 2003c). The present study assessed the predictive utility of driver's angry thoughts in combination with driving anger, sensation seeking, and narcissistic personality traits in the prediction of aggressive and risky driving behaviors.

The third way in which the present study proposed to extend the extant literature is by improving upon important methodological limitations of the two prior studies which investigated multivariate predictive models (e.g., Dahlen et al., 2003; Dahlen & White, 2006). First, the samples used in these studies were significantly restricted by age and gender. Virtually all participants were college-age, and a large majority (around 70%) were female. Given previously observed age and gender differences on some of the predictors (Arnett et al., 1996; 1997; Jonah, 1986; Smith & Heckert, 1998), this is an important limitation on the generalizability of previous findings. Therefore, the present study sought to improve on the previous research by obtaining a more representative sample. Second, these prior studies relied exclusively on retrospective self-report data as criterion measures. Although self-report data are generally preferred over official records in research on driving behavior (Ball & Owsley, 1991) because they include many behaviors that may otherwise go unreported (e.g., close calls or near misses), retrospective data are prone to distortion. Previous data collected by the current research team suggested that the reported frequency of minor accident-related outcomes (e.g., near misses) was far greater when using prospective tracking methods rather than retrospective ratings. Therefore, the present study supplemented traditional methods of assessing driving behavior through retrospect recall with the addition of a driving log on

which participants recorded certain driving behaviors and outcomes immediately after they occurred during the course of the study.

The present study addressed the following research questions:

1. Will the combination of gender, age, trait driving anger, sensation seeking, driving-related angry thoughts, and narcissistic personality traits predict the frequency of risky and aggressive driving behaviors reported retrospectively on a survey of driving behavior within a college sample?
2. Will the combination of gender, age, trait driving anger, and sensation seeking predict the frequency of risky and aggressive driving behaviors reported retrospectively on a survey of driving behavior within a non-college sample?
3. Can previous findings of the incremental validity of sensation seeking in predicting losses of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving above trait driving anger be replicated within a college sample?
4. Can previous findings of the incremental validity of sensation seeking in predicting losses of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving above trait driving anger be replicated within a non-college sample?
5. Will the addition of driving-related angry thoughts and narcissistic personality traits provide incremental validity beyond driving anger and sensation seeking in the prediction of retrospectively recalled risky and aggressive driving behaviors?

6. Will findings differ depending on whether the dependent variables (i.e., self-reported frequency of risky and aggressive driving behaviors) are measured retrospectively or prospectively using a driving log?

Specific hypotheses were as follows:

1. The combination of driving anger, sensation seeking, narcissistic traits, and driver's angry thoughts will predict crash-related conditions, aggressive driving, risky non-aggressive driving, and each form of driving anger expression within a college sample.
2. The combination of driving anger, and sensation seeking will predict crash-related conditions, aggressive driving, risky non-aggressive driving, and each form of driving anger expression within a non-college sample.
3. Independent of miles driven, age, and gender, sensation seeking will offer incremental validity over driving anger in the prediction of loss of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving behaviors within a college sample.
4. Independent of miles driven, age, and gender, sensation seeking will offer incremental validity over driving anger in the prediction of loss of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving behaviors within a non-college sample.
5. Independent of miles driven, age, and gender, narcissistic traits will offer incremental validity over driving anger and sensation seeking in the prediction

of aggressive driving, risky non-aggressive driving behaviors, and each form of driving anger expression.

6. Independent of miles driven, age, and gender driver's angry thoughts will offer incremental validity over driving anger and sensation seeking in the prediction of crash-related conditions, aggressive driving, risky non-aggressive driving behaviors, and driving anger expression.

In addition to these hypotheses, the two methods of assessing the dependent variables (i.e., prospective driving log and retrospective survey) were compared in order to determine the degree to which these methods of data collection produced similar vs. disparate results. However, because such a comparison had not previously been made in the accident analysis literature, these analyses were treated as exploratory and not included as a formal hypothesis.

CHAPTER II

METHODS

Participants

Two distinct groups of participants were recruited for the present study. The first group included 349 (254 female and 95 male) undergraduate students from Psychology courses at the University of Southern Mississippi who were recruited through the web-based research system. These participants were required to be over the age of 18 (*Mdn* age = 20) and to drive at least 5 miles/week on average. They reported that they had a median of 5 years of driving experience and that they drove an average of 95.5 miles/week (*Mdn* = 60). Participants' racial backgrounds were as follows: 1.1% were American Indian, 0.9% were Asian/Pacific Islander, 35.2% were Black (non-Hispanic)/African American, 2.3% were Hispanic/Latino/Latina, 59.0% were white (non-Hispanic)/European American, and 1.4% indicated that they were of another race. These participants received research credit for completing the online survey, which required approximately 20 minutes of their time.

In order to obtain a wider age range of participants, each of the student participants was given the opportunity to receive additional research credit for recruiting up to two adults (21 years of age or older), who were not presently enrolled in college, to complete a subset of the measures of interest. These non-college adults composed the second group of participants (N = 175). Approximately 60% of these participants were female, their median age was 40, and they reported driving an average of 169.69 miles/week (*Mdn* = 120). These participants indicated that they had an average of 23.42 years of driving experience (*Mdn* = 21). In reference to race, 2.9% were American Indian,

1.1% were Asian/Pacific Islander, 26.3% were Black (non-Hispanic)/African American, 2.3% were Hispanic/Latino/Latina, 66.9% were white (non-Hispanic)/European American, and .6% indicated other.

Instruments

Given the complexity of the constructs under study, a number of assessment instruments were used. Criterion measures included the Survey of Driving (Deffenbacher et al., 2000b), a driving log, and the Driving Anger Expression Inventory (Deffenbacher et al., 2002). The predictor measures consisted of the Form V of the Sensation Seeking Scale (Zuckerman, 1994), the short form of the Driving Anger Scale (Deffenbacher et al., 1994), the Driver's Angry Thoughts Questionnaire (Deffenbacher et al., 2003c), and the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988) (see Appendix A).

Survey of Driving

In order to evaluate participants' unsafe driving behaviors, the 35-item Survey of Driving (Deffenbacher et al., 2000b) was used (see Appendix A). This instrument is designed to measure three areas of unsafe driving including: crash-related conditions, aggressive driving, and non-aggressive risky driving. Items are rated from 0 to +5 according to the number of times a particular event occurred during a given time frame. Crash related conditions includes six items that assess for losses of concentration while driving, minor losses of vehicular control, "close calls," during the last 3 months and lifetime incidents of moving violations, minor accidents, and major accidents. These items are analyzed individually because they do not form a reliable scale (Deffenbacher, Deffenbacher, Lynch, & Richards, 2003b; Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003a; Deffenbacher, Petrilli, Lynch, Oetting, & Swaim, 2003c). Aggressive

driving (αs = .84 to.88) is assessed by 13 items that ask how often in the last 3 months one has engaged in a variety of aggressive driving behaviors (e.g., flashed your headlights in anger, drove up close behind another driver in anger, made an angry gesture at another driver or pedestrian, etc.). Finally, how often one engaged in various risky driving behaviors (e.g., passed unsafely, driven recklessly, run a red light or stop sign, etc.) during the last 3 months is measured by the 16-item risky non-aggressive driving subscale (α = .86). Test-retest reliabilities have been shown to be adequate over a 3-month period for aggressive driving, (.85 to .89) and risky driving (.83 to .86) in an undergraduate population (Deffenbacher et al., 2003a, 2003b, 2003c).

Driving Log

Participants' unsafe driving behaviors were also recorded on a driving log developed for the purposes of this study (see Appendix B). The driving log is a list of 34 unsafe driving behaviors (e.g., cut off another driver, passed unsafely/illegally, tried to scare another driver/pedestrian) that participants were asked to carry with them each time they drive and tally up the number of times they engage in each behavior upon arrival at their destination. The items were adapted from the Survey of Driving (Deffenbacher et al., 2000b). The Driving Log was pilot tested by having a small undergraduate sample (N = 42) complete it over two consecutive weeks. When compared with Survey of Driving data from a previous study it was found that some items (e.g., close calls) were endorsed more frequently on the Driving Log. Thus, it was thought that having drivers log their behaviors immediately after driving would offer a more accurate assessment of those behaviors than measures relying on retrospective information over a certain time frame (e.g., last three months).

Driving Anger Expression Inventory

Individual differences in the expression of anger while driving were measured by the 49-item Driving Anger Expression Inventory (DAX; Deffenbacher et al., 2002) (see Appendix A). Respondents were asked to indicate how often they express their anger while driving on a 4-point Likert-type scale (1 = almost never, 4 = almost always). The DAX produces scores for four ways of expressing ones anger while driving. The 12-item Verbally Aggressive Expression scale (αs = .79 to .90) measures anger expression through verbally aggressive means (e.g., swearing or yelling at another driver). The 11-item Personal Physically Aggressive Expression scale (αs = .80 to .89) assesses for the expression of anger through the use of one's physical presence (e.g., giving another driver the finger or trying to get out of the vehicle to have a physical fight). Third, behaviors involving the use of ones vehicle to express anger are measured by the 11-item Use of the Vehicle to Express Anger scale (αs = .85 to .89) (e.g., speeding up to frustrate another driver or flashing lights at another driver). The last subscale, Adaptive/Constructive Expression (αs = .89 to .90), has 15 items that measure various ways in which a person positively copes with anger while driving (e.g., relaxing to calm down or thinking about things to distract one's self from frustration on the road). The three hostile/aggressive forms of anger expression (i.e., Verbally Aggressive Expression, Personal Physically Aggressive Expression, and Use of the Vehicle to Express Anger) positively correlate with each other (*rs* = .39 to .53) and negatively correlate with Adaptive/Constructive expression (*rs* = -.18 to -.28) (Deffenbacher et al., 2002; White & Dahlen, 2004). Further, there is evidence that the hostile/aggressive forms of expression are positively correlated with trait anger, aggression, and risky behavior, while

adaptive/constructive expression is negatively correlated with these behaviors (Deffenbacher et al., 2001, 2002). These differential correlations lend support for the convergent and discriminant validity of the DAX.

Sensation Seeking Scale

Sensation seeking was measured with a modified version of the 40-item Form V of the Sensation Seeking Scale (SSS; Zuckerman, 1994) (see Appendix A). Respondents are asked to choose between two statements for each item, one of which indicates a preference for sensation (e.g., "I sometimes like to do things that are a little frightening") while the other is related to more cautious behaviors (e.g., "A sensible person avoids activities that are dangerous"). Based on criticisms regarding the somewhat outdated wording of some SSS items (e.g., Arnett, 1994), phrases such as "far-out" and "jet set" was be followed by updated terms. The SSS produces a total score of general sensation seeking (αs = .83 to .68) and scores for four subscales derived through factor analytic techniques (Zuckerman, 1994). Thrill and Adventure Seeking (TAS) (αs = .77 to.82) measures one's preferences for risky and exciting activities (e.g., mountain climbing). The desire to adopt a non-conforming lifestyle and tendency to gravitate towards sensations through the senses and mind is assessed by the Experience Seeking (ES) subscale (αs = .61 to .67) (e.g., like to explore a strange city). Boredom Susceptibility (BS) (αs = .56 to .65) assesses for the propensity to avoid monotonous situations (e.g., bored seeing the same old faces). Finally, ones tendency to look for various opportunities or social experiences is measured by the Disinheriting (Dis) subscale (αs = .74 to .78) (e.g., a preference for wild parties). Test-retest reliability for the total score was reported to be .94 over a 3-week period (Zuckerman, 1994). In addition, there is evidence that

total scores on the SSS are positively correlated with several risky traits and behaviors, including cigarette smoking, driving practices, impulsivity, and use of drugs and alcohol (Zuckerman, 1994; Dahlen & White, 2006). Due to relatively low internal consistencies of some of the subscales, only the total SSS score was used.

Driving Anger Scale

Participants' tendency to become angry while driving was measured by the 14-item short form of the Driving Anger Scale (DAS; Deffenbacher et al., 1994) (see Appendix A). Each item presents a driving related scenario which respondents rate as to the level of anger it elicits on a 5-point scale (1 = not at all to 5 = very much). Scores range from 14 to 70, with higher scores suggesting a greater tendency to experience trait-driving anger. The short form of the DAS was developed by narrowing down the 33-item version to the best single-cluster structure that included at least one item from each of the six subscales that compose the long version. The short form of the DAS is reported to be highly correlated with the longer form (r = .95). Internal reliability has been reported to range from .80 to .92 and test retest reliability over a 10-week period is reported to be .84 (Deffenbacher et al., 2000a, 1994). In addition, high DAS scores are positively related to aggressive driving behaviors, risky driving behaviors, and some crash-related outcomes (Deffenbacher et al., 2000b, 2001, 2002, 2003a, 2003b; Dahlen & White, 2006). Those who score high on the DAS also tend to report higher general trait anger, impulsiveness, and trait anxiety (Deffenbacher et al., 2000b, 2003a, 2003b).

Driver's Angry Thoughts Questionnaire

Participants' angry cognitions while driving were measured by the 65-item Driver's Angry Thoughts Questionnaire (DATQ) (Deffenbacher et al., 2003c) (see

Appendix A). Respondents rate each item on a 5-point Likert-type scale (1 = not at all, 5 = all the time) depending on how often he/she has a given thought (or one similar to it) while driving. The DATQ produces scores for five subscales. The first subscale, Judgmental/Disbelieving Thinking (αs = .94 to .96) is measured by 21 items that assess for thoughts related to questioning others driving behaviors, thoughts of mild to moderate derogation of another person's driving behavior, and thoughts regarding disbelief at another drivers actions. Second, thoughts related to making critical judgments that involve name calling and the desire to engage in verbally abusive behavior (e.g., "What an idiot!") are measured by the 13-item Pejorative Labeling/Verbally Aggressive Thinking scale (αs = .92 to .93). The Revenge/Retaliatory Thinking subscale (αs = .92 to .93) is composed of 14 items that address thoughts related to revenge and retaliation. Fourth, thoughts regarding the desire to engage in physically aggressive behaviors directed at another driver are assessed by the 8-item Physically Aggressive Thinking subscale (αs = .91 to .93). Finally, the Coping Self-Instruction subscale (αs = .83 to .87) is composed of 9 items that address positive and adaptive ways of thinking to deal with anger while driving (e.g., just turn up the radio and tune them out). Three of the maladaptive scales (i.e., Judgmental/Disbelieving, Pejorative Labeling/Verbally Aggressive, Physically Aggressive, and Revengeful/Retaliatory Thinking) have been found to be positively related with each other. Additionally, these subscales have been shown to be positively correlated to aggression, aggressive driving anger expression, driving anger, and risky driving. The Coping Self-Instruction subscale was found to be inversely related to all of the maladaptive thoughts subscales behavior (Deffenbacher et al., 2003; Dahlen & White, 2006).

Narcissistic Personality Inventory

Narcissism was assessed with the 40-item Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988) (see Appendix A). Respondents choose one of two statements that describe them most accurately, one of which is related to narcissism. The NPI yields a total score for Narcissism (L3 = .83; αs = .80 to .82; del Rosario & White, 2005) as well as scores for seven subscales. The first subscale, Authority (L3 = .73) consists of 8 items that assess ones qualities of dominance, assertiveness, leadership, criticality, and self-confidence (e.g. I have a natural talent for influencing people). Exhibitionism (L3 = .63) is measured by 7 items that are related to exhibitionism, sensation seeking, extraversion, and lack of impulse control (e.g., I will usually show off if I get the chance). Personal qualities regarding ambitiousness, need for power, dominance, hostility, toughness, and lack of self-control and tolerance for others is measured by the 6 item Entitlement scale (L3 = .50) (e.g., I will never be satisfied until I get all that I deserve). The Self-sufficiency subscale (L3 = .50) is assessed by 6 items that address ones assertiveness, independence, self-confidence, and need for achievement (e.g., I like to take responsibility for my decisions). Exploitiveness (L3 = .52), which is measured by 5 items addresses qualities of rebelliousness, nonconformity, hostility, and a lack of consideration and tolerance for others (e.g., I find it easy to manipulate people). Ones capacity of status, social presence, self-confidence, and narcissistic ego inflation is assessed by the 5-item Superiority scale (L3 = .54) (e.g., I am an extraordinary person). The Vanity subscale (L3 = .64) is measured by 3 items that are related to viewing oneself as physically attractive and being actually judged to be physically attractive (e.g., I like to

show off my body). The present study utilized only the full scale as it has demonstrated sufficient reliability.

Procedure

All undergraduate participants were recruited through the Department of Psychology's research website (www.experimetrix .com/usm). Participants were given two options for completing the questionnaire portion of this study. The first option was through a secure on-line website, surveymonkey.com. The second option was through classrooms in Owings-McQuagge Hall. The two options were offered for two main reasons. First, an on-line option allowed students more convenience in completing the study. However, the online option required participants to enter their name on the consent form and last four digits of their social security code on all documents involved in the study. Thus, while there were no attempts made to link participants' names to their particular survey answers, anonymity could not be guaranteed through this option. As a result, participants were given the option to participate through classroom collections where they would have more anonymity if they so desired. As a result, two procedures will be described below for in classroom collections and on-line collection.

In classroom collection

Questionnaire data were collected in groups (20-60 people) in classrooms that can accommodate between 40 and 100 people in the Owings-McQuagge building at the University of Southern Mississippi. First, participants were asked to read and sign a consent form explaining that they were being asked to participate in a research project investigating the role of personality and mood on driving behavior (see Appendix C). Participants were verbally reminded of the eligibility requirements, and those who did not

meet them were excused. Following oral and written informed consent, the next phase of data collection was described. Participants were given a driving log and detailed instructions about how to complete it over the next two weeks. They were instructed to drop their logs off at a box located in Owings-McQuagge building room 213, 2 weeks from the initial data collection phase. In addition, they were notified that the survey packets and driving logs have been preassigned a unique four-digit identification number that would allow them to be linked in order to properly assign credit and for data entry purposes. Participants received 1 research credit for completing the initial questionnaires and an additional 2 credits on receipt of their completed driving logs. Finally, participants were informed that they could earn two additional credits for getting up to two people who were 21 years of age or older, drive five or more miles per week, and were not college students to fill out a subset of the measures. They were instructed to return these packets upon returning their driving logs and that they had to write the four digit number in the upper right hand corner in order to receive credit.

The questionnaire packets administered to the USM student participants included the SSS, DAS, DSP, NPI, DATQ, DAX, Survey of Driving, and two driving log sheets. In each packet, the SSS and NPI were presented first in a counter balanced order. This order was devised to help reduce any effects that the driving specific measures could have on these broader personality measures. Next, the DAS, DSP, DATQ, DAX, and survey of driving were presented in a counterbalanced order. Administration of this questionnaire packet took approximately 30 minutes to complete.

Participants who chose to gain additional research credit by recruiting non-college adults were given direction to have the non-college participant(s) complete the survey on-

line and were given directions on how to do so, or were given up to two packets of questionnaires. All packets included a consent form for the potential participant(s) specifying that (1) they were being asked to participate in a research project investigating the role of personality and mood in driving behaviors; (2) the student recruiting them would earn additional research credit for their participation; and (3) that they permit the researcher to contact them in order to verify that they actually completed the questionnaire in question (see Appendix D). Verification of non-college responses were completed on a random basis. Questionnaire packets for non-college participants also included the DAS, SSS, and driving survey. The packets were arranged with the SSS first followed by the DAS and driving survey in a counterbalanced order so that any possible effects that the driving specific measures could have on the broader sensation seeking measure would be reduced. Completion of these measures took less than 20 minutes. The consent forms and questionnaire packets were returned when the undergraduate sample returned the driving logs. The consent forms and questionnaire packets for both samples were separated to preserve the anonymity of participants' questionnaire responses and stored in a locking filing cabinet.

On-line collection

Participants who choose the option to complete the survey on-line were also recruited through the Department of Psychology's web-based research system (www.experimetrix.com/usm). From here clients were directed to a gateway website, drivingsurvey.com. This website provided explicit directions for completing the survey, completing the log, and administering surveys to non-college participants.

Once a participant decided to begin the questionnaire phase of the study they were directed to click a link that took them to the survey hosted on surveymonkey.com. When these participants signed on, they were taken to a page presenting a written informed consent (see Appendix C) during which the second phase of the study involving non-college participants was again described. Surveymonkey.com does not provide the ability to assign a unique 4-digit identification number. As a result, these participants were required to enter their name and last 4 digits of their social security number in order to assign credit appropriately. After entering this information, they were presented with web pages including the same instruments, delivered in the same manner as the in classroom collection sample. Upon completion of the questionnaires, participants were taken back to drivingsurvey.com where they were offered the option of either obtaining pre-printed copies of the driving logs in OMH 213 or downloading the logs and printing them for themselves. The page also contained detailed written instructions about how to complete the logs over the next two weeks after each time they drive. After the two-week period, participants were instructed to drop their logs off in a secure drop box in the psychology department (OMH 213 office suites) or enter them online through a link that directed them to surveymonkey.com. Students were informed that they must enter the last for digits of their social security number in a blank provided on the logs in order for them to be linked with the questionnaires for data entry purposes and in order to assign credit appropriately.

Statistical Analyses

Prior to conducting the primary analyses during which the research hypotheses were evaluated, a series of preliminary analyses were conducted to establish the integrity

of the data. First, reliability analyses were conducted on all measures to determine whether internal consistencies were adequate. Second, one-way (gender) MANOVAs were calculated on subsets of variables (i.e., DAS, SSS, DATQ subscales, DAX subscales, aggressive and risky driving) to assess potential gender differences so that such differences could be used to inform subsequent analyses and make informed decisions about whether to collapse results across gender or report separately. Third, means and standard deviations were computed for each of the variables, and intercorrelations were computed for all variables.

Primary analyses to evaluate the research hypotheses utilized hierarchical multiple regression, and unless otherwise noted, included only the college participants. First, the hypothesis that the combination of driving anger, sensation seeking, narcissistic traits, and driver's angry thoughts would predict crash-related conditions aggressive driving, risky non-aggressive driving, and each form of driving anger expression was tested through a series of hierarchical multiple regressions. Miles driven, age, and gender were entered on Step 1, and the predictor variables (i.e., DAS, SSS, NPI, and DATQ) were entered simultaneously on Step 2. The individual crash-related condition items, aggressive driving scale, risky non-aggressive driving scale, and each of the four driving anger expression scales served as the dependent variables onto which predictors were regressed. Hypothesis 2 was evaluated with the non-college age sample in the same manner with one exception. Only the DAS and SSS were entered on Step 1, as these participants did not receive the other predictor measures.

Hypotheses 3, 5, and 6, concerning the college sample, were tested through another series of hierarchical multiple regressions. Miles driven, age, and gender were

entered on Step 1, DAS scores were entered on Step 2, SSS scores were entered on Step 3, and the NPI and DATQ were entered on Step 4. Crash-related conditions, aggressive driving, risky non-aggressive driving, and driving anger expression served as the dependent variables onto which predictors were regressed.

Hypothesis 4, concerned the incremental validity of sensation seeking over driving anger, age, gender and miles driven within the non-college sample. For this analysis, gender, age, and miles driven were entered on Step 1, DAS scores were entered on Step 2, and SSS scores were entered on Step 3. The dependent variables were the crash-related conditions items, aggressive, and non-aggressive risky driving scales from the Driving Survey.

Tests of the research hypotheses were followed by exploratory analyses in which the two methods of data collection (i.e., retrospective survey data and prospective driving log data) were compared. First, reliability analyses were conducted on the driving log to ensure that internal consistencies were adequate for subscales corresponding to the Survey of Driving. Next, paired samples t-tests were utilized to compare the corresponding subscales of the Survey of Driving and the driving log (i.e., crash-related conditions, aggressive driving, and non-aggressive risky driving).

CHAPTER III

RESULTS

Preliminary Analyses

Scale Reliabilities

Internal consistencies were calculated for each measure via coefficient alpha in order to ensure that scales were assessing unitary constructs (see Table 1). Alpha coefficients indicated adequate internal consistency (i.e., αs > .70) for all measures except the subscales of the SSS with each sample (see Table 1 and 2). As planned, only the total score for the SSS was utilized in subsequent analyses, so analyses were not in any way affected by low subscale reliability.

Potential Gender Differences

A one-way (gender) MANOVA was computed on all variables, except the 6 crash-related conditions items of the Survey of Driving, for each sample in order to assess potential gender differences on variables of interest. A multivariate gender effect was found for the college sample, $F(14, 334) = 2.79$, $p < .01$ ($\eta p^2 = .11$). Significant univariate gender differences were found for the SSS, R/RT, PAT, and PAX with men scoring higher than women on each variable (see Table 1). A multivariate gender effect was also found for the non-college sample, $F(4, 170) = 4.39$, $p < .01$ ($\eta p^2 = .09$). A univariate gender effect was found for the SSS. Examination of the means indicated that men scored higher than women on this variable (see Table 2).

Next, two separate one-way (gender) MANOVAs were computed on the 6 crash-related conditions items of the Survey of Driving (i.e., one MANOVA was conducted for each sample). There were no multivariate effect was found in the college sample. With

the non-college sample, a multivariate gender effect was found, $F(6, 168) = 3.70$, $p < .01$ ($\eta p^2 = .03$). Significant univariate gender differences were found in MV, MinA, MajA, and LoC with men scoring higher on all of these variables (See Table 2).

Table 1

Alphas, Means, and Standard Deviations for all Variables in the College Sample (N=349).

		Men		Women			
Variable	α	*M*	*SD*	*M*	*SD*	*F*	ηp^2
SSS	.82	17.58	7.19	14.93	6.09	11.85**	.03
NPI	.85	18.07	7.21	16.98	7.04	1.66	
DAS	.88	43.42	11.05	45.34	10.86	2.14	
Driver's Angry Thoughts							
J/DT	.96	55.25	20.22	55.59	20.71	.02	
PL/VAT	.96	35.41	14.38	36.07	14.34	.15	
R/RT	.95	26.75	13.76	22.25	9.79	11.56**	.03
PAT	.92	13.98	7.84	11.62	5.70	9.5*	.03
CSI	.86	32.07	7.18	32.94	7.27	.97	
Survey of Driving							
MV	N/A	1.45	1.52	1.15	1.46	2.99	
MinA	N/A	1.12	1.06	1.21	1.29	.39	
MajA	N/A	.37	.72	.45	.87	.71	
Crash-Related Conditions							
LC	N/A	2.64	1.67	2.79	1.64	.57	
LoC	N/A	1.49	1.35	1.89	1.55	4.80*	.01
CC	N/A	1.28	1.41	1.49	1.36	1.52	
AD	.88	13.62	12.54	13.00	11.46	.19	
RD	.88	26.64	15.92	24.88	14.96	.92	
Driving Anger Expression							
PAX	.90	13.95	4.41	12.90	4.25	4.12*	.01
VAX	.91	24.58	8.44	24.83	8.36	.06	
UVX	.89	18.26	6.23	17.79	5.85	.43	
A/CX	.91	34.74	8.94	35.74	9.24	.83	

Note. SSS = Sensation Seeking Scale, NPI = Narcissistic Personality Inventory, DAS = Driving Anger Scale, J/DT = Judgmental/Disbelieving Thinking, PL/VAT = Pejorative Labeling/Verbally Aggressive Thinking, R/RT = Revenge/Retaliatory Thinking, PAT = Physically Aggressive Thinking, CSI = Coping Self-Instruction, MV = moving violation, MinA = minor accident, MajA = major accident, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, RD = risky driving, PAX =

Physically Aggressive Expression, VAX = Verbally Aggressive Expression, UVX = Use of the Vehicle to Express Anger, and A/CX = Adaptive/Constructive Expressing.
**p < .01. *p < .05

Table 2

Alphas, Means, and Standard Deviations for all Variables in the non college sample (N=175.)

		Men		Women			
Variable	α	*M*	*SD*	*M*	*SD*	*F*	ηp^2
SSS	.82	15.68	8.07	11.34	6.89	14.53**	.08
DAS	.93	40.49	13.66	42.21	12.46	.74	
Survey of Driving							
MV	N/A	2.40	2.01	1.37	1.56	14.41**	.08
MinA	N/A	1.63	1.56	1.17	1.18	4.85*	.03
MajA	N/A	.79	1.14	.41	.74	6.99**	.04
Crash-Related Conditions							
LC	N/A	2.07	1.86	1.94	1.48	.26	
LoC	N/A	1.51	1.56	.97	1.17	6.90**	.04
CC	N/A	.94	1.14	.93	1.05	.00	
AD	.88	9.34	10.97	7.70	9.58	1.11	
RD	.87	19.47	13.44	17.22	13.88	1.11	

Note. SSS = Sensation Seeking Scale, DAS = Driving Anger Scale, MV = moving violation, MinA = minor accident, MajA = major accident, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, and RD = risky driving.
**p < .01. *p < .05

Primary Analyses

Correlations

In order to examine the interrelationships among all variables, bivariate correlations were computed (see Tables 3 and 4). Due to the number of comparisons made, alpha was set at .01 to minimize Type II error. As a result of the large number of correlations, results will mainly focus on the college sample followed by a summary of significant findings in the non-college sample. For both college and non-college samples, relationships among the predictor variables and dependent variables were generally consistent with previous research.

In the college sample, the SSS was positively correlated with all other predictor variables except for the DAS and the CSI subscale of the DATQ. The NPI was positively related to the DAS, SSS, R/RT, and PAT. The DAS was positively correlated with all of the DATQ subscales except for CSI. All of the subscales of the DATQ were correlated with one another in the expected directions, except CSI, which was positively correlated with the maladaptive DATQ subscales.

The predictor variables were mostly related to the dependent variables in the expected directions. Specifically, the SSS was positively related to MV, MinA, MajA, LC, LoC, CC, AD, RD, VAX, PAX, and UVX, and negatively correlated with A/CX. The DAS was positively correlated with the majority of the dependent variables (i.e., MajA, LC, LoC, CC, AD, RD, VAX, PAX, and UVX) and inversely related to A/CX. All of the DATQ subscales, except for CSI, were positively related to CC, AD, RD, and each of the hostile/aggressive forms of driving anger expression. In addition, R/RT and PAT were negatively related to A/CX. Further, J/DT, PL/VAT, and R/RT were positively related LC and Loc. PL/VAT had a positive relationship with MV. R/RT was positively related to MV, MinA, and MajA. Finally, CSI was positively related to A/CX.

In the non-college sample the DAS and SSS were significantly related. In addition, the predictor variables were, mainly, related to the dependent variables in an expected manner (see Table 4). The DAS was positively related to LC, LoC, AD, and RD. The SSS was positively related to MV, MajA, AD, and RD.

Table 3

Intercorrelations Among all Variables in the college sample (N=349)

Variable	1	2	3	4	5	6	7	8	9	10
1) MV										
2) MinA	.44**									
3) MajA	.26**	.42**								
4) LC	.12	.20**	.15**							
5) LoC	.18**	.29**	.15**	.52**						
6) CC	.24**	.29**	.25**	.39**	.57**					
7) AD	.21**	.26**	.28**	.37**	.36**	.43**				
8) RD	.36**	.32**	.24**	.46**	.51**	.52**	.67**			
9) VAX	.12	.19**	.18**	.29**	.27**	.28**	.63**	.46**		
10) PAX	.15**	.15**	.17**	.04	.12	.23**	.53**	.35**	.43**	
11) UVX	.20**	.21**	.18**	.28**	.29**	.32**	.64**	.59**	.61**	.61**
12) A/CX	.01	-.04	-.09	-.09	-.08	-.14**	-.28**	-.15**	-.18**	-.14**
13) DAS	.08	.12	.14**	.19**	.14**	.18**	.42**	.40**	.49**	.22**
14) SSS	.23**	.19**	.14**	.21**	.16**	.15**	.30**	.29**	.24**	.23**
15) NPI	.08	.07	.15**	-.04	.02	.06	.17**	.19**	.08	.27**
16) J/DT	.08	.05	.09	.21**	.18**	.20**	.36**	.27**	.64**	.26**
17) PL/VAT	.15**	.12	.13	.28**	.24**	.25**	.51**	.42**	.77**	.28**
18) R/RT	.23**	.14**	.16**	.15**	.18**	.24**	.60**	.48**	.53**	.61**
19) PAT	.12	.04	.12	.04	.11	.17**	.49**	.36**	.45**	.65**
20) CSI	.06	.04	.02	-.01	.05	.03	-.06	.06	.08	.06

Table 3 (continued).

Intercorrelations Among all Variables in the college sample (N=349)

Variable	11	12	13	14	15	16	17	18	19
12) A/CX	-.19**								
13) DAS	.47**	-.14**							
14) SSS	.28**	-.14**	.09						
15) NPI	.26**	-.15**	.18**	.31**					
16) J/DT	.43**	.11	.41**	.16**	.01				
17) PL/VAT	.53**	-.11	.49**	.25**	.06	.79**			
18) R/RT	.75**	-.26**	.36**	.32**	.30**	.48**	.56**		
19) PAT	.53**	-.19**	.30**	.23**	.31**	.45**	.52**	.79**	
20) CSI	.08	.58**	.11	.06	-.07	.50**	.24**	.14**	.16**

Note. MV = moving violation, MinA = minor accident, MajA = major accident, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, RD = risky driving, VAX = Verbally Aggressive Expression, PAX = Physically Aggressive Expression, UVX = Use of the Vehicle to Express Anger, A/CX = Adaptive/Constructive Expressing, DAS = Driving Anger Scale, SSS = Sensation Seeking Scale, NPI = Narcissistic Personality Inventory, J/DT = Judgmental/Disbelieving Thinking, PL/VAT = Pejorative Labeling/Verbally Aggressive Thinking, R/RT = Revenge/Retaliatory Thinking, PAT = Physically Aggressive Thinking, and CSI = Coping Self-Instruction.
**$p < .01$.

Table 4

Intercorrelations Among all Variables In the Non-college Sample (N=175)

Variable	1	2	3	4	5	6	7	8	9
1) MV									
2) MinA	.47**								
3) MajA	.35**	.47**							
4) LC	.28**	.25**	.17						
5) LoC	.31**	.31**	.21**	.42**					
6) CC	.10	.14	.15	.22**	.48**				
7) AD	.26**	.19	.12	.14	.39**	.44**			
8) RD	.38**	.18	.22**	.31**	.44**	.36**	.67**		
9) DAS	.18	.04	.06	.21**	.21**	.17	.43**	.51**	
10) SSS	.22**	.17	.28**	-.01	.14	.14	.38**	.43**	.20**

Note. MV = moving violation, MinA = minor accident, MajA = major accident, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, RD = risky driving, DAS = Driving Anger Scale, SSS = Sensation Seeking Scale.

**$p < .01$.

Regression Analyses

In order to test the hypotheses, a series of hierarchical multiple regressions were conducted on the two Survey of Driving subscales (i.e., AD and RD), each of the 6 crash-related condition items, and each of the four DAX subscales for each sample (see Table 5).

Hypothesis 1: The combination of driving anger, sensation seeking, narcissistic traits, and driver's angry thoughts will predict crash-related conditions, aggressive driving, risky non-aggressive driving, and each form of driving anger expression within a college sample.

Gender, age, and average miles driven per week were entered on Step 1 in order to control for their possible effects. The DAS, SSS, NPI, and DATQ were entered on Step 2. Results offered partial support for Hypothesis 1. All of the dependent variables were predicted through some combination of predictors. Overall, results demonstrated that different types of unsafe driving behaviors were predicted by different combinations of predictor variables. Tables regarding regressions for Hypothesis 1 are not presented as the numbers for tables for Hypothesis 3, 5, and 6 are identical (see Table 5). MV and MinA were predicted by the SSS, R/RT, and J/DT. MinA was also predicted by PAT. LC was predicted by the SSS, PL/VAT, NPI, and PAT. SSS predicted LoC. R/RT predicted CC. AD was predicted by the DAS, SSS, PL/VAT, R/RT, and CSI. The DAS, SSS, and J/DT predicted RD. VAX was predicted by the DAS, J/DT, PL/VAT, R/RT, and CSI. R/RT, PAT, and PL/VAT predicted PAX. UVX was predicted by the DAS, R/RT, and PAT. Finally, A/CX was predicted by DAS, R/RT, and CSI scores.

Hypotheses 3, 5, and 6 were tested through another series of hierarchical multiple regressions on crash-related conditions, AD, RD, and DAX (see Table 5). In each case, miles driven, age, and gender was entered on Step 1, the DAS was entered on Step 2, the SSS was entered on Step 3, and the NPI and DATQ were entered on Step 4.

Hypothesis 3: Independent miles driven, sensation seeking will offer incremental validity over driving anger in the prediction of loss of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving behaviors within a college sample.

Hypothesis 3 was generally supported across dependent variables (see Table 5). The SSS predicted MV, MinA, LC, LoC, AD, and RD. Only MajA was not predicted by the SSS.

Hypothesis 5: Independent of miles driven, narcissistic traits will offer incremental validity over driving anger and sensation seeking in the prediction of aggressive driving, risky non-aggressive driving behaviors, and each form of driving anger expression.

Hypothesis 5 was generally not supported (see Table 5). LC was predicted by the NPI. However, the NPI did not offer predictive utility for any of the other dependent variables after controlling for age, gender, miles driven, DAS, and SSS.

Hypothesis 6: Independent of miles driven, driver's angry thoughts will offer incremental validity over driving anger and sensation seeking in the prediction of crash-related conditions, aggressive driving, risky non-aggressive driving behaviors, and driving anger expression.

Hypothesis 6 was supported for the most part. Overall, it was found that various combinations of driver's angry thoughts added utility to the prediction of most of the dependent variables. MV was predicted by R/RT and J/DT. R/RT, J/DT, and PAT predicted MinA. PL/VAT and PAT predicted LC. CC was predicted by R/RT. PL/VAT, R/RT, and CSI predicted AD. RD was predicted by J/DT. VAX was predicted by J/DT, PL/VAT, R/RT, and CSI. R/RT, PAT, and PL/VAT predicted PAX. R/RT and PAT scores predicted UVX. Finally, A/CX was predicted by R/RT and CSI scores. Driver's angry thoughts did not offer utility in the prediction of MajA or LoC.

Table 5

Summary of Hierarchical Multiple Regressions for Driving Anger, Sensation Seeking, Narcissistic Personality Inventory, Moving Violations, Minor Accidents, Major Accidents, Crash Related Conditions, Aggressive Driving, Risky Driving, and Driving Anger Within a College Population (N = 349)

Moving Violations					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.03*	
Gender	-.15	.18	-.05		
Age	.06	.02	.15**		
Miles	.00	.00	.10		
Step 2				.04*	.01*
DAS	.00	.01	-.00		
Step 3				.08**	.05**
SSS	.04	.01	.16**		
Step 4				.13**	.05**
NPI	.01	.01	.03		
J/DT	-.02	.01	-.22*		
PL/VAT	.02	.01	.19		
R/RT	.04	.01	.29**		
PAT	-.04	.02	-.16		
CSI	.02	.01	.10		

Table 5 (continued).

Minor Accidents					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.01	
Gender	.17	.15	.06		
Age	.04	.02	.13*		
Miles	.00	.00	.03		
Step 2				.02	.02
DAS	.01	.01	.08		
Step3				.06**	.04**
SSS	.03	.01	.16**		
Step4				.09**	.03**
NPI	.00	.01	.03		
J/DT	-.01	.01	-.21*		
PL/VAT	.01	.01	.16		
R/RT	.02	.01	.22*		
PAT	-.03	.02	-.18*		
CSI	.02	.01	.09		

Major Accidents					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.00	
Gender	.13	.10	.07		
Age	.02	.01	.10		
Miles	-5.08	.00	-.01		
Step 2				.02	.02
DAS	.01	.01	.08		
Step 3				.04**	.02**
SSS	.01	.01	.08		
Step 4				.06*	.02*
NPI	.01	.01	.11		
J/DT	-.00	.00	-.09		
PL/VAT	.01	.01	.10		
R/RT	.01	.01	.09		
PAT	-.00	.01	-.02		
CSI	.00	.01	.04		

Table 5 (continued).

Loss of concentration					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.01	
Gender	.17	.20	.05		
Age	-.04	.02	-.08		
Miles	.00	.00	.03		
Step 2				.04*	.03*
DAS	.01	.01	.08		
Step3				.08**	.04**
SSS	.05	.01	.20**		
Step 4				.15**	.07**
NPI	-.03	.01	-.12*		
J/DT	.01	.01	.06		
PL/VAT	.02	.01	.20*		
R/RT	.02	.01	.14		
PAT	-.06	.02	-.22*		
CSI	-.02	-.01	.10		

Loss of Vehicular Control					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.02	
Gender	.50	.18	.15**		
Age	-.02	.02	-.05		
Miles	.00	.00	.04		
Step 2				.04*	.02*
DAS	.00	.01	.02		
Step 3				.07**	.03**
SSS	.03	.01	.14*		
Step 4				.10**	.03**
NPI	-.01	.01	-.05		
J/DT	.00	.01	.01		
PL/VAT	.02	.01	.14		
R/RT	.02	.01	.16		
PAT	-.02	.02	-.09		
CSI	-.00	-.01	.01		

Table 5 (continued).

Close Calls					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.02	
Gender	.31	.17	.10		
Age	-.01	.02	-.02		
Miles	-.00	.00	-.11*		
Step 2				.05**	.03**
DAS	.01	.01	.06		
Step 3				.07**	.02**
SSS	.02	.01	.08		
Step 4				.11**	.04**
NPI	-.01	.01	-.04		
J/DT	.00	.01	.05		
PL/VAT	.01	.01	.10		
R/RT	.03	.01	.21*		
PAT	-.02	.02	-.07		
CSI	-.01	-.01	.04		

Aggressive Driving					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.01	
Gender	1.31	1.09	.05		
Age	-.07	.13	-.02		
Miles	-.00	.00	-.04		
Step 2				.19**	.18**
DAS	.21	.05	.19**		
Step 3				.25**	.07**
SSS	.26	.08	.15**		
Step 4				.48**	.23**
NPI	-.11	.08	-.07		
J/DT	.02	.04	.03		
PL/VAT	.13	.06	.16*		
R/RT	.42	.07	.39**		
PAT	.09	.12	.05		
CSI	-.35	.08	-.21**		

Table 5 (continued).

Risky Driving					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.02	
Gender	.21	1.58	.01		
Age	-.13	.19	-.03		
Miles	.01	.01	.06		
Step 2				.18**	.16**
DAS	.32	.07	.23**		
Step 3				.24**	.06**
SSS	.33	.12	.14**		
Step 4				.34**	.11**
NPI	.01	.11	.00		
J/DT	-.17	.06	-.23**		
PL/VAT	.30	.09	.28		
R/RT	.49	.11	.36		
PAT	-.17	.18	-.07		
CSI	.06	.11	.03		

Verbally Aggressive Expression					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.01	
Gender	.23	.64	.01		
Age	-.02	.08	-.01		
Miles	-.00	.00	-.01		
Step 2				.24**	.23**
DAS	.10	.03	.13**		
Step 3				.28**	.04**
SSS	.07	.05	.05		
Step 4				.65**	.37**
NPI	-.04	.04	-.04		
J/DT	.08	.03	.20**		
PL/VAT	.30	.04	.51**		
R/RT	.13	.04	.17**		
PAT	-.07	.07	-.05		
CSI	-.20	.05	-.18**		

Table 5 (continued).

Physically Aggressive Expression					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.02	
Gender	.31	.40	.03		
Age	-.02	.05	-.01		
Miles	.00	.00	.05		
Step 2				.07**	.05**
DAS	.02	.02	.04		
Step 3				.10**	.03**
SSS	.04	.03	.07		
Step 4				.47**	.37**
NPI	.01	.03	.02		
J/DT	.01	.02	.04		
PL/VAT	-.06	.02	-.19*		
R/RT	.10	.03	.27**		
PAT	.33	.05	.50**		
CSI	-.02	.03	-.04		

Use of the Vehicle to Express Anger					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.02	
Gender	.82	.47	.06		
Age	-.03	.06	-.02		
Miles	.00	.00	.02		
Step 2				.23**	.21**
DAS	.10	.02	.18**		
Step 3				.28**	.05**
SSS	.03	.03	.04		
Step 4				.63**	.35**
NPI	.03	.03	.03		
J/DT	-.00	.02	-.01		
PL/VAT	.05	.03	.12		
R/RT	.40	.03	.76**		
PAT	-.17	.05	-.19**		
CSI	-.03	-.03	.04		

Table 5 (continued).

Adaptive/Constructive Expression					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.01	
Gender	.57	.86	.03		
Age	.05	.10	.02		
Miles	.00	.00	.03		
Step 2				.03*	.02*
DAS	-.08	.04	-.09*		
Step 3				.04*	.01*
SSS	-.10	.06	-.07		
Step 4				.47**	.43**
NPI	.05	.06	.04		
J/DT	.01	.04	.03		
PL/VAT	-.04	.05	-.07		
R/RT	-.20	.06	-.25**		
PAT	-.05	.10	-.04		
CSI	.80	.06	.64**		

Note. DAS = Driving Anger Scale, SSS = Sensation Seeking Scale, NPI = Narcissistic Personality Inventory, J/DT = Judgmental/Disbelieving Thinking, PL/VAT = Pejorative Labeling/Verbally Aggressive Thinking, R/RT = Revenge/Retaliatory Thinking, PAT = Physically Aggressive Thinking, and CSI = Coping Self-Instruction. B values, SEBs, and βs are presented for the full model after entering all variables.
$p < .05$. ** $p < .01$

Hypotheses 2 and 4 were tested through a series of multiple hierarchical regressions with the non-college population (see Table 6). For these analyses, gender, age, and miles driven were entered on Step 1, DAS scores were entered on Step 2, and SSS scores were entered on Step 3. The dependent variables were crash related conditions and the AD and RD scales from the Survey of Driving.

Hypothesis 2: The combination of driving anger, and sensation seeking will predict crash-related conditions, aggressive driving, risky non-aggressive driving, and each form of driving anger expression within a non-college sample.

Hypothesis 2 was generally supported (see Table 6). MV was predicted by the DAS. MinA and MajA were predicted by the SSS. DAS scores predicted LC and LoC. AD and RD were predicted by the DAS and SSS. The only departure from the hypothesis was the finding that CC was not predicted by either of the hypothesized predictors.

Hypothesis 4: Independent of miles driven, age, and gender, sensation seeking will offer incremental validity over driving anger in the prediction of loss of concentration, moving tickets, minor accidents, major accidents, aggressive driving, and risky non-aggressive driving behaviors within a college sample.

Hypothesis 4 was partially supported (see Table 6). The SSS demonstrated predictive utility above driving anger, age, miles driven, and gender with regard to MinA, MajA, RD, and AD. However, the SSS did not offer incremental validity over driving anger in the prediction of MV, LC, and LoC.

Table 6

Summary of Hierarchical Multiple Regressions for Driving Anger, Sensation Seeking, Moving Violations, Minor Accidents, Major Accidents, Crash Related Conditions, Aggressive Driving, and Risky Driving Within the Non-College sample. (N=175)

Moving Violations					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.18**	
Gender	-.93	.27	-.25**		
Age	-.02	.01	-.17*		
Miles	.00	.00	.26**		
Step 2				.22**	.04**
DAS	.03	.01	.19**		
Step 3				.22**	.00**
SSS	.01	.02	.03		

Minor Accidents					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.06*	
Gender	-.26	.22	-.09		
Age	.01	.01	.13		
Miles	.00	.00	.18*		
Step 2				.06*	.01*
DAS	.00	.01	.04		
Step 3				.08*	.02*
SSS	.03	.02	.18*		

Major Accidents					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.13**	
Gender	-.20	.14	-.10		
Age	-.00	.01	-.02		
Miles	.00	.00	.27**		
Step 2				.13**	.01**
DAS	.00	.01	.05		
Step 3				.17**	.04**
SSS	.03	.01	.23**		

Table 6 (continued).

Loss of Concentration					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.05*	
Gender	-.24	.26	-.07		
Age	-.02	.01	-.15		
Miles	.00	.00	.20**		
Step 2				.10**	.05**
DAS	.03	.01	.25**		
Step 3				.12**	.02**
SSS	-.03	.02	-.15		

Loss of Vehicular Control					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.06*	
Gender	-.57	.20	-.21**		
Age	-.01	.01	-.10		
Miles	.00	.00	.05		
Step 2				.10**	.04**
DAS	.02	.01	.21**		
Step 3				.10**	.00**
SSS	.00	.02	-.00		

Close Calls					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.05*	
Gender	-.03	.18	-.03		
Age	-.01	.01	-.19*		
Miles	.00	.00	-.07		
Step 2				.07*	.02*
DAS	.01	.01	.13		
Step 3				.07*	.00*
SSS	.01	.01	.04		

Table 6 (continued).

Aggressive Driving					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.13**	
Gender	-.93	1.40	-.05		
Age	-.16	.05	-.22**		
Miles	.00	.00	.04		
Step 2				.29**	.16**
DAS	.29	.05	.37**		
Step 3				.32**	.03**
SSS	.27	.10	.20**		

Risky Driving					
Variables	*B*	*SEB*	β	R^2	ΔR^2
Step 1				.13**	
Gender	-.75	1.77	-.03		
Age	-.18	.06	-.18**		
Miles	.01	.01	.12		
Step 2				.37**	.24**
DAS	.49	.07	.45**		
Step 3				.42**	.05**
SSS	.46	.12	.25**		

Note. DAS = Driving Anger Scale, SSS = Sensation Seeking Scale. B values, SEBs, and βs are presented for the full model after entering all variables.
* $p < .05$. ** $p < .01$

Exploratory Analyses

Comparison of Survey of Driving and Driving Log

In order to compare the Survey of Driving and driving log, a series of paired samples t-tests were conducted (see Table 6) between each measure's comparable items and subscales. Internal consistencies were comparable for RD and AD on the driving log as compared to the Survey of Driving. However, significant differences were found for most of the variables. For example, participants reported significantly more MV, $t(97) = -7.38$, $p < .001$ and MinA $t(97) = -6.06$, $p < .001$ on the Survey of Driving than on the driving log. In addition, LC was reported significantly more often on the driving log than on the Survey of Driving $t(97) = 5.45$, $p < .001$. Further, participants reported engaging in

RD t(97) = -7.58, p < .001 and AD t(97) = -4.58, p < .001 more often on the driving log than they did on the Survey of Driving. No significant differences were found with regard to LoC and CC.

Table 7

Comparison of Survey of Driving and Driving Log (N=98)

		Driving Survey			Log		
Variable	*t*	α	*M*	*SD*	α	*M*	*SD*
MV	-7.38**	N/A	1.40	1.60	N/A	.21	.89
MinA	-6.06**	N/A	.99	1.20	N/A	.15	.79
LC	5.45**	N/A	2.61	1.58	N/A	6.12	6.93
LoC	1.89	N/A	1.70	1.55	N/A	2.38	3.85
CC	.67	N/A	1.48	1.34	N/A	1.62	2.15
AD	-4.58**	.88	12.30	11.60	.88	24.86	31.97
RD	-7.58**	.88	23.94	15.37	.89	61.27	52.14

Note. MV = moving violation, MinA = minor accident, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, RD = risky driving
* p < .05. ** p < .01

Comparison of College and Non-college Drivers

In order to compare college and non-college drivers with regard to predictors a series of between samples t-tests were conducted (see Table 7). Significant differences were found for most of the variables. For example, college sample reported significantly more DAS t(522) = 3.06, p < .01, SSS t(522) = 4.01, p < .001, LC t(522) = 4.97, p < .001, LoC t(522) = 4.39, p < .001, CC t(522) = 4.16, p < .001, RD t(522) = 5.29, p < .001, and AD t(522) = 4.63, p < .001. The only variable that the non-college sample reported significantly more of was MV t(522) = -3.73, p < .001. No significant differences were found with regard to MinA or MajA.

Table 8

Comparison of Survey of College and Non-college.

		College		Non-College	
Variable	*t*	*M*	*SD*	*M*	*SD*
DAS	3.05**	44.81	10.93	41.52	12.94
SSS	4.00**	15.65	6.51	13.08	7.67
MV	-3.73**	1.23	1.48	1.78	1.82
MinA	-1.45	1.18	1.23	1.35	1.36
MajA	-1.62	.43	.83	.56	.94
LC	4.97**	2.75	1.65	1.99	1.64
LoC	4.39**	1.78	1.51	1.19	1.36
CC	4.16**	1.43	1.37	.94	1.08
AD	4.63**	13.17	11.74	8.36	10.16
RD	5.28**	25.36	15.22	18.12	13.88

Note. DA = Driving Anger Scale, SS = Sensation Seeking Scale, MV = moving violation, MinA = minor accident, MajA = Major Accidents, LC = lost concentration, LoC = loss of control, CC = close calls, AD = aggressive driving, RD = risky driving

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

CHAPTER IV

DISCUSSION

The present study was conducted to assess the utility of combining driving anger, sensation seeking, narcissism, and driver's angry thoughts in order to increase the accuracy with which various unsafe driving behaviors could be predicted. Overall, the results offer further support for the utility of multivariate prediction of unsafe driving. Additional support was obtained for the predictive utility of both driving anger and sensation seeking in both college and non-college samples. In addition, angry thoughts experienced while driving contributed to the prediction of several unsafe driving behaviors within a college sample. On the other hand, the utility of narcissistic personality traits was not well supported among the various predictors examined. Exploratory analyses conducted to compare the two methods of assessing dependent variables (i.e., retrospective survey and prospective driving logs) revealed significant differences. These findings will be discussed in the sections that follow.

Multivariate Prediction

In support of the previous literature (Peck, 1993), additional support for the utility of multivariate prediction in unsafe driving was obtained. For example, with regard to aggressive driving in the college population the combination of predictors accounted for 47% of the variance. Where as driving anger accounted for 18% and sensation seeking accounted for 7% of the variance alone. Similar results were found for the non-college sample. For example, the combination of driving anger and sensation seeking accounted for 19% of the variance in aggressive driving. However, in isolation driving anger accounted for 16% and sensation seeking accounted for 3% of the variance. Similar

results were found with regard to the majority of unsafe driving behaviors. Thus, there seems to be clear evidence that combining predictors accounts for more variance in unsafe driving behaviors than any single predictor.

Role of Driving Anger in Unsafe Driving

Previous literature provides strong support for the utility of driving anger, commonly measured with the Driving Anger Scale, in predicting a variety of unsafe driving behaviors and accident-related outcomes (e.g., Dahlen & White, 2006; Deffenbacher, et al., 2000b, 2001, 2002, 2003a, 2003b; Lynch et al., 1995; Underwood et al., 1999). The present study found additional support for the role of driving anger. As expected, driving anger predicted aggressive driving, risky driving, verbally aggressive driving anger expression, use of the vehicle to express anger while driving, and adaptive/constructive expression of driving anger. Drivers who were more prone to experience anger while driving from various provocations encountered on the road were more likely to engage in problematic driving behaviors and less likely to cope with driving anger in a constructive manner. The effect of driving anger was observed even after controlling for respondent age, gender, and miles driven per week. In fact, driving anger accounted for 2% to 23% of the variance, independently, within the college sample. Among non-college drivers, scores on the Driving Anger Scale predicted moving violations, losses of concentration, losses of vehicular control, aggressive driving, and risky driving, accounting for 4% to 24% of the variance, independently.

To date, only one other study (Dahlen & White, 2006) has included age, gender, miles driven, driving anger, sensation seeking, and driver's angry thoughts. The results of the current study supported the findings of Dahlen and White (2006), with the few

exceptions that are noted. With regard to driving anger, it did not predict close calls or physically aggressive anger expression as it did with the previous research (Dahlen & White, 2006). The lack of predictive power for driving anger in these variables could be due to the inclusion of driver's angry thoughts in the present study. In fact, driver's angry thoughts added 4% above the other predictors with regard to close calls and 37% with regard to physically aggressive anger expression.

Because much of the previous literature on driving anger has involved college student samples, it was important to determine whether similar results would be obtained from a non-college sample. Some differences were observed between college and non-college drivers with regard to the utility of driving anger. For example, lifetime moving violations, minor accidents, loss of concentration, and loss of vehicular control were predicted in the non-college sample but not in the college sample. However, it should be noted that the college sample scored higher on driving anger, loss of concentration, and loss of vehicular control, while non-college participants scored higher on lifetime moving violations. No differences were found for minor accidents. Assuming that these findings can be replicated, it may be that the impact of driving anger varies across different groups of drivers. It seems possible that as one gets older he/she may develop better methods of coping with driving anger and as a result report fewer instances of related behaviors while driving. However, non-college participants who reported high driving anger seem engage in several unsafe driving behaviors. It must also be noted that the driver's angry thoughts and narcissism measures were not administered to the college sample, and may have accounted for some of the variance in the previously mentioned behaviors within this sample, and possibly rendered driving anger as less significant. For example,

narcissism and driver's angry thoughts accounted for 1% to 4% more of the variance than driving anger in the previously mentioned variables. In addition, these variables were correlated with driving anger. Thus it seems plausible that driver's angry thoughts and narcissism accounted for some of the variance attributed to driving anger in the non-college population.

The results regarding driving anger are particularly noteworthy, considering that few studies (Dahlen & White, 2006; Dahlen et al., 2003) have attempted to control for age, gender, or average miles driven. Further, even after adding sensation seeking, narcissism, and driver's angry thoughts, driving anger continued to predict the greatest amount of variance in risky driving within the college sample. Within the non-college sample, driving anger accounted for the most variance in moving violations, loss of concentration, loss of vehicular control, close calls, aggressive driving, and risky driving. Thus, it appears that the present results suggest that driving anger is predictive of a driver engaging in several unsafe driving behaviors despite age, gender, or miles driven, which could in turn result in injury or even death while driving.

Sensation Seeking and Unsafe Driving

Consistent with the previous literature (e.g., Arnett et al., 1996, 1997, 1990; Clement & Jonah, 1984; Dahlen & White, 2006; Dahlen et al., 2003; Donovan et al., 1982, 1985; Jonah et al., 1996, 2001; Trimpop & Kirkcaldy, 1997), sensation seeking, "a trait defined by the seeking of varied, novel, complex, and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experiences" (Zuckerman, 1994, p. 27), was found to be a useful predictor of many unsafe driving behaviors. As expected, independent of age, gender, miles driven,

and driving anger, sensation seeking was found to predict moving violations, minor accidents, loss of concentration while driving, loss of vehicular control, aggressive driving, and risky driving. Within the college sample, sensation seeking accounted for 3% to 5% of the variance in the previously mentioned unsafe driving behaviors. In the non-college sample, minor accidents, major accidents, aggressive driving, and risky driving were predicted by sensation seeking, accounting for 2% to 5% of the variance. In other words, drivers higher in sensation seeking were more likely to engage in various unsafe driving behaviors. While sensation seeking has received a great deal of attention with regard to risky driving it (Arnett et al., 1990, 1996, 1997; Donovan et al., 1985, 1982; Jonah et al., 1984, 1997, 2001; Trimpop & Kirkcaldy, 1997) it has received little attention focused on aggressive driving (Dahlen et al, 2003, 2006). Thus, these findings provide further support that sensation seeking may play a larger role in aggressive driving behaviors rather than only risky driving behaviors as previously thought.

Consistent with Dahlen and White (2006), sensation seeing was not related to driving anger in the present study. Thus, sensation seeking is explaining a proportion of variance in unsafe driving behaviors that driving anger does not explain. Further, in accordance with previous literature (e.g., Dahlen & White, 2006; Trimpop & Kirkcaldy, 1997), sensation seeking predicted lifetime moving tickets and minor accidents within the college population and minor and major accidents within the non-college population. In other words, young drivers who were more likely to report high sensation seeking were more likely to have been involved in accidents and receiving moving violations. Similarly, older drivers who reported high sensation seeking were also likely to be involved in accidents.

As a whole, it seems that further evidence has been obtained suggesting that sensation seeking added utility to the prediction of several unsafe driving behaviors within college and non-college samples. Hence, it seems possible that people high in sensation seeking may engage in unsafe driving behaviors as a result of experiencing a thrill from them (Jonah, 1997) and/or they may simply perceive less risk in unsafe driving behaviors (Arnett, 1990), which could in turn result in accident or injury for any parties involved.

Like driving anger, there is reason to believe that the role of sensation seeking may differ somewhat across various groups. In the present study, sensation seeking predicted major accidents in the non-college sample, but not in the college sample. On the other hand, in the college sample, sensation seeking predicted moving violations, loss of concentration, and loss of vehicular control, but failed to do so in the non-college sample. It seems possible that with age individuals may exhibit less risk taking behaviors or learn to compensate for such urges in order to stay safe while driving. In accordance with the previous literature (Arnett, 1996; Arnett et al., 1997; Jonah, 1986) the present results indicate that younger drivers report significantly higher sensation seeking than older drivers. It is also possible that the low base rates of major accidents may account for the lack of sensation seeking providing utility in predicting them. As a result of these discrepancies it seems that more research is needed in order to better understand the role of sensation seeking in samples of varying ages.

Narcissistic Personality Traits and Unsafe Driving

The role of Narcissism in predicting unsafe driving was less than that of the other predictors. It was expected that narcissistic traits would add to the prediction of unsafe

driving. However, this hypothesis was minimally supported in the current study. In fact, narcissism only added predictive utility in the prediction of loss of concentration. These findings may initially be surprising, as narcissism was correlated with major accidents, aggressive driving, risky driving physically aggressive anger expression, and use of a vehicle to express driving anger. However, narcissism was also found to be correlated with driving anger, sensation seeking, and the Revenge/Retaliatory Thinking and Physically Aggressive Thinking subscales of the driver's angry thoughts measure. As a result, it seems that the variance narcissism may have accounted for was insignificant when other predictors were entered into the regressions. The findings of the current study conflict with existing literature focused on assessing narcissism in the prediction of driving behaviors (Schreer, 2002). However, in Schreer's research only aggressive driving was studied. In addition, Schreer (2002) found support for the subscales of the NPI and not the total score. However, the present study did not utilize the subscales, as they were not sufficiently reliable. Further, the previous study did not hold age, gender, miles driven, driving anger, and sensation seeking constant, nor did it include drivers' angry thoughts. While narcissism has proven to be a significant predictor of aggressive driving in a previous study (Schreer, 2002) and appears to be correlated with many of the unsafe driving variables, it does not appear to be adding any significant predictive utility above the other predictors used in the present study. Further study may be warranted in order to clarify these discrepancies. In addition, the NPI may be valuable if used in isolation to predict certain unsafe driving behaviors. Such exploration is beyond the scope of the present study but is warranted in future research.

Cognitive Contributions to Aggressive Driving: A Role For Angry Thoughts

As expected, drivers' angry thoughts added to the prediction of unsafe driving behaviors within a college sample. These findings are in line with previous studies that have included the DATQ as a predictor of unsafe driving (e.g., Dahlen & White, 2006; Deffenbacher et al., 2003c). The results offer further evidence for the utility of assessing angry thoughts experienced while driving in the context of understanding unsafe driving. Further, it was noteworthy that drivers' angry thoughts predicted unsafe driving independent of age, gender, miles driven, driving anger, sensation seeking, and narcissism. This combination of variables has not previously been examined, and results lend support to the fairly robust nature of drivers' angry thoughts in this context.

In agreement with the previous literature, it was found that, Judgmental/Disbelieving Thinking predicted moving violations, minor accidents, risky driving, and verbal driving anger expression (e.g., swearing at another driver). Pejorative Labeling/Verbally Aggressive Thinking predicted loss of concentration, aggressive driving, verbally aggressive anger expression, and physically aggressive anger expression (e.g., giving another driver the finger). Revenge/Retaliatory Thinking predicted moving violations, minor accidents, close calls, aggressive driving, verbally aggressive anger expression, physically aggressive anger expression, use of the vehicle to express driving anger (e.g., speeding up to frustrate another driver or flashing lights at another driver). Further, adaptive/constructive anger expression (e.g., relaxing to calm down or thinking about things to distract one's self from frustration on the road) was predicted by Revenge/Retaliatory Thinking. Physically Aggressive Thinking predicted physically aggressive anger expression, minor accidents, loss of concentration, and low Physically

Aggressive Thinking predicted the use of the vehicle to express driving anger. Finally, adaptive/constructive anger expression, verbally aggressive anger expression, and aggressive driving were predicted by Coping Self-Instruction.

Unfortunately, it is difficult to decipher the role of drivers' angry thoughts in the present data due to what appear to be suppression effects in the multiple regressions. Those DATQ subscales which emerged as significant predictors of unsafe driving were each positively correlated with the dependent variables when bivariate correlations were examined. Thus, the more of the particular type of thought was reported, the greater the likelihood of engaging in the unsafe behavior or experiencing the accident-related outcome. However, in the multiple regression analyses, some DATQ variables were inversely related to the dependent variables after all other independent variables had been accounted for, suggesting a form of suppression. This suggests that the relationships among the DATQ subscales and/or other predictors was such that the role of certain DATQ subscales in predicting unsafe driving was distorted in some way. For example, after accounting for all other predictors, Pejorative Labeling/Verbally Aggressive Thinking was inversely related to physically aggressive driving anger expression.

Overall, it seems that various combinations of driver's angry thoughts are valuable in adding to the ability to predict several unsafe driving behaviors. Further, the results are remarkable as they were found independently of age, gender, miles driven, driving anger, sensation seeking, and narcissism.

On an exploratory basis, Dahlen and White (2006) included driver's angry thoughts as a predictor in addition to sensation seeking and driving anger. Overall, similar results were found with regard to driver's angry thoughts in the present study.

However the current study found utility for driver's angry thoughts in the prediction of several more unsafe driving behaviors than in the previous study. For example, in the present study low Judgmental/Disbelieving Thinking was predictive of minor accidents, risky driving and verbally aggressive anger expression. These results were not found in the previous study. A possible reason for the differences observed in the present research as compared to the findings of Dahlen and White (2006) may be explained by the inclusion of other predictors in the previous study.

Exploratory Analyses

With regard to exploratory analysis of prospective (i.e., driving log) data collection as compared to retrospective (i.e., Survey of Driving), several significant differences were noted on the corresponding subscales. For example, results indicated that participants tended to report over 6 times more moving violations and minor accidents on the survey of driving than on the driving log. A possible explanation for these results could be due to the low base rate of accidents during the 2 week driving log period. Over twice as many incidents of losing concentration were reported on the driving log than on the Survey of Driving. Further, participants reported over two and a half times more engagement in risky driving behaviors and over twice as many aggressive driving behaviors on the driving log than on the survey of driving. Overall, the results offer clear evidence that participants report greater engagement in many different unsafe driving behaviors when reporting them prospectively as compared to retrospectively.

Limitations

There are some possible limitations to the current study. First, the gender imbalance in the college portion of the present sample (72% female) places limits on the

degree to which findings can be generalized, even to male college students. This problem was anticipated, and gender was used as a control variable in the regressions, but it is clear that the present results can only be tentatively applied to men. Second, while on-line data collection results tend to be similar to paper and pencil collection (Gosling et al., 2004; Kveton et al., 2007; Pettit, 2002; Roberts, 2007) some researchers may criticize this form of data collection for integrity. Third, although the use of self-report measures will be considered a limitation by some, this is open to debate.

It is true that the present study made heavy use of retrospective self-report measures instead of alternatives such as informant ratings, official driving records, or performance on a driving simulator. This can be justified on a number of grounds. First, many of the predictor variables used here involve internal experiences that do not readily lend themselves to other forms of data collection (e.g., angry thoughts experienced while driving). Self-report is the only way to collect some of these data. Second, many of the behaviors targeted in the present study would not show up in any sort of official records (e.g., near misses) nor would it be possible to accurately study accidents as a person may be involved in one but not report it, it may have occurred in a different state, or it was judged not serious enough to report by a police officer (McGuire, 1976; Smith, 1976). In such cases, self-report provides a viable alternative. In fact, it has been demonstrated that self-report does not moderate the relationship between predictors and driving accident involvement (Arthur et al., 1991). In addition, the majority of measures utilized in the present study were validated through previous research using driving simulators and driving logs (Deffenbacher, 200b, 2003a, 2003b, Jonah, 1997). As a result, it seems likely that utilizing self-report measures is not a severe limitation to the present study.

On the other side of this debate, are the implications raised by the present finding of meaningfully large differences between self-report and diary data. The size and direction of these differences suggests that participants in studies of this nature may report considerably fewer incidents of problematic behaviors (e.g., losses of concentration while driving, risky and aggressive driving behaviors, etc.) when asked to recall such incidents retrospectively than when recording via prospective driving diaries. Pending replication with a larger and more diverse sample, it seems likely that greater use of driving diaries would yield more accurate data about the frequency with which respondents engage in certain unsafe driving behaviors than the far more commonly used retrospective surveys.

Implications and Directions for Future Research

The present study has several implications. First, it offers support for the idea that power to predict unsafe driving behaviors may be improved through combining driving anger, sensation seeking, and driver's angry thoughts. In accordance, future studies attempting to predict various unsafe driving behaviors could utilize a subset of predictors in order to more accurately predict a given behavior. As an example, assuming a researcher wanted to predict aggressive driving, the results of the present study suggest that driving anger, sensation seeking, Pejorative Labeling/Verbally Aggressive Thinking, Revenge/Retaliatory Thinking, and Coping Self-Instruction would be useful. Further, these predictors could be utilized to identify individuals who are at a greater risk for engaging in unsafe driving behaviors. In addition, if a person had several moving violations or accidents a subset of the measures in the present study could be given to the person in order to develop a more specific and accurate treatment or educational program.

Similarly, this information could be used to assess the effectiveness of treatments aimed at reducing a given unsafe driving behavior. Human factors have been found to account for more variance in vehicle accident rates than vehicle and environmental factors combined (Evans, 1991; GAO, 2003). Thus, identifying and accurately treating individuals who engage in unsafe driving related behaviors could increase overall traffic safety and reduce accident related deaths.

Several directions exist for future research. For example, the current study should be replicated with samples including a more balance ratio of males and females. Further, the current research should be further explored with the non-collage population in order to better sort out existing discrepancies. For example, further research is needed in order to explore the discrepancies between driving anger within college and non-college samples.

With regard to the measures used in the present study, it is suggested that driver's angry thoughts be studied with a non-college population. In addition, further study of driver's angry thoughts in conjunction with other predictors is suggested in order to clarify possible suppressor effects. Further study of the NPI may also be warranted. The NPI may be valuable if used in isolation to predict certain unsafe driving behaviors. Despite the conclusion that the use of self-report measures was not a serious concern, the results of the present research could be further strengthened if they could be replicated in studies utilizing driving simulators, behavioral observations, or objective data.

The results of the log data suggest that it is important for researchers to consider how dependent variables are measured in driving data in order to obtain greater accuracy of what is being reported. These results have some implications for measurement of

dependent variables (e.g., risky driving) in future research. For example, when studying behaviors that occur frequently and may typically be overlooked it seems more accurate to utilize a prospective method of data collection. Conversely, when studying behavioral consequences that rarely occur (e.g., moving violations or accidents) using a retrospective method of collection may provide more accuracy.

It must be noted that some important difficulties were faced during the collection of driving log data in the current study. Specifically, out of the 349 college participants who completed the surveys, only 98 completed the driving log. It is unclear why so few of the participants chose to complete the driving log. One possible explanation could be that participants may have thought the log was simply too difficult or time consuming to complete after each driving session. Limiting the frequency a participant is required to complete a log may ease the use of a driving log in the future. For example, drivers may be more apt to complete a log after each day rather than after each driving session.

In summary, the current study added to the literature by demonstrating significant improvements in the prediction of various unsafe driving behaviors through the use of combining driving anger, sensation seeking, and driver's angry thoughts. Further, the results are striking as they were obtained after holding constant age, gender, and average miles driven per week. Overall, the results could prove useful for future researchers, treatment providers, and treatment evaluators.

APPENDIX A

INSTRUMENTS

#_____

Directions: Please fill in the blank or check the response that applies to you. Do not put your name anywhere on this form.

1. Age: ____ (if you are under 18, please notify me at once and do not continue)

2. Gender:
   ___ Male
   ___ Female

3. Racial/Ethnic Background:
   ___ American Indian/Alaskan Native
   ___ Asian/Pacific Islander
   ___ Black (Non-Hispanic)/African American
   ___ Hispanic/Latino/Latina
   ___ White (Non-Hispanic)/European American
   ___ Other _____ (please specify)

4. On average, how many miles do you drive per week? _____ (miles)

5. How many years have you been driving? _____ (years)

Directions: Each of the items below contains two choices A and B. Please indicate which of the choices most describe your likes or the way you feel. In some cases you may find items in which both choices describe your likes or feelings. Please choose the one which better describes your likes or feelings. In some cases you may find items in which you do not like either choice. In these cases mark the choice you dislike least. Do not leave any items blank. It is important that you respond to all items with only one choice, A or B. We are interested only in your likes or feelings, not in how others feel about these things or how one is supposed to feel. There are no right or wrong answers as in other kinds of tests. Be frank and give your honest appraisal of yourself.

1. A. I like "wild" uninhibited parties.
   B. I prefer quiet parties with good conversation.

2. A. There are some movies I enjoy seeing a second or even third time.
   B. I can't stand watching a movie that I've seen before.

3. A. I often wish I could be a mountain climber.
   B. I can't understand people who risk their necks climbing mountains.

4. A. I dislike all body odors.
   B. I like some of the earthy body smells.

5. A. I get bored seeing the same old faces.
   B. I like the comfortable familiarity of everyday friends.

6. A. I like to explore a strange city or section of town by myself, even if it means getting lost.
   B. I prefer a guide when I am in a place I don't know well.

7. A. I dislike people who do or say things just to shock or upset others.
   B. When you can predict almost everything a person will do and say he or she must be a bore.

8. A. I usually don't enjoy a movie or play where I can predict what will happen in advance.
   B. I don't mind watching a movie or play where I can predict what will happen in advance.

9. A. I have tried marijuana or would like to.
   B. I would never smoke marijuana.

10. A. I would not like to try any drug which might produce strange and dangerous effects on me.

    B. I would like to try some of the drugs that produce hallucinations.

11. A. A sensible person avoids activities that are dangerous.
    B. I sometimes like to do things that are a little frightening.

12. A. I dislike "swingers" (people who are uninhibited and free about sex).
    B. I enjoy the company of real "swingers."

13. A. I find that stimulants (like alcohol/drugs) make me uncomfortable.
    B. I often like to get high (drinking liquor or smoking marijuana).

14. A. I like to try new foods that I have never tasted before.
    B. I order the dishes with which I am familiar, so as to avoid disappointment and unpleasantness.

15. A. I enjoy looking at home movies, videos, or travel slides.
    B. Looking at someone's home movies, videos, or travel slides bores me tremendously.

16. A. I would like to take up the sport of water-skiing.
    B. I would not like to take up water-skiing.

17. A. I would like to try surfboard riding.
    B. I would not like to try surfboard riding.

18. A. I would like to take off on a trip with no pre-planned or definite routes, or timetable.
    B. When I go on a trip I like to plan my route and timetable fairly carefully.

19. A. I prefer the "down-to-earth" kinds of people as friends.
    B. I would like to make friends in some of the "far-out" (weird) groups like artists or "punks" (who set their own trends regardless of what is popular).

20. A. I would not like to learn to fly an airplane.
    B. I would like to learn to fly an airplane.

21. A. I prefer the surface of the water to the depths.
    B. I would like to go scuba diving.

22. A. I would like to meet some persons who are homosexual (men or women).
    B. I stay away from anyone I suspect of being "gay" or "lesbian."

23. A. I would like to try parachute jumping.
    B. I would never want to try jumping out of a plane, with or without a parachute.

24. A. I prefer friends who are excitingly unpredictable.
    B. I prefer friends who are reliable and predictable.

25. A. I am not interested in experience for its own sake.
    B. I like to have new and exciting experiences and sensations even if they are a little frightening, unconventional, or illegal.

26. A. The essence of good art is in its clarity, symmetry of form, and harmony of colors.
    B. I often find beauty in the "clashing" colors and irregular forms of modern painting.

27. A. I enjoy spending time in the familiar surroundings of home.
    B. I get very restless if I have to stay around home for any length of time.

28. A. I like to dive off the high board.
    B. I don't like the feeling I get standing on the high board (or I don't go near it at all).

29. A. I like to date persons who are physically exciting.
    B. I like to date persons who share my values.

30. A. Heavy drinking usually ruins a party because some people get loud and boisterous (rowdy).
    B. Keeping the drinks full is the key to a good party.

31. A. The worst social sin is to be rude.
    B. The worst social sin is to be a bore.

32. A. A person should have considerable sexual experience before marriage.
    B. It's better if two married persons begin their sexual experience with each other.

33. A. Even if I had the money, I would not care to associate with flighty rich persons in the "jet set" (people who travel to trendy places just to be seen there).
    B. I could conceive of myself seeking pleasures around the world with the "jet set."

34. A. I like people who are sharp and witty even if they do sometimes insult others.
    B. I dislike people who have their fun at the expense of hurting the feelings of others.

35. A. There is altogether too much portrayal of sex in movies.
    B. I enjoy watching many of the "sexy" scenes in movies.

36. A. I feel best after taking a couple of drinks.
    B. Something is wrong with people who need liquor to feel good.

37. A. People should dress according to some standards of taste, neatness, and style.
    B. People should dress in individual ways even if the effects are sometimes strange.

38. A. Sailing long distance in small sailing crafts is foolhardy (risky).
    B. I would like to sail a long distance in a small but seaworthy sailing craft.

39. A. I have no patience with dull or boring persons.
    B. I find something interesting in almost every person I talk with.

40. A. Skiing fast down a high mountain slope is a good way to end up on crutches.
    B. I think I would enjoy the sensation of skiing very fast down a high mountain slope.

Directions: Read each pair of statements and then choose the *one* that is closer to your own feelings and beliefs. Indicate your answer by circling "A" or "B" for each item.

1. A = I have a natural talent for influencing people.
   B = I am not good at influencing people.

2. A = Modesty doesn't become me.
   B = I am essentially a modest person.

3. A = I would do almost anything on a dare.
   B = I tend to be a fairly cautious person.

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

5. A = The thought of ruling the world frightens the hell out of me.
   B = If I ruled the world, it would be a much better place.

6. A = I can usually talk my way out of anything.
   B = I try to accept the consequences of my behavior.

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

8. A = I will be a success.
   B = I am not too concerned about success.

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

10. A = I am not sure if I would make a good leader.
    B = I see myself as a good leader.

11. A = I am assertive.
    B = I wish I were more assertive.

12. A = I like to have authority over people.
    B = I don't mind following orders.

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

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

15. A = I don't particularly like to show off my body.
    B = I like to display my body.

16. A = I can read people like a book.
    B = People are sometimes hard to understand.

17. A = If I feel competent I am willing to take responsibility for making decisions.
    B = I like to take responsibility for making decisions.

18. A = I just want to be reasonably happy.
    B = I want to amount to something in the eyes of the world.

19. A = My body is nothing special.
    B = I like to look at my body.

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

21. A = I always know what I am doing.
    B = Sometimes I am not sure what I am doing

22. A = I sometimes depend on people to get things done.
    B = I rarely depend on anyone else to get things done.

23. A = Sometimes I tell good stories.
    B = Everyone likes to hear my stories.

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

25. A = I will never be satisfied until I get all that I deserve
    B = I take my satisfactions as they come.

26. A = Compliments embarrass me.
    B = I like to be complimented.

27. A = I have a strong will to power.
    B = Power for its own sake doesn't interest me.

28. A = I don't care very much about new fads and fashions.
    B = I like to start new fads and fashions.

29. A = I like to look at myself in the mirror.
    B = I am not particularly interested in looking at myself in the mirror.

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

31. A = I can live my life in anyway I want to.
    B = People can't always live there lives in terms of what they want.

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

33. A = I would prefer to be a leader.
    B = It makes little difference to me whether or not I am a leader.

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

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

36. A = I am a born leader.
    B = Leadership is a quality that takes a long time to develop.

37. A = I wish somebody would someday write my biography.
    B = I don't like people to pry into my life for any reason.

38. A = I get upset when people don't notice how I look when I go out in public.
    B = I don't mind blending into the crowd when I go out in public.

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

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

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

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

	Number of times happened					
	0	1	2	3	4	5+
1. Lost concentration while driving (daydreaming, thinking of something else, etc.)?	O	O	O	O	O	O
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?	O	O	O	O	O	O
3. Had a "close call" but were not actually in an accident?	O	O	O	O	O	O

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

	Number of times happened					
	0	1	2	3	4	5+
1. Broken or damaged a part of a vehicle (e.g., pulled knob off the radio, kicked a fender)?	O	O	O	O	O	O
2. Had an argument with a passenger while you were driving?	O	O	O	O	O	O
3. Had a verbal argument with the driver of another vehicle?	O	O	O	O	O	O
4. Had a physical fight with the driver of another vehicle?	O	O	O	O	O	O
5. Made an angry gesture at another driver or pedestrian?	O	O	O	O	O	O
6. Swore at or called another driver or pedestrian names?	O	O	O	O	O	O
7. Flashed your headlights in anger?	O	O	O	O	O	O
8. Honked your horn in anger?	O	O	O	O	O	O
9. Yelled at another driver or pedestrian?	O	O	O	O	O	O
10. Drove while being very angry?	O	O	O	O	O	O
11. Lost control of your anger while driving?	O	O	O	O	O	O
12. Drove up close behind another driver in anger?	O	O	O	O	O	O
13. Cut another driver off in anger?	O	O	O	O	O	O

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

	Number of times happened					
	0	1	2	3	4	5+
1. Driven without using your seat belt?	O	O	O	O	O	O
2. Drank alcohol and driven?	O	O	O	O	O	O
3. Been drunk and driven?	O	O	O	O	O	O
4. Driven 10-20 mph over the limit?	O	O	O	O	O	O
5. Driven 20+ miles over the limit?	O	O	O	O	O	O
6. Passed unsafely?	O	O	O	O	O	O
7. Tailgated or followed another vehicle too closely?	O	O	O	O	O	O
8. Changed lanes unsafely?	O	O	O	O	O	O
9. Drifted into another lane?	O	O	O	O	O	O
10. Switched lanes to speed through slower traffic?	O	O	O	O	O	O
11. Gone out of turn at a red light or stop sign?	O	O	O	O	O	O
12. Made an illegal turn (e.g., illegal right turn on red light)?	O	O	O	O	O	O
13. Driven recklessly?	O	O	O	O	O	O
14. Run a red light or stop sign?	O	O	O	O	O	O
15. Entered an intersection when the light was turning red?	O	O	O	O	O	O
16. Used a cellular phone while you were driving?	O	O	O	O	O	O

Directions: 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 fill in the bubble reflecting how many times you have done or experienced the item. If it has happened more than five times, fill in the 5+ bubble.

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

	Number of times happened					
	0	1	2	3	4	5+
1. Gotten moving (non-parking) tickets?	O	O	O	O	O	O
2. Had a minor accident (such as a fender bender)?	O	O	O	O	O	O
3. Had a major accident?	O	O	O	O	O	O

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. Mark your response by filling in the bubble to the right.

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

Directions: Everyone feels angry or furious from time to time when driving, but people differ in the ways that they react when they are angry while driving. A number of statements are listed below which people have used to describe their reactions when they feel angry or furious. Read each statement and then fill in the bubble to the right of the statement indicating how often you generally react or behave in the manner described when you are angry or furious while driving. There are no right or wrong answers. Do not spend too much time on any one statement.

		Almost Never	Some-times	Often	Almost Always
1.	I give the other driver the finger.	O	O	O	O
2.	I drive right up on the other driver's bumper.	O	O	O	O
3.	I drive a little faster than I was.	O	O	O	O
4.	I try to cut in front of the other driver.	O	O	O	O
5.	I call the other driver names aloud.	O	O	O	O
6.	I make negative comments about the other driver	O	O	O	O
7.	I follow right behind the other driver for a long time.	O	O	O	O
8.	I try to get out of the car and tell the other driver off.	O	O	O	O
9.	I yell questions like "Where did you get your license?"	O	O	O	O
10.	I roll down the window to help communicate my anger.	O	O	O	O
11.	I glare at the other driver.	O	O	O	O
12.	I shake my fist at the other driver.	O	O	O	O
13.	I stick my tongue out at the other driver.	O	O	O	O
14.	I call the other driver names under my breath.	O	O	O	O
15.	I speed up to frustrate the other driver.	O	O	O	O
16.	I purposely block the other driver from doing what he/she wants to do.	O	O	O	O
17.	I bump the other driver's bumper with mine.	O	O	O	O
18.	I go crazy behind the wheel.	O	O	O	O
19.	I leave my brights on in the other driver's rear view mirror.	O	O	O	O
20.	I try to force the other driver to the side of the road.	O	O	O	O
21.	I try to scare the other driver.	O	O	O	O

22.	I do to other drivers what they did to me.	O	O	O	O
23.	I pay even closer attention to being a safe driver.	O	O	O	O
24.	I think about things that distract me from thinking about the other driver.	O	O	O	O
25.	I think things through before I respond.	O	O	O	O
26.	I try to think of positive solutions to deal with the situation.	O	O	O	O
27.	I drive a lot faster than I was.	O	O	O	O
28.	I swear at the other driver aloud.	O	O	O	O
29.	I tell myself it's not worth getting all mad about.	O	O	O	O
30.	I decide not to stoop to their level.	O	O	O	O
31.	I swear at the other driver under my breath.	O	O	O	O
32.	I turn on the radio or music to calm down.	O	O	O	O
33.	I flash my lights at the other driver.	O	O	O	O
34.	I make hostile gestures other than giving the finger.	O	O	O	O
35.	I try to think of positive things to do.	O	O	O	O
36.	I tell myself it's not worth getting involved in.	O	O	O	O
37.	I shake my head at the other driver.	O	O	O	O
38.	I yell at the other driver.	O	O	O	O
39.	I make negative comments about the other driver under my breath.	O	O	O	O
40.	I give the other driver a dirty look.	O	O	O	O
41.	I try to get out of the car and have a physical fight with the other driver.	O	O	O	O
42.	I just try to accept that there are bad drivers on the road.	O	O	O	O
43.	I think things like "Where did you get your license?"	O	O	O	O
44.	I do things like take deep breaths to calm down.	O	O	O	O
45.	I just try and accept that there are frustrating situations while driving.	O	O	O	O
46.	I slow down to frustrate the other driver.	O	O	O	O

47.	I think about things that distract me from the frustration on the road.	O	O	O	O
48.	I tell myself to ignore it.	O	O	O	O
49.	I pay even closer attention to other's driving to avoid accidents.	O	O	O	O

Directions: Below are a number of thoughts people have when they are angry or hostile when driving. Take a few seconds to think about whether that thought (or one similar to it) occurs to you when you are angry at another driver or about something when you are driving. Read each statement and then fill in the bubble indicating how much you think this thought (or one similar to it) when you are angry while driving. Please answer all questions:

		Not At All	Some-times	Moderately Often	Often	All the Time
1.	What an idiot!	O	O	O	O	O
2.	They don't seem to think they can hurt others doing that.	O	O	O	O	O
3.	I'm going to get back at them.	O	O	O	O	O
4.	I'm not going to let them do that to me.	O	O	O	O	O
5.	Just what we need, someone who thinks they are more important than others.	O	O	O	O	O
6.	I want to yell at them.	O	O	O	O	O
7.	I want to kick their ass.	O	O	O	O	O
8.	I'm going to get revenge.	O	O	O	O	O
9.	I'm going to give them the finger.	O	O	O	O	O
10.	I want to curse at them.	O	O	O	O	O
11.	I hate drivers like that.	O	O	O	O	O
12.	Get off my ass!	O	O	O	O	O
13.	I'm going to box them in and show them.	O	O	O	O	O
14.	I'm going to slow them up on purpose.	O	O	O	O	O
15.	I feel like telling them off.	O	O	O	O	O
16.	I'm going to get even with them.	O	O	O	O	O
17.	They are going to get someone killed.	O	O	O	O	O
18.	People like you ought to have to take a driver's test.	O	O	O	O	O
19.	You didn't even look!	O	O	O	O	O
20.	I'm going to slam on my brakes and back them off.	O	O	O	O	O
21.	They shouldn't be allowed to drive.	O	O	O	O	O
22.	They ought to be shot.	O	O	O	O	O

23.	I'm going to slow down to spite them.	O	O	O	O	O
24.	How rude!	O	O	O	O	O
25.	Cope with it, sometimes you just have to live with bad drivers.	O	O	O	O	O
26.	What a stupid driver!	O	O	O	O	O
27.	Where do they get off doing this?	O	O	O	O	O
28.	I would like to hurt them.	O	O	O	O	O
29.	Why don't they have to drive like the rest of us?	O	O	O	O	O
30.	They are not going to get away with that.	O	O	O	O	O
31.	Where are the cops when you need them?	O	O	O	O	O
32.	Damn it!	O	O	O	O	O
33.	I'm going to tailgate them.	O	O	O	O	O
34.	I can't believe they're so inconsiderate.	O	O	O	O	O
35.	What an ass!	O	O	O	O	O
36.	They are going to kill someone doing that.	O	O	O	O	O
37.	Who do they think they are?	O	O	O	O	O
38.	What a dumb ass!	O	O	O	O	O
39.	I want to beat them up.	O	O	O	O	O
40.	I want to run them off the road.	O	O	O	O	O
41.	I want to kill them.	O	O	O	O	O
42.	What a jerk!	O	O	O	O	O
43.	That's unsafe.	O	O	O	O	O
44.	How did that person get a license?	O	O	O	O	O
45.	They think they are the only people on the road.	O	O	O	O	O
46.	Who in their right mind would drive like that?	O	O	O	O	O
47.	They think they are above the rules.	O	O	O	O	O
48.	Just back off and relax.	O	O	O	O	O
49.	This is crazy.	O	O	O	O	O
50.	Nothing I can do about it so take it easy.	O	O	O	O	O
51.	I'll just have to call and tell them I'll be late.	O	O	O	O	O
52.	Get people like them off the road.	O	O	O	O	O
53.	Don't even make eye contact with people like that.	O	O	O	O	O
54.	I'm so angry.	O	O	O	O	O
55.	Just calm down.	O	O	O	O	O
56.	Just turn up the radio and tune them out.	O	O	O	O	O
57.	I want to punch them out.	O	O	O	O	O
58.	I'll cut them off and see how they like it.	O	O	O	O	O

59.	I would like to beat the hell out of them.	O	O	O	O	O
60.	They are clueless.	O	O	O	O	O
61.	I'm going to return the favor.	O	O	O	O	O
62.	I am so pissed.	O	O	O	O	O
63.	I'm going to teach them a lesson.	O	O	O	O	O
64.	Chill out.	O	O	O	O	O
65.	Just pay attention to my driving, others can be crazy if they want.	O	O	O	O	O

APPENDIX B

DRIVING LOG

Date Started:_____ #_____

Directions: Complete this form after each driving session for one week. Please write a number indicating how many times you have done or experienced the item. Use a comma to separate each time you drive (e.g., 4,6,5…etc.). Upon completion of this log please return it to the drop box located in OMH 213 in order to receive credit.

Please record your odometer readings below.
Beginning of week:_____ End of week:_____

Lost concentration while driving (daydreaming, etc.)	
A minor loss of control of a vehicle you were driving (e.g., your vehicle drifted into another lane)	
Had a "close call" but were not actually in an accident	
Gotten moving (non-parking) ticket	
Had a minor accident	
Broken or damaged a part of a vehicle (e.g., pulled knob off the radio, kicked a fender)	
Argued with a passenger while you were driving	
Had a verbal argument with the driver of another vehicle	
Had a physical fight with the driver of another vehicle	
Made an angry gesture at another driver or pedestrian	
Swore at or called another driver or pedestrian names	
Flashed your headlights in anger	
Honked your horn in anger	
Yelled at another driver or pedestrian	
Drove while being very angry	
Lost control of your anger while driving	
Drove up close behind another driver in anger	
Cut another driver off in anger	
Driven without using your seat belt	
Drank alcohol and driven	

Been drunk and driven	
Driven 10-20 mph over the limit	
Driven 20+ mph over the speed limit	
Passed unsafely/illegally	
Tailgated or followed another vehicle too closely	
Changed lanes unsafely/illegally	
Drifted into another lane	
Switched lanes to speed through slower traffic	
Gone out of turn at red light or stop sign	
Made an illegal turn (e.g., illegal right turn on red light)	
Driven recklessly	
Run a red light or stop sign	
Entered an intersection when the light was turning red	
Used a cellular phone while you were driving	
Tried to scare another driver/pedestrian	
Told by a passenger to calm down	
Attempted to keep another driver from passing/merging	
Hit brakes/slowed down because someone was following too close	
Raced another driver	
Felt very impatient while driving	
Gave another driver or a pedestrian a dirty look	

APPENDIX C

INFORMED CONCENT FOR COLLEGE SAMPLE

UNIVERSITY OF SOUTHERN MISSISSIPPI
AUTHORIZATION TO PARTICIPATE IN RESEARCH PROJECT

Consent is hereby given to participate in the study entitled: Personality and Driving Behavior.

1. Purpose: This study is being conducted to investigate the role of personality and mood in driving behavior.

2. Description of Study: This study consists of three parts. First, participants will be asked to complete several brief questionnaires about your feelings, attitudes, and behaviors today. This should take no more than 30 minutes and will be worth 1 research credit. Second, participants will be asked to complete a driving log each time they drive during a 2-week period. Logs will be returned to a drop box in Owings-McQuagge Hall room 213. Participants who turn in driving logs which have been completed correctly will earn an additional 2 research credits. Please follow the instructions provided with the driving log carefully. Third, participants will be given the option of earning up to 2 additional research credits for recruiting two people who meet the requirements below to complete a subset of questionnaires about their feelings, attitudes, and driving behaviors.

   The individuals you recruit must:
   a. be at least 21 years old,
   b. drive at least five miles per week,
   c. not currently enrolled in college,
   d. be willing to complete a set of questionnaires, which will take approximately 20 minutes and
   e. include his/her phone number and agree to be contacted by a researcher in order to verify that he/she completed the questionnaire packet.

3. Benefits: Although you will receive no direct benefit from participation in this study, the information provided in this study will enable researchers to better understand the role of personality and mood in driving behavior.

4. Risks: There are no foreseeable risks to participating in this study. If you feel that completing these questionnaires has resulted in emotional distress, please stop and notify the researcher. If you appear visibly distressed during this project, you may be asked to discontinue participation and discuss your concerns with the researcher or a staff member at the Community Counseling and Assessment Clinic or University Counseling Center. If you should decide at a later date that you would like to discuss your concerns, please contact Dr. Dahlen or one of the several local agencies, such as:

   University Counseling Center
   200 Kennard Washington Hall
   Phone: (601) 266-4829

   Community Counseling and Assessment Clinic
   Owings-McQuagge Hall Rm. 202
   Phone: (601) 266-4601

   Pine Belt Mental Healthcare Resources
   Phone: (601) 544-4641

5. Confidentiality: These questionnaires are intended to be anonymous and you are asked not to provide your name on any of the forms you will be completing, except for this consent form. The information you provide will be kept strictly confidential. Names on this consent form will not be associated with questionnaires in any way. Questionnaire packets and driving logs have been preassigned a unique four-digit identification number that will allow them to be linked in order to properly assign credit and for data entry purposes. If significant new information relating to this study becomes known which may relate to your willingness to continue to take part in this study, you will be given this information.

6. Subject's Assurance: Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted), the researchers will take every precaution consistent with the best scientific practice. Your participation is completely voluntary, and you may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning this research should be directed to Roy White, M.A. at (601) 544-1499 or Eric Dahlen, Ph.D. at (601) 266-4608. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the directed to the Chair of the Institutional Review Board, University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406.the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001. A copy of this form will be given to the participant.

7. Consent to Participate: I consent to participate in a study of the role of mood and personality in driving behavior. In agreeing to participate, I understand that:
    a. I must be at least 18 years of age to participate.
    b. I must drive at least five miles per week to participate.
    c. I am being asked to complete a set of questionnaires, which will take approximately 1 hour.
    d. I am being asked to complete and return a driving log after two weeks.
    e. I will receive 1 research credit upon completion of this packet of questionnaires today.
        f. I will receive another 2 research credits upon completion and return of the driving log in 2 weeks if I have completed it correctly.
        g. I may earn up to 2 additional credits for recruiting non-college participants who meet the requirements outlined above.
        h. All information I provide will be used for research purposes and will be kept confidential.

I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled. I have been given the opportunity to ask questions and have them answered to my satisfaction.

I have read and understand the information stated, am at least 18 years of age, and I willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing two pages.

_____
(Subject name printed)

_____ _____
(Subject signature) Date

_____ _____
(Investigator signature) Date

APPENDIX D

INFORMED CONCENT FOR NON-COLLEGE SAMPLE

UNIVERSITY OF SOUTHERN MISSISSIPPI
AUTHORIZATION TO PARTICIPATE IN RESEARCH PROJECT

Consent is hereby given to participate in the study entitled: Personality and Driving Behavior.

1. Purpose: This study is being conducted to investigate the role of personality and mood in driving behavior.

2. Description of Study: Participation will involve completing brief questionnaires asking about your feelings, attitudes, and behaviors. It is important that you read the instructions on each questionnaire carefully, as similar looking questionnaires may have different instructions. Please answer every item. This study should take no more than 20 minutes. The student administering these questionnaires to you will receive research credits.

3. Benefits: Although you will receive no direct benefit from participation in this study, the information provided in this study will enable researchers to better understand the role of personality and mood in driving behavior.

4. Risks: There are no foreseeable risks to participating in this study. Your participation in this study is entirely voluntary, and you may withdraw anytime. Other options will be given to the student recruiting you for this study by his/her course instructor if you decide to forgo participation. All questionnaires are self-report and noninvasive. If you feel that completing these questionnaires has resulted in emotional distress, please stop and notify the researcher (Eric Dahlen, Ph.D. at (601) 266-4608). You may be referred for counseling at:

   Community Counseling and Assessment Clinic
   Owings-McQuagge Hall Rm. 202
   Phone: (601) 266-4601

   Pine Belt Mental Healthcare Resources
   Phone: (601) 544-4641

5. Confidentiality: These questionnaires are intended to be anonymous and you are asked not to provide your name on any of the forms you will be completing, except for this consent form. The information you provide will be kept strictly confidential. Names and information on this consent form will not be associated with questionnaires in any way. If significant new information relating to this study becomes known which may relate to your willingness to continue to take part in this study, you will be given this information. In order to verify that you completed these questionnaires please permit the researchers to contact you by including your telephone number, area code included, below.

6. Subject's Assurance: Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted), the researchers will take every precaution consistent with the best scientific practice. Your participation is completely voluntary, and you may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning this research should be directed to Roy White, M.A. at (601) 544-1499 or Eric Dahlen, Ph.D. at (601) 266-4608. This project and this consent form have been reviewed by the Institutional Review Board,

which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the directed to the Chair of the Institutional Review Board, University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406.the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001. A copy of this form will be given to the participant.

7. Consent to Participate: I consent to participate in a study of the role of mood and personality in driving behavior. In agreeing to participate, I understand that:
    a. I must be at least 21 years of age to participate.
    b. I must drive at least five miles per week to participate.
    c. I must not currently be enrolled in college.
    d. I will be asked to complete a set of questionnaires, which will take approximately 20 minutes.
    e. All information I provide will be used for research purposes and will be kept confidential.
    f. The student administering these questionnaires will receive research credits upon completion and return of this packet of questionnaires, and inclusion of my telephone number.
    g. I understand that the researcher may call me at the number I provide in order to verify that I was the one who completed these questionnaires.

I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled. I have been given the opportunity to call the above researchers to ask any questions and have them answered to my satisfaction.

I have read and understand the information stated, am at least 18 years of age, and I willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing two pages.

_____ _____

(Subject name printed) Phone Number

_____ _____

(Subject signature) Date

_____

(Student receiving credit name printed)

APPENDIX E

IRB APPROVAL

The University of Southern Mississippi
Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **C26071101**
PROJECT TITLE: **Driving Anger, Sensation Seeking, and Narcissism in the Prediction of Unsafe Driving**
PROPOSED PROJECT DATES: **10/24/07 to 10/24/08**
PROJECT TYPE: **Dissertation or Thesis**
PRINCIPAL INVESTIGATORS: **Roy White**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **Psychology**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Change in Previously Approved Project**
PERIOD OF APPROVAL: **10/18/07 to 10/17/08**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

10-23-07
Date

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