Validity and Reliability Assessment of a Dangerous Driving Self-Report Measure

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(ABSTRACT)

The Dula Dangerous Driving Index (DDDI) was created to measure drivers' self-reported propensity to drive dangerously (Dula & Ballard, in press). In the early stages of development, the DDDI and each of its subscales (Dangerous Driving Total, Aggressive Driving, Negative Emotional Driving, and Risky Driving) were found to have strong internal reliability (alphas from .83 to .92), and there was evidence of construct validity.

In Study One, the alpha coefficient of .91 for the DDDI Total scale indicated excellent internal reliability for the measure and good internal reliability was demonstrated for its subscales with coefficient alphas equal to .81 for the DDDI Risky Driving subscale, .79 for the DDDI Negative Emotional subscale, and the DDDI Aggressive Driving subscale. Additionally, convergent and divergent validity was shown for the DDDI, but evidence was weaker for the validity of the separate subscales. Factor analysis demonstrated that the DDDI seemed to measure a unitary construct.

In Study Two, coefficients of stability were generated from a four-week test-retest procedure, which were .76 for the DDDI Risky Driving subscale, .68 for the DDDI Negative Emotional subscale, .55 for the DDDI Aggressive Driving subscale, and .73 for the DDDI Total. In Study Three, the percentage of variance accounted for in criterion variables by different models ranged from 13.6% to 47.7%, where the DDDI Negative Emotional and DDDI Total scales frequently accounted for large portions of variance. In Study Four, the percent of variance accounted for in criterion variables by different models ranged from 22.0% to 65.6%, where some of the DDDI scales were regularly found to account for significant variance.

Thus, it was concluded that the DDDI is a measure with high levels of internal reliability and reasonable stability across time, and that face, construct, and predictive validity was demonstrated. However, the evidence in support of the present division of subscales was weak, though present. Therefore, should further data fail to produce more substantial evidence for the validity of the DDDI subscales, a singular dangerous driving measure would be warranted, and the number of items should be shortened as guided by results from factorial analysis.

Dedication

This dissertation is dedicated to God (in every conceivable name), my wife Karen, my daughter Nikila, my son Daelin, my father Stephen, my mother Linda, my mentor and friend Scott, and all the rest of my family and friends.

Acknowledgement

I wish to acknowledge and give my appreciation to all the people of the Center for Applied Behavior Systems of Virginia Tech, without whom, this work as it stands, would not have been possible

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Public uneasiness over driver aggression has risen over the past several years, as road rage has become an increasingly familiar danger on international roadways (e.g., James & Nahl, 2000; U.S. of Transportation, USDOT, 1998). Aggressive driving brings about devastating losses such as property damage, injury, and death (e.g., Martinez, 1997; Mizell, 1997). Martinez (1997), then Director of the National Highway Traffic Safety Administration (NHTSA), estimated that approximately 27,650 deaths, hundreds of thousands of injuries, and roughly $50 billion in crash-related costs were the result of aggressive driving on American roads in 1996. Martinez used a broad definition of driver aggression including such behaviors as speeding, red-light running, and weaving in traffic, as well as acts intended to harm others.

Research suggests incidents of aggressive driving have risen 51% since 1990 (Vest, Cohen, & Tharp, 1997), and continue to rise about 7% per year (Pepper, 1997). However, these estimates were based on a study that did not use random sampling. Over six years, Mizell (1997) collected information on 10,037 aggressive driving events from a number of sources including 30 major newspapers, 16 police departments, and various insurance companies. Aggressive driving was defined as an incident where a driver intentionally injured or killed another driver, passenger, or pedestrian, or attempted such an attack as a result of a traffic dispute. The number of incidents increased steadily each year with a total of 218 murders and 12,610 injuries, many of which were severe. It was noted that often, more than one person was killed or injured per event (Mizell, 1997).

In metropolitan areas, aggressive driving and road rage seem to be of particular concern. Over three months in 1998, researchers analyzed cellular phone calls to the California Highway Patrol from drivers in San Diego (Sarkar, et. al, 2000). They put 1,987 calls into five categories. They found that 19.8% of the calls were about drivers who were said to be speeding excessively; 24.6% were related to drivers mixing speeding with at least one other unsafe behavior; 27.1% were related to drivers weaving in and out of traffic and cutting off other vehicles, but who were not speeding (usually in congested traffic); 12.5% referred to drivers who were tailgating; and 19.8% referred to drivers who were said to be perpetrating various types of road rage.

In the road rage category, behaviors listed were almost invariably aggressive in a classic sense, in that there was an implied or overt intention on the part of the aggressor to cause

physical and/or psychological injury to the target (Sarkar et al., 2000). The road rage category included events such as verbal harassment, threats, obscene gesturing, flashing headlights or high-beams, repetitive horn-honking, malicious braking, blocking other vehicles, threatening with weapons, firing gun shots, hitting vehicles with objects, chasing a vehicle, and trying to run a vehicle off the road.

Felson (2000) recently defined interpersonal aggression as any behavior involving intent to harm another, including insults and threats, as well as physical intimidation and/or attack. Here, harm was said to be any event where the intent of the antagonist implies a purposeful action and which produces a result that a target person would prefer to avoid. While this is an adequate definition, the confusion seems greater looking at aggression in a vehicular context.

Additionally, negative emotions such as anger and frustration, are difficult to disentangle from, and may be more common than, aggressive behaviors. Recently, 283 university students completed questionnaires assessing their emotions and behaviors related to driving (Dula, 2001). Of those sampled, 60% admitted to losing their temper while driving, at least sometimes. Seventy-nine percent reported getting very irritated in traffic jams at least sometimes, and nearly 40% reported getting very irritated in traffic jams “often” or “always.” Left to define the term for themselves, over 50% of the sample reported driving aggressively at least sometimes. Again, these were university students; a group not typically characterized as having clinically significant anger problems (Dula, 2001). James and Nahl (2000) indicated that many who could be considered aggressive drivers have anger problems only when they get behind the wheel of a vehicle.

Public Perception of the Problem

Willis, President of the American Automobile Association Foundation for Traffic Safety (AAAFTS), said that, "For every aggressive driving incident serious enough to result in a police report or newspaper article, there are hundreds or thousands more which never got reported to the authorities" (AAAFTS, 1999, p. 2). After typing in “aggressive driving” as a unified term on a common Internet search engine, 21,100 hits were revealed in February 2003. Similarly, a search for “road rage” as a unified term revealed a staggering 173,000 hits. Granted there was considerable redundancy between the first and second searches, and the results included web sites dedicated to spin-off themes, but nonetheless, it is evident that great public concern exists regarding these topics. In contrast, using the same unified terms, a current search on a

psychology journal database revealed only 29 works dedicated to aggressive driving and 18 pertaining to road rage. The discrepancy between public concern and scientific knowledge is astounding.

From a survey of Washington, D.C. Beltway drivers, researchers concluded that in recent years more drivers have come to believe that crashes are often related to driver aggression (USDOT, 1998). While only 2% of a 1994 sample of Beltway drivers ($N = 64$) cited driver aggression as one of the three top causes of automobile crashes, 38% of a 1997 sample ($N = 52$) perceived this was the case. Within the latter sample, participants were divided into groups of general drivers ($N = 32$) and aggressive drivers ($N = 20$). Among general drivers, 53% believed driver aggression was a main cause of crashes compared to 15% of aggressive drivers. General drivers also named driver aggression as their primary roadway safety concern (USDOT, 1998).

Joint (1995) reported the results of an AAAFTS sponsored survey of 526 United Kingdom motorists. Almost 90% of the drivers reported having experienced road rage incidents in the last 12 months and 60% admitted to losing their tempers while driving. It appears the majority of events occurred during the day on a main road, and involved drivers under the age of 35 (Joint, 1995). A 1997 Gallup Poll revealed that three out of four people felt drivers were more aggressive "today" than they were five years ago (Insurance Institute for Highway Safety, Highway Loss Data Institute, 1998). Goehring (2000) related results of a recent nationwide telephone survey sponsored by NHTSA involving 6,000 drivers of all ages. Seventy-five percent thought it important to do something about unsafe drivers; 62% believed another driver's behavior had been personally threatening in the last year; 61% felt enforcement of tailgating was lacking; and 33% reported that driving is more dangerous now than one year ago. The problem of aggressive driving in the U.S. has prompted a flurry of legislative action in an attempt to curtail what the public perceives as a great danger.

Rathbone and Huckabee (1999) reported that nine states introduced 26 aggressive driving bills in 1998. Rathbone and Huckabee (1999) conducted a survey of 504 randomly selected law enforcement offices in the 50 largest metropolitan areas in the U.S. and received 139 responses. Of these, 54% believed road rage was definitely a problem in their area while only 14 % did not think it was a problem at all (Rathbone & Huckabee, 1999). At this point, highway laws and enforcement programs directed at reducing aggressive driving and road rage have been introduced in 23 states (NHTSA, 2001). However, law enforcement also suffers from problems

with definitions. Rathbone and Huckabee (1999) said many of the laws intended to control aggressive driving are difficult to enforce due to ambiguous wording about what constitutes an infraction.

As mentioned above, driver aggression is a problem in other industrialized nations, as evidenced by a survey of motorists in the United Kingdom (Joint, 1995). In Canada, a phone survey of a random sample of 1,002 drivers revealed that 85% had engaged in some form of aggressive driving in the last year, and 72% said their behavior was brought on by stress and/or frustration (Canada Safety Council & The Steel Alliance, CSC & TSA, 2001). Of these drivers, 18% believed aggressive driving was the primary cause of automobile crashes. Younger drivers had the highest rates of aggressive driving incidents, with 96% reporting they committed at least one aggressive driving act in the last year. Of this sample, 77% reported they believed incidents of aggressive driving were increasing, compared with 74% of drivers in 2000 (CSC & TSA, 2001).

Though the problem has been studied in many nations, Lonero (2000) pointed out that findings in one country do not necessarily generalize to other countries due to cultural differences. While it seems aggressive driving is relatively prevalent in many nations, the exact meaning of the term remains unclear. While some refer to aggressive driving in a way that could be deemed as assertive behavior by some, others obviously refer to behavior that is more aggressive in terms of intention and damage done.

Definitions of Driver Aggression

Tasca (2000) stated that only 21 studies in the traffic safety and psychological literatures were directly related to aggressive driving. To understand the phenomenon, a great deal more is called for in the way of systematic exploration. However, the methods by which the problem can be effectively studied are few and fraught with difficulties, one of which is the lack of consensus on a definition for aggressive driving. While there is a noted paucity of research in the field of driver aggression (e.g., Gulian, Matthews, Glendon, Davies, & Debney, 1989; Tasca, 2000), researchers concur that there is no agreement on a definition for aggressive driving (e.g., Ellison-Potter, Bell, & Deffenbacher, 2001; Lonero, 2000; Sarkar et al., 2000; Tasca, 2000).

Lay definitions of aggressive driving are less than scientific, but they give a sense of what drivers feel are core problems. A telephone survey of 1,000 licensed American drivers from a representative sample was conducted, asking the question: Is this act aggressive? Answers were

gauged in terms of the percentage of drivers who agreed: tailgating (95%); rude gestures (91%); passing on the shoulder of the road (90%); failing to yield to merging traffic (85%); pulling into a parking space someone else is waiting for (80%); and flashing the high beams at a car in front of you (74%) (The Steel Alliance, 1999). In a similar survey, Canadian drivers revealed they feel just as strongly that these behaviors are indicative of driver aggression (The Steel Alliance, 2000). Unfortunately, research definitions often fair no better than those of laypersons.

In congressional testimony, Martinez (1997) said NHTSA defined aggressive driving as "driving behavior that endangers or is likely to endanger people or property." Martinez further explained that this includes a wide variety of driving behaviors ranging from risky driving (e.g., running red lights, weaving in traffic, speeding) to violence (e.g., running a vehicle off the road, confronting a driver with a weapon). This definition is all-inclusive, and fits the popular notion of aggressive driving, yet it is leaves much to be desired in terms of informing research.

Goehring (2000) stated that the NHTSA regards aggressive driving as a traffic offense, and road rage as a criminal offense, noting that NHTSA defines road rage as “an assault with a motor vehicle or other dangerous weapon by the operator or passenger(s) of one motor vehicle on the operator or passengers(s) of another motor vehicle or vehicles precipitated by an incident which occurred on a roadway” (p. 3). Terminology must be consistent and concise in order for operational variables to be formulated and measured, and for results to be meaningfully communicated. However, the NHTSA definition is similar to those researchers have worked with for years.

The problem can be traced to the first quasi-experimental study of aggressive driving. Doob and Gross (1968) tried to measure the effect of an antagonists’ social status on aggressive responses of drivers. They hypothesized that an unresponsive confederate vehicle at a traffic light would instigate aggression by drivers stuck behind the blockage. Horn-honking latency was the operational definition of aggression. It was found that a low-status vehicle was more likely to generate honking than one of high-status, and males honked more than females. However, Chase and Mills (1973) replicated the work and obtained opposite results regarding vehicle status while finding no gender differences. The implication was that horn-honking was a form of aggressive driving, yet no definition of aggressive driving was provided.

Similarly, others have used horn-honking latency as a measure of aggression while driving, but have failed to provide an explicit definition of aggressive driving (Diekmann,

Jungbauer-Gans, Krassnig, & Lorenz, 1996; Kenrick & MacFarlane, 1986; Shinar, 1998; Turner, Layton, & Simons, 1975). This operational definition lacks a theoretical framework which would allow for solid predictions and that would provide explanative power. Horn-honking could have been an aggressive product of annoyance or irritation; however, it could have simply been a benign signal used to alert the driver in front that the light had changed, which would not have been aggressive in any way.

Parry (1968) conducted a survey of British drivers and found reactions fitting a hostile profile that included such behaviors as: negative facial expressions, profanity and yelling, obscene gestures, tailgating, headlight flashing, chasing other vehicles, and physical fights. He concluded it was not uncommon for drivers to get angry and become aggressive. Turner, Layton, and Simons (1975) followed up Parry's research, replicating the survey in Salt Lake City, Utah. Of the 59 surveys completed by randomly selected drivers, 77% of men and 56% of women reported, "swearing under their breaths" at other drivers; and, 50% of men and 15% of women reported "flashing their lights in anger." This led to the conclusion that a high percentage of drivers become angry or irritated at times while driving (Turner, Layton, & Simons, 1975). As the problem of aggressive driving has been around for a considerable amount of time, the dilemma of researchers lacking or providing an adequate definition has also endured.

Willis (1998) reported that the two foremost "aggressive driving problems" were red-light running and road rage. The difficulty becomes readily apparent when running a red light and intense wrath are compared by the same standard. While this comment came from a non-scientist, unfortunately, scientists often fare no better. For example, Rathbone and Huckabee (1999) stated that definitions of road rage fluctuate and often go unstated, emphasizing that road rage and aggressive driving are not synonymous. According to them, aggressive driving includes tailgating, abrupt lane changes, and speeding, alone or in combination. Road rage was said to define an incident where "an angry or impatient motorist or passenger intentionally injures or kills another motorist, passenger, or pedestrian, or attempts or threatens to injure or kill another motorist, passenger or pedestrian" (Rathbone & Huckabee, 1999, p. 4).

The preceding definition of road rage was almost word-for-word the same as the one Mizell (1997) used to define aggressive driving. The simple replacement of Mizell's (1997) "aggressive driving" with "road rage" makes the two terms synonymous with regard to the literature, in spite of the assertion to the contrary. While Rathbone and Huckabee (1999)

supposed that aggressive driving included tailgating, abrupt lane changes, and speeding, others have referred to such behaviors as risky driving, without any mention of driver aggression (e.g., Jonah, 1997; Parker, Lajunen, & Stradling, 1998; Zimbardo, Keough, & Boyd, 1997).

Tasca (2000) reviewed several explicit definitions of aggressive driving found in the literature. The first was by Hauber (1980), where aggressive driving was considered to be an action where the intention was to do physical or psychological harm to a target where the target perceived the act as aggressive. Second was Mizell's definition (1997) cited above, where aggressive driving was defined specifically as a driver intentionally injuring or killing another driver, passenger, or pedestrian. Third was the NHTSA (1998) definition given above, whereby aggressive driving is considered any behavior that endangers or is likely to endanger other people. Fourth was an AAA definition, which viewed aggressive driving as the "…operation of a motor vehicle without regard to others' safety" (Tasca, 2000, p. 4).

Tasca (2000) noted that the NHTSA and AAA definitions differentiate between road rage and aggressive driving, but also that both definitions of aggressive driving are vague. Last to be listed was Shiner's (1998) description based on the frustration-aggression model where aggressive driving was defined as an instrumental behavior manifested as inconsiderateness or annoyances directed at others, and also deliberately driving dangerously. Tasca (2000) proposed a definition which stated that, "A driving behavior is aggressive if it is deliberate, likely to increase the risk of a collision, and is motivated by impatience, annoyance, hostility, and/or an attempt to save time" (p. 8).

Likewise, Sarkar et al. (2000) reviewed definitions of aggressive driving and road rage. They also observed that NHTSA distinguished between road rage and aggressive driving, but noted the lack of an adequate operational definition for both terms. Second, they reviewed the definition by Connell and Joint (1996), which indicated that road rage could be any exhibition of driver aggression up to, and including, murder. Third, was the definition by Joint (1995) cited and listed below in context. Fourth, was Mizell's (1997) definition which was cited above. Fifth, were Ellison-Potter, Bell, and Deffenbacher's (2001) definition labeling as aggressive driving, any behavior compelled by frustration and/or anger that endangered others physically or psychologically. A psychotic level of aggressive driving was said to exemplify road rage. The sixth and final definition noted was Shinar's definition (1998) also cited above.

Sarkar et al. (2000) did not offer a specific definition either, but instead used the categorical system referred to above to classify driving behaviors. Once again, the first category was Speeding Alone. The next was Aggressive Driving 1, which included speeding together with any other type of unsafe driving behavior. Aggressive Driving 2 involved incidents of weaving and cutting through congested traffic without speeding. Aggressive Driving 3 included tailgating incidents. Lastly, the Road Rage category included verbal harassment, threats, obscene gesturing, headlight flashing, horn-honking, malicious braking, blocking other vehicles, threatening with weapons, etc.

James and Nahl (2000) also attempted to establish a categorical definition of aggressive driving, asserting that aggressive driving is driving under the influence of a negative emotional state. They recognized three main categories of emotional impairment to be indicative of aggressive driving: 1) impatience and inattentiveness, 2) power struggles, and 3) recklessness and road rage. Within this type of definition, a wide variety of driving behaviors could be considered as aggressive, but could only be assessed if the actual emotional state of the driver was known. No attempt has been made to verify the validity of these theoretical categories.

Joint (1995) suggested that generally, road rage might not be different from any other type of anger-induced hostility. Joint said road rage could be broadly defined as any aggressive behavior engaged in by a driver, but noted that the term tended to be reserved for more extreme cases of aggressive driving that usually involved goal-directed acts of violence. He surmised that for many, driving causes stressful situations and frustrated feelings to arise, and that anger is a natural response to such tensions. Joint (1995) said tailgating in an antagonistic fashion was the most common form of road rage. Other examples included deliberate obstruction of vehicles, headlight flashing, obscene gestures and verbal abuse. However, these behaviors are considered to be aggressive driving instead of road rage according to some of the above definitions.

Many of the studies mentioned above are condensed into Table 1 in Appendix A, where the various examples of aggressive driving and explicit definitions of aggressive driving are presented. Explicit definitions of aggressive driving were rare and most researchers resorted to the use of behavioral examples in lieu of a definition. Several studies measured aggression, but the behaviors were never examined in a manner where the intention of the drivers could be directly assessed. Still, the aggressive intent involved in the more extreme behaviors might be inferred with confidence.

The explicit definitions that were available were not usually consistent with one another. The variety of dangers is clear enough to have prompted calls for investigations (e.g., James & Nahl, 2000; Lonero, 2000). Yet, while there have been many attempts to investigate the problem, the lack of a clear definition has detracted considerably from any knowledge that may have been gained. A precise, consistent definition of aggressive driving is needed so hypotheses can be proposed and tested empirically, and findings can be generalized. Additionally, the language constituting such a definition should be free of cultural biases in so far as possible, so a common standard may be used to measure the effects of cultural differences.

Toward a Pragmatic, Research-Oriented Definition

Geen and O'Neil (1976) observed some time ago that inconsistent usage by investigators and the many possible meanings of the word "aggression" explained why scientific explorations of the aggression concept have been historically confounded. But while other researchers in the field of aggression have settled on reasonably comparable definitions, there is continued disregard for exactitude in the aggressive driving literature. The call for definitional precision and increased consistency in the field of aggressive driving research must be heeded and acted upon promptly.

Tasca (2000) suggested there are three guiding principles from which a definition of aggressive driving should flow, namely that: 1) it should not be too general, 2) it should not include behavior associated with road rage, and 3) behaviors included in the definition should be intentional in nature. While Tasca advocated excluding road rage from the concept of aggressive driving, Dula and Geller (in press) suggested the term "road rage" be eliminated from the scientific literature entirely. Instead, the behavioral spectrum to be considered should be called dangerous driving, a term encompassing any behavior that endangers or has the potential to endanger others.

Intention, Emotion, and Behavior

Thus, consistent with Dula and Ballard (in press), Dula and Geller (in press) suggested there are three major classes of dangerous driving which have been often labeled as aggressive in the literature: 1) intentional acts of bodily and/or psychological aggression toward other drivers, passengers, and/or pedestrians (physical, gestural, and/or verbal in nature), 2) negative emotions felt while driving (including anger and rage, but which could also include sadness, frustration, dejection, jealousy, etc.), and 3) risk-taking behaviors (dangerous behaviors performed without

intent to harm the self or others). The third class includes behaviors such as speeding, general tailgating, running red lights, weaving through traffic, maneuvering without signaling, and frequent lane changing. The third class would also include dangers from lapses of attention while driving inherent in such off-task behaviors as using a phone, attending to appearance, eating, drinking, smoking, and adjusting a car stereo.

The second class of behaviors is related to negative emotions experienced while driving, including anger, frustration, sadness, discontent, jealousy, and the like. All such emotions, when felt profoundly, are likely to have deleterious effects on the attention level of a driver. Though much driving behavior is automatic, vigilance is vital to the safe operation of a motor vehicle. While anger and frustration usually precipitate aggression, it is possible to experience either or both without actually behaving in an aggressive manner. For example, a driver could be angry at a significant other who is not even present in the vehicle and thus be deprived of cognitive resources that could be used for safer driving. Likewise, a driver might get upset that another driver did not allow him or her to enter the roadway, but yet refrain from behavior that is intended to harm.

When speaking of driver aggression researchers would do well to eliminate all elements of the spectrum except those where there is a clear intention to harm. Behaviors traditionally considered indicative of road rage are those that are most clearly aggressive in intent. In the Sarkar et al. (2000) Road Rage category, the behaviors described share an implied intent to cause physical or psychological harm to the target. Lajunen, Parker, and Stradling (1998) said driver aggression "…can be conceptualized as any form of behavior that is intended to injure or harm other road users physically or psychologically" (p. 108). Similarly, Ellison-Potter et al. (2001) said aggressive driving "…may be defined as any driving behavior that intentionally...endangers others psychologically, physically, or both." (p.432).

This focus is critical to the pursuit of scientific investigations of driver aggression. From a research standpoint, a definition of aggressive driving that includes intention to harm is crucial, and Dula and Geller (in press) posited this one: Aggressive driving is any behavior emitted by a driver while driving that is intended to cause physical and/or psychological harm to the occupant(s) of another vehicle and/or to pedestrians.

Measurement of Individual Differences

Dangerous driving, including the subcategories of aggressive driving, driving while

experiencing negative emotions, and taking risks while driving, is of empirical and practical concern. The Dula Dangerous Driving Index (DDDI) was created to measure drivers' self-reported likelihood to drive dangerously, consistent with these three subcategories (Dula & Ballard, in press). A sound measure of dangerous driving behavior (i.e., aggressive, negative emotional, risky) is necessary for empirical research into driver aggression (e.g., to understand differences and commonalties between driver aggression and risky driving) and for applied uses (e.g., clinical assessment and intervention, employment screening). The DDDI one of the first such measures to be published (e.g., DePasquale, et al., 2001: Dula & Ballard, in press).

Original Development of the DDDI

The following summarizes Dula and Ballard (in press). A pilot measure of 96 items potentially related to driver aggression in its broadest definition (i.e., dangerous driving) was created and was based on research findings (e.g., Connell & Joint, 1996; Joint, 1995; Mizell, 1997; USDOT, 1998), congressional testimony (e.g., James, 1997; Larson, 1997; Martinez, 1997; Snyder, 1997), and anecdotal experiences. Twenty-three participants rated the items on a five-point Likert scale in terms of how strongly they associated each item with aggressive driving (e.g., 1 = Not at all aggressive to 5 = Extremely Aggressive). Average ratings were calculated for each of the 96 pilot items and a tripartite split (N = 32 items) was used to determine which items most strongly evidenced behaviors related to dangerous driving. The item "I play highly competitive and/or physical contact sports" was eliminated as irrelevant. The remaining 31 items comprised the DDDI (see Appendix B), which had excellent internal reliability (α = .94).

Following the original development of the DDDI, it was administered 119 undergraduates (47% male, 53% female; missing = 2) from Appalachian State University (ASU), a small western North Carolina university. The Propensity for Angry Driving Scale (PADS; DePasquale, Geller, Clarke, & Littleton, 2001**)** Interpersonal Behavior Survey (IBS, Mauger & Adkinson, 1980), and the State-Trait Anger Expression Inventory (STAXI, Spielberger, 1996) were used to demonstrate concurrent validity and to preliminarily examine dispositional factors which might be common to aggressive, negative emotional, and risky driving.

Based on item content and feedback from expert reviewers in the submission process, three items were removed and the remaining 28 DDDI items were divided into three categorical subscales: (a) Risky Driving (DDDI Risky Driving; 12 items gauging willingness to engage in

unsafe driving behaviors, α = .83), (b) Negative Emotional Driving (DDDI Negative Emotional; 9 items measuring irritability and anger experienced while driving and the tendency to be become annoyed with other drivers, α = .85), and (c) Aggressive Driving (DDDI Aggressive Driving; 7 items assessing behaviors that are intentionally meant to annoy, irritate, or punish other drivers; α = .84). The DDDI Total scores (DDDI Total; α = .92) were the sum of the 28 subscale items.

Males scored significantly higher than females on the DDDI Aggressive Driving and Risky Driving subscales and on the PADS (see Table 2, Appendix C). Males and females did not differ on DDDI Total or Negative Emotional Driving scores. Each DDDI scale was significantly and positively correlated with all IBS and STAXI aggression and anger subscales and negatively correlated with the IBS Denial scale (see Table 3, Appendix C). Each driver scale was significantly, positively correlated to the number of traffic tickets received in the past two years (see Table 4, Appendix C). The IBS scales, STAXI scales, gender, age, number of years driving, were entered in a step-wise fashion as predictor variables. The results for the analysis using the DDDI Total scores as the criterion variable are summarized in Table 5, Appendix C. The results regarding DDDI Aggressive Driving scores, DDDI Negative Emotional Driving scores, and DDDI Risky Driving scores are presented in Tables 6-8, Appendix C.

There were two major weaknesses of the previous study that bear consideration. First, the data were based on self-reports, which have inherent limitations. Second, results were drawn from a small, homogenous sample of undergraduates with relatively limited driving experience. Consequently, conclusions may not generalize to other driver populations. However, given the prominence of the constructs examined and the robust relations among relevant variables, it was deemed likely that these results would be replicated in broader samples of drivers (Dula & Ballard, in press).

Current Validation and Reliability Assessment

Overview of Present Research

Aspects of the Dula and Ballard (in press) study were in need of repetition with a larger, more diverse sample. The increased diversity found in the undergraduate student body of Virginia Tech as compared to that of ASU made this a highly appropriate sample with which to repeat the previous work. Additional personality measures were added to demonstrate divergent as well as convergent validity. A larger sample would enable confirmation of the previously

cited internal reliability figures, and a factorial analysis of items in each of the DDDI subscales would further confirm the appropriateness of their placement. Additionally, the establishment of coefficient of stability for the overall scale and each of the subscales was accomplished with a four-week test-retest procedure.

Finally, predictive validity was examined by two paradigms. The first involved administering relevant measures to participants and videotaping their performance on a driving video-game. Variables were defined which represented aggressive, negative emotional and risky driving, and behavior was coded and analyzed by trained observers. Driving simulators have begun to be used by researchers to study driver behavior in a more realistic manner, which has advantages over relying on self-reports alone.

In their study of aggressive driving, Ellison-Potter, Bell, and Deffenbacher (2001) successfully employed a machine called the STISIM Drive which is a relatively low-cost driving simulator. However, variations of the simulator made by this company range in price from $5,250 to $63,950 and the purchase and installation of such a simulator were not feasible for the present study. Other simulators were more cost prohibitive, so a video-game system was purchased to be used as a driving simulator for the present study.

The second paradigm entailed training at drivers from the university community to record their relevant daily driving behaviors on a checklist which was to be filled out on a daily basis for two weeks. Scores on the DDDI were used to predict differential driving behaviors and emotions experienced while driving. The design for this study was based on an innovative approach of having drivers maintain journals of daily driving experiences (Underwood, Chapman, Wright, & Crundall, 1999). Recording events immediately after they occur promises a much higher rate of accuracy, as opposed to having drivers estimate behaviors out of context and after considerable time has passed.

Writing journal entries at the end of every trip in a vehicle could be tedious and may frustrate a participant's immediate goals to be some particular place at a particular time. A similar approach was thought to be easier on drivers, which was to have them fill out simple checklists. Critical behavior checklists have been developed and used in industrial safety applications (e.g., Geller, 2002; Williams & Geller, 2000).

Geller (1996) also developed a Critical Behavior Checklist for Driving, for use in teen or novice driver training. Driving checklists can be created to cover many variables and can be

filled out quickly as one only selects from categories that were relevant for the trip. Participants can be easily trained on the checklist before going into the field so that they become more efficient at monitoring their behavior. Additionally, participants can be compensated for their efforts and prompted frequently to help make sure they fill out driving diary checklists on a regular basis, though this does not guarantee they will do so.

Study One Methods

Purpose and Hypotheses

The main aim of this study was to verify preliminary results with regard to the factor structure, internal reliability, and convergent validity of the DDDI. Also, divergent validity was to be demonstrated via use of different personality assessment tools.

DePasquale et al. (2001) noted that scores on the PADS did not correlate significantly with scores for venturesomeness, which they believed indicated a clear distinction between risky driving and road rage. Thus, it was hypothesized that high Eysenck Personality Questionnaire-Ventursomeness (EPQV) scores would be significantly, positively correlated with DDDI Risky Driving scores, but would not be significantly correlated with DDDI Negative Emotional Driving scores.

Based on its similarity to the IBS Denial scale which correlated significantly and negatively with the DDDI scales in the data of Dula & Ballard (in press) it was hypothesized that 16PF Impression Management (IM) scores would be significantly and negatively correlated with scores on each of the DDDI scales.

For reasons similar to the above hypothesis regarding the EPQV, it was hypothesized that 16PF Extraversion (EX) scores would be significantly, positively correlated with DDDI Risky Driving scores, but would not be significantly correlated with DDDI Negative Emotional Driving scores.

Based on its reported measuring of test-takers' propensity to be agitated, it was hypothesized that 16PF Anxiety (AX) scores would be significantly, positively correlated with DDDI Negative Emotional Driving scores, but would not be significantly correlated with DDDI Risky Driving scores.

Due to its relating to being unempathetic, it was hypothesized that 16PF Tough-Mindedness (TM) scores would be significantly, positively correlated with DDDI Aggressive Driving and DDDI Risky Driving scores, but would not be significantly correlated with DDDI

Negative Emotional Driving scores. Similarly, due to its relation to being unaccommodating and disagreeable, it was hypothesized that IN scores would be significantly, positively correlated with DDDI Risky Driving and Aggressive Driving scores, but not significantly correlated with DDDI Negative Emotional Driving scores.

As it was said to measure test-takers' inabilities to inhibit impulsive behavior, it was hypothesized that 16PF Self-Control (SC) scores would be significantly, negatively correlated with DDDI Risky Driving and Aggressive Driving scores, but would not be significantly correlated with DDDI Negative Emotional Driving scores.

Being said to be measuring levels of emotional maturity and adaptability, it was hypothesized that 16PF Emotional Stability (ES) scores would be significantly, negatively correlated with DDDI Negative Emotional Driving and DDDI Aggressive Driving scores, but would not be significantly correlated with DDDI Risky Driving scores.

Said to be measuring attitudes toward authority and conformity, it was hypothesized that 16PF Rule-Consciousness (RC) scores would be significantly, negatively correlated with DDDI Risky Driving and Aggressive Driving scores, but would not be significantly correlated with DDDI Negative Emotional Driving scores.

As it was reported to measure levels of energy and impatience, it was hypothesized that 16PF Tension (TN) scores would be significantly, positively correlated with DDDI Negative Emotional Driving scores and DDDI Aggressive Driving scores, but would not be significantly correlated with DDDI Risky Driving scores.

With the data obtained, the internal reliability of each of the DDDI scales was assessed. It was hypothesized that the alpha coefficients would exceed .75 on all DDDI scales. Additionally, a factorial analysis was performed on the items in each of the DDDI subscales. It was hypothesized that when each subscale was subjected to a principal components factor analysis there would be a single interpretable factor where each item would load at .40 or higher.

It was also hypothesized that when the same procedure was performed on the DDDI Total scale, three interpretable factors would emerge, where constituent items loading at .40 or higher, would belong to their respective predetermined subscales. It was also hypothesized that DDDI subscale scores would be correlated with self-estimated risky, negative emotional, and aggressive driver behavior items from the demographic questionnaire as a further measure of each subscale's concurrent and convergent validity.

Lastly, with regard to the Propensity for Angry Driving Scale, Interpersonal Behavior Survey, State-Trait Anger Expression Inventory, all of which were used by Dula and Ballard (in press), it was hypothesized that the same pattern and direction of significant correlations would be replicated.

Participants

Participants included 277 undergraduates from Virginia Tech, a university in southwestern Virginia. All students received extra credit for a psychology course and were paid $2.00 for their participation. Demographic data were as follows: there were 161 female participants (58.1%), 112 males (40.4%), and 4 participants (1.4%) did not disclose their gender; the mean age of participants was 19.4, ranging from age 17 to 46; 29 participants were African American (10.5%), 2 were American Indian (0.7%), 21 were Asian American (7.6%), 205 were Caucasian American (74%), 3 were Hispanic American (1.1%), 5 were Citizens of a Foreign Country (1.8%), 8 labeled themselves as Other than the above listed categories (2.9%), and 4 cases were missing race data (1.4%). Participants ranged from 0.5 to 30 years of driving experience (M = 3.76, SD = 2.70).

Measures

The 28-item DDDI (see Appendix B) was administered to assess driver aggression, negative emotions related to driving, and risky driving behavior. A demographic questionnaire (see Appendix D) was used to gather information on age, gender, ethnicity, estimated grade point average, years of driving experience, total number of tickets received in the last two years (excluding safety-belt violations), total number of crashes caused, stress level on the day of participation, and overall stress level (both of the latter will be measured on nine-point Likert scales).

The Propensity for Angry Driving Scale (PADS; DePasquale, Geller, Clarke, & Littleton, 2001; see Appendix E) was administered to assess angry driving behavior and to examine convergent validity of the DDDI. The PADS consists of 22 hypothetical driving situations (e.g., "You are driving on a single lane road. For no apparent reason, the car in front of you is constantly braking and accelerating, causing you to drive in the same manner. How do you respond?"). Participants select one of four responses, weighted for relative hostility per each scenario [e.g., Slow down a little and keep a safe distance; Deliberately tailgate the car and

occasionally lay on the horn]. Three of the items are used as distracters and the 19 scored items have high internal validity, $\underline{\alpha} = 0.89$ and test-retest reliability $r = 0.91$ (DePasquale et al., 2001).

The 133-item Interpersonal Behavior Survey Short Form (IBS, Mauger & Adkinson, 1980) was used to assess participants' dispositional aggressiveness, assertiveness, and denial of socially undesirable traits. The IBS General Aggressiveness-Empirical scales measures dispositional aggression (e.g., "Some people think I have a violent temper."). The IBS General Assertiveness-Empirical scales measure assertiveness versus non-assertiveness (e.g., "I say what I want to say in most situations."). The IBS Denial scale measures participants' willingness to admit socially undesirable behaviors and minor flaws (e.g., "I never make fun of people who do things I feel are stupid."). The IBS Short-Form also has subscales measuring anger expression (e.g., "I get mad easily."), physical aggression (e.g., "There are times when I'd like to pick fist fights."), and verbal aggression (e.g., "I usually tell people off when they disagree with me."). All of the IBS subscales have adequate validity (see Mauger & Adkinson, 1980 for a review). Test-retest reliability for the subscales is excellent and 10-week test-retest coefficients range from $r = .81$ to $r = .93$ (Mauger & Adkinson, 1980).

Four subscales of the State-Trait Anger Expression Inventory (STAXI, Spielberger, 1996) were used to measure participants' anger and expression of hostility toward others. The Trait Anger scale served as a measure of dispositional anger. The Trait Anger scale measures participants' experience of anger, frustration, and unfairness. It has two subscales, the Angry Temperament subscale and the Angry Reaction subscale. High Angry Temperament scores are related to lack of anger control (e.g., "I have a fiery temper."). High Angry Reaction scores are related to overreacting to perceived injustices or criticism from others (e.g., "I get angry when I'm slowed down by other's mistakes."). The Anger-Out scale measures the use of verbal and physical aggression (e.g., "I make sarcastic remarks to others."). Each scale has good reliability ($\underline{\alpha}$'s range from .74 to $\underline{\alpha} = .84$) and validity (Spielberger, 1996).

The Eysenck Personality Questionnaire and the 16 PF, was added to the battery to further assess for convergent and divergent validity of the DDDI. Consistent with Depasquale et al. (2001), the Eysenck Personality Questionnaire Venturesomeness scale (EPQV; Eysenck, Pearson, Easting, & Allsopp, 1985) was used to assess for convergent validity with the DDDI Risky Driving subscale and divergent validity of the DDDI Negative Emotional Driving

subscale. The EPQV scale has reported alpha levels in excess of .80 (Clift, Wilkins, & Davidson, 1993).

The 16 Personality Factors (16 PF) is a well-established measure of global and specific personality factors (Russell & Karol, 1994). The 16 PF has five global factor scales and 16 primary factor scales. All of the following scales have ample evidence for validity and have good reliability with two-week test-retest coefficients ranging from .84 to .91 for global factors and .69 to .86 for primary factors. Two-month test-retest coefficients ranged from .70 to .82 for global factors and .56 to .79 for primary factors. Based on data from a sample of 2500 adult participants, alpha coefficients ranged from .64 to .85.

The Impression Management (IM) scale is neither a global nor primary factor scale, but as a measure of veracity it was used as an additional assessment of social desirability biases in participants' self-report responses. The Extraversion (EX) scale was used to assess socially participative behavior. The Anxiety (AX) scale was used to assess participants' baseline levels of perturbability. The Tough-Mindedness (TM) scale was used to measure participants' tendencies to be unempathetic, closed-minded and resolute. The Independence (IN) scale measured test-takers' degree of unaccommodating attitude, disagreeableness, and willfulness. The Self-Control (SC) scale was used to measure participants' ability to inhibit behavioral urges.

The following three 16 PF Primary Factor scales were used in addition to the five Global Factor scales. The Emotional Stability (ES) scale was used to measure emotional maturity and adaptability. The Rule-Consciousness (RC) scale was used to assess conformity to authority. Finally, the Tension (TN) scale was used to assess participants' energy levels and impatience.

Procedure

Groups of 5 to 30 participants were run together and individuals were spaced around a large classroom so they could complete the surveys with relative privacy. Each participant signed an informed consent form and received a packet containing the DDDI, PADS, IBS, STAXI, and the demographic form. The order of the measures was counterbalanced across packets. Participants were asked verbally to follow written instructions, included in the packet, for each measure. Participants completed the procedure in between 60 and 120 minutes, at which point they were thanked, given extra credit, and paid $2.00.

Study One Results and Discussion

A summary of all Study One hypotheses and the support status of each can be found in

Table 9, Appendix E. Due to a few participants not completing some of the items, the number of data points varies slightly for some survey measures.

For all 28 DDDI items together (Dangerous Driving Total; DDDI Total), the alpha coefficient was .91 ($N = 272$), and it was .79 ($N = 273$) for the DDDI Risky Driving subscale (DDDI Risky Driving; 12 items), .85 ($N = 274$) for the Negative Emotional Driving subscale (DDDI Negative Emotional; 9 items), and .81 ($N = 273$) for the Aggressive Driving subscale (DDDI Aggressive Driving; 7 items). The DDDI Total alpha coefficient of .91 indicated excellent internal reliability for the measure overall, with good internal reliability for its subscales. These results virtually replicated those in the original development work (Dula & Ballard, in press) and confirmed the hypothesis that alpha values for each of the scales and the overall scale, would all exceed .70.

The mean for the DDDI Risky Driving scale scores was 23.48 ($SD = 6.17$), ranging from 12 to 44. The average for DDDI Negative Emotional score was 24.69 ($SD = 4.96$), ranging from 14 to 44. The DDDI Aggressive Driving scale score mean was 14.64 ($SD = 4.86$), ranging from 7 to 33. Thus, there was a floor effect for the Aggressive Driving subscale. However, only eight participants of 274 (2.9% of the sample) bottomed out on that scale. Similarly, two participants (0.7%) scored a 12 on the Risky Driving subscale. No ceiling scores occurred and scores on all DDDI subscales followed a normal distribution. There appeared to be satisfactory variability in scores on all DDDI scales and no modifications were deemed necessary based on range concerns. Finally, the average score for the DDDI Total was 62.81 ($SD = 13.96$), ranging from 37 to 110.

Males scored significantly higher than females on the DDDI Risky Driving, DDDI Aggressive Driving, and DDDI Total scales, while both genders scored similarly on the DDDI Negative Emotional scale (see Table 10, Appendix E). Male and female means for each DDDI scale were similar, but slightly lower in the current sample as compared with the Dula and Ballard (in press) sample. Mean score differences ranged from 1.35 to 5.43, each less than a standard deviation for each scale in both samples.

A remarkable exception occurred with the DDDI Risky Driving means, which were 9.07 and 9.15 points lower for males and females, respectively, in the present versus the original Dula and Ballard (in press) sample. No explanation can be readily offered for this striking difference except to note that the difference in sample size was dramatic. There were as many males and

females separately in the present sample as there were total participants in the original Dula and Ballard (in press) sample.

That male scored significantly higher on DDDI Total scores, was a new finding compared to Dula and Ballard (in press). This was likely due to the greater statistical power resulting from increased sample size, as males in the present sample scored higher on the DDDI Risky Driving and Aggressive Driving subscales which comprise the DDDI Total scale scores. In the Dula and Ballard (in press) sample, males scored significantly higher on these two subscales, but the gender difference in DDDI Total scores did not reach significance. Also replicated was the finding that males and females did not differ significantly in terms of their DDDI Negative Emotional scores, leading one toward the conclusion that becoming upset in a vehicle is common to all, whereas engaging in risky driving maneuvers and open displays of aggression is more likely to be performed by a male driver (e.g., Joint, 1995).

The present hypotheses were that venturesomeness would be definitively related to a scale which theoretically measures only risky driving behaviors (i.e., DDDI Risky Driving) and unrelated to one which theoretically gauges only aggressive driving (DDDI Aggressive Driving). The EPQV (Venturesomeness) scores were significantly and positively correlated with the DDDI Risky Driving, DDDI Aggressive Driving, and DDDI Total scores, but not with the DDDI Negative Emotional scores (see Table 11, Appendix E), supporting the related hypotheses.

This provided backing for the notion of DePasquale et al. (2001) that a lack of significant correlations between their measure of angry driving (i.e., PADS) and scores for venturesomeness indicated a contrast between risky driving and road rage (i.e., strong anger). This finding has implications for future research, allowing for researchers to clearly distinguish one type of dangerous driving from another. It was also evidence of both convergent and divergent construct validity of the DDDI.

All 16PF scale scores were significantly correlated with DDDI scale scores, except for the 16PF Tough Mindedness scale, which was not related to any of the DDDI scales (Table 11, Appendix E). Males scored significantly higher on the 16PF Tough-Mindedness scale, while females scored significantly higher on 16PF Extraversion, Self-Control, Rule-Consciousness, and Tension scales (see Table 10, Appendix E, for complete listing of scale means by gender).

As predicted, the 16PF IM (Impression Management) scores were significantly, negatively related to each of the DDDI scales. Given that IM scores and IBS Denial scores

follow the same trends, where IBS Denial scores have been consistently shown to be related to DDDI scales (see Dula & Ballard, in press), the present results are further confirmation that social desirability biases are in operation when participants respond to DDDI items. If this were not the case, then scores should be expected to be significantly higher in general.

Lajunen et al. (1997) concluded that traffic behavior questionnaires as self-reports, are easily and frequently biased by socially desirable responding, especially when investigating more or less normal driving behavior. Given that the processes under investigation in the present study represent a normal range of driving behaviors and emotions, the results support this conclusion. This raises a question about the usefulness of the DDDI in applied settings where socially desired responding may be more the rule than the exception. The implications of this finding are addressed more fully in the general discussion section below.

Contrary to the current hypothesis, the 16PF EX (Extraversion) was significantly, negatively related to the DDDI Risky Driving scale. The hypothesis that 16PF EX scores would not be significantly related to the DDDI Negative Emotional scale was also not supported, as the relationship was significantly negative. The Extraversion (EX) scale assessed socially participative behavior, where extremely outgoing behavior was thought to be indicative of an assertiveness that might carry over to driving. As stated in the 16PF manual (Russell & Karol, 1994), EX is a scale which taps being people-oriented, wanting to seek interaction with others to value time spent with others, in social pursuits. The hypothesis was not well thought out, as these qualities may not make a person liable to put others at-risk and in fact, may make one more conscious of the safety of others.

This disconfirmed hypothesis was focused on the EX qualities listed as being bold gregariousness, and tendencies to be forthright and self-disclosing. This led the author to believe there was a sensation-seeking aspect to this measure, and also that a high EX person might be more willing to disclose risk-taking behaviors. Upon inspection of the component items, it appeared the EX scale more readily tapped into social relationships than into aspects previously considered as part of extraversion, such as venturesomeness and sensation-seeking. Thus, based on the results and a more careful reading of the full listing of qualities measured by the EX, it was misguided to presuppose the EX scale should be related to risky driving.

However, this finding has implications for further research, in determining whether pro-social or non-risk-taking behavior is related to an extraverted orientation. These findings raise

another question as to why an introverted orientation should be related to either negative emotional driving, and perhaps more interestingly, why should it be related to risky driving? It can be interpreted that while the negative correlation between the EX and DDDI Risky Driving scales was weak (r = -.19, p < .01), it may still represent a tendency for those more introverted to report taking more risks when driving. Similarly, the case can be made with a weak negative correlation between the EX and DDDI Negative Emotional scales (r = -.17 p < .01), that drivers who lean toward introversion are more likely to experience driving as aversive.

The 16PF AX (Anxiety) scale was hypothesized to be significantly, positively correlated with the DDDI Negative Emotional scale, and this was supported. This is definitive support for the notion that the DDDI Negative Emotional is tapping into negative emotional constructs, and that a disposition to experience higher baseline levels of anxiety, should lead one to consistently find driving to be an experience that generates negative emotions. The hypothesis that 16PF AX scores should not be related to the DDDI Risky Driving scores was made because negative emotions and risky driving are viewed as being independent, albeit frequently related constructs.

Strictly speaking, this hypothesis was not supported. However, it could be said it received partial support in that the correlation between the 16PF AX and DDDI Risky Driving scales was not only weak but less significant than the vast majority of established relationships (r = .14, p < .05). The finding of a stronger and more significant relationship between the DDDI Risky Driving and AX (r = .37, p < .01) than the DDDI Aggressive Driving and AX scales, lends support to the notion that the separation of DDDI Risky Driving and Aggressive Driving subscales is justified.

It was hypothesized that the 16PF TM (Tough-mindedness) scale would be significantly, positively correlated with both the DDDI Risky Driving and Aggressive Driving scales, and these hypotheses were not supported. There was, in fact, no relationship at all between the DDDI Risky Driving and Aggressive Driving scales and the TM scale (r's = .01 and .03, respectively, p < .01). This was difficult to understand given that the TM scale supposedly measures one's tendency to lack empathy (Russell & Karol, 1994), which should be related to aggressive, if not risky driving. However, the emphasis of the TM scale is apparently more centered on a general rigidity of thinking, which might include an inflexibility inclined toward being safe as easily as one inclined toward being risky, or to be kind as well as aggressive.

Given that the TM scale actually measures flexibility of thinking rather than a disposition

to be unsympathetic, it now makes sense that it was unrelated to the DDDI Risky Driving and Aggressive Driving scales. It was hypothesized that as the TM scale tended to measure a non-emotional construct, it should not be related to the DDDI Negative Emotional scale. This hypothesis was supported providing divergent validity evidence for the DDDI Negative Emotional scale. Similarly, as there was no assumption that cognitive rigidity is related to any form of dangerous driving, the non-relationship between the TM and DDDI Risky Driving and Aggressive Driving scales might also be interpreted as providing evidence of divergent validity to these DDDI constructs.

The 16PF IN (Independence) scale was hypothesized to be significantly and positively related to the DDDI Risky Driving and Aggressive Driving scales, and this turned out to be the case. Though the correlations were highly significant, the relationship was not strong (r's = .16 and .24, respectively, $p < .01$). The IN scale was said to measure an energetic life quality which might include these four characteristics: dominance and reluctance to submit; social daring and fearlessness; skepticism of others; and readiness to question the status quo (Russell & Karol, 1994). While the first three characteristics might be directly relevant to aggressive driving and the latter suggests a willingness to question laws and thus perhaps promote riskier driving, none have guaranteed relations. The failure to find a robust relationship between the IN and the DDDI Risky Driving and Aggressive Driving scales, may be because the IN scale does not measure a strong unitary concept.

It was hypothesized the 16PF SC (Self-Control) scale would be significantly, negatively correlated with the DDDI Risky Driving and Aggressive Driving scores, since a lack of self-control would seem to promote driving in a self-serving manner and also to be less inhibited in expressing derision. This hypothesis was supported, but to a lesser degree than was anticipated, with only moderately weak relationships (SC with DDDI Risky Driving, $r = -.27$, $p < .01$; SC with DDDI Aggressive Driving, $r = -.17$, $p < .01$).

The hypothesis that SC would not be significantly related to the DDDI Negative Emotional scale was not supported, but again some qualification appears warranted. The relationship was moderately significant, but weaker than the relationships between the SC and DDDI Risky Driving and Aggressive Driving scales (SC with DDDI Aggressive Driving, $r = -.14$, $p < .05$). Thus, it appeared that the SC, while purportedly measuring behavioral self-control (Russell & Karol, 1994), actually overlaps in some ways (and reasonably so) with emotional

self-regulation, which would explain the weak, but significant relationship between the SC and DDDI Negative Emotional scales.

It was hypothesized that the 16PF ES (Emotional Stability) scale would be significantly, negatively related to DDDI Aggressive Driving and Negative Emotional scales, due to conjecture that one who was less emotionally stable in general, would be more likely to experience negative affective states when driving, and thus be more likely to report higher levels of aggressive behavior. While the hypothesis was supported with the relationship between the ES and DDDI Negative Emotional scales (r = -.33, p < .01), there was only weak support for the hypothesis regarding the ES and DDDI Aggressive Driving scales (r = -.14, p < .05). As the DDDI Aggressive Driving scale taps behaviors specifically, the relationship may be weaker due to the focus of the ES scale on purely emotional content. Yet, there was also a failure to support the hypothesis that the ES and DDDI Risky Driving scales would be unrelated. This may have been due to the same reason mentioned above for the SC and DDDI Aggressive Driving scale relationship: that there is some significant emotional component to risky driving behaviors.

It was hypothesized that 16PF RC (Rule Consciousness) scores would be significantly, negatively related to the DDDI Risky Driving and Aggressive Driving scales, which turned out to be the case (r's = -.29 and -.20, respectively, p < .01). However, the hypothesis that the RC scale would not be related to the DDDI Negative Emotional scale, was not supported (r = -.18, p < .01). On further examination of RC scale item content (Russell & Karol, 1994), it was found that the domain measured actually tapped into emotional assessment of rules and authority.

For example, the RC item "If a bank were careless and didn't charge me for something, I'd feel…," clearly calls for an emotional response to the prompt, though this emotional response logically results in a behavioral outcome of either reporting an error or not. And, the item "I get annoyed when people insist that I follow every single minor safety rule," clearly relates to DDDI Negative Emotional item "I feel that passive drivers should learn how to drive or stay home," where a passive driver might easily be interpreted as someone who follows every single minor safety rule. This unforeseen relation between the two scales may well account for the failure to find support for the hypothesis.

It was hypothesized that the 16PF TN (Tension) scale scores would correlate significantly and positively with the DDDI Aggressive Driving and Negative Emotional scale scores, and there was clear support for both (r's = .35 and .24, respectively, p < .01). High scorers on the TN

scale are thought to be driven, high strung, and fidgety when made to wait (Russell & Karol, 1994), which fits well with negative emotionality when driving, and potential subsequent aggressive expressions. These characteristics might also cause one to take risks when driving in order to further perceived progress toward one' goal. This may explain the failure to find support for the hypothesis that the TN scale would be unrelated to the DDDI Risky Driving scale (r = .15, $p < .05$).

When hypotheses failed to be supported with regard to the DDDI Risky Driving and Aggressive Driving and 16PF scales, it was often the case that the personality concepts measured by the 16PF were more emotional in content than previously thought by the author. It was an error to believe the DDDI Risky Driving and Aggressive Driving scales would be largely free of emotional components, whereas dangerous driving phenomena are indeed likely to be highly convoluted in terms of behaviors, attitudes, beliefs, and emotions. The DDDI Aggressive Driving measures in behavioral domains largely, but actually links feelings about those behaviors on some items, rather than calling for a straightforward endorsement of actual behavioral frequency. Thus, the DDDI Risky Driving and Aggressive Driving scales are not as clearly unrelated to scales measuring emotional content, as was initially thought and implied by the hypotheses.

Actually, there was overlap between the DDDI scales on many of the variables with which it was compared. Post hoc it was noticed that divergent validity hypotheses had not been made for the measure as a whole. Thus, it was predicted that the DDDI scales would not be related to the following 16PF scales: Openness to Change (based on the lack of a relationship to its counterpart, cognitive rigidity), Infrequency (a 16PF internal validity check scale), Artistic, Conventional, Enterprising, Leadership Potential, and Creative Potential. The results largely supported the predictions, with some minor but interesting exceptions. The correlation coefficients are presented in Table 13, Appendix E. This evidence supported the view that the DDDI has divergent validity.

The PADS, STAXI, and IBS scale scores were all significantly correlated with all DDDI scale scores (see Table 12, Appendix E). Correlations between self-reported frequencies of risky and aggressive driving behaviors, negative emotions expressed while driving, and the DDDI, are presented in Table 14, Appendix E. There were significant differences between males and females, where males scored higher on the PADS, EPQV, IBS General Aggressiveness, Anger Expression, and Physical and Verbal Aggressiveness scales.

Dula & Ballard (in press) stated that while there were limitations to deriving generalizations from their work (i.e., being based solely upon self-report data and working from a relatively small and homogenous sample), the constructs examined were likely to be genuinely measurable and that given the robust relations among relevant variables, their results would likely be replicated in broader samples of drivers. This assertion was supported by the current data. Comparing the correlation matrices found in Tables 2, 3, and 4 in Appendix C, with those in Tables 10, 11, and 12 in Appendix E, the similarities are remarkable.

With regard to the PADS, there were similar mild drops in gender means in the present sample. With regard to the IBS scales, there were consistent drops in the present sample's correlation coefficients between all DDDI scales and the IBS Denial, General Assertiveness, and General Aggressiveness scales, ranging from one coefficient remaining the same as before, to a drop of .15 in four of the 12 relationships. On the other hand, correlation coefficients for the present sample increased between all DDDI scales and the IBS Anger Expression, Physical Aggression, and Verbal Aggression scales, ranging in magnitude from .01 on two of the 12 relationships, to a .19 increase in a single coefficient.

With regard to the relationships between the DDDI scales and the STAXI scales, variations in correlation coefficients ranged from a decrease of .12 in one figure in the present sample, to one figure remaining the same, to an increase of .13 in one relationship in the present sample. All the relationships in the present samples were significant versus all but 3 of 40 in the original sample, and all said relationships were in the same direction in both samples. This is interpreted as being evidence of consistent convergent validity for the DDDI.

Risky behaviors significantly correlated with all DDDI scale scores, except where noted, included: checking appearance in the mirror while driving (in the last two weeks; not significantly correlated with the DDDI Negative Emotional or DDDI Aggressive Driving scale scores); cutting off other drivers (in last two weeks); eating food while driving (in last two weeks); running red lights (in last two weeks); wearing a safety belt (in general; not significantly correlated with DDDI Aggressive Driving scale scores); speeding more than five miles per hour over the limit (in last two weeks); tailgating other drivers (in last two weeks); talking on the phone while driving (in last two weeks); tickets received (excluding safety belt violations; in last three years); weaving in and out of traffic (in last two weeks); and writing while driving (in last two weeks) (see Table 18).

The behaviors which were not correlated significantly (i.e., adjusting music, at-fault crashes, reading) with any DDDI scale, were not included in the summing which resulted in a demographic questionnaire risky driving total. Being on a five-point Likert scale ranging from "Never" to "Always," the safety belt usage item was reverse scored and added into the risky driving total for the demographic questionnaire. Each DDDI scale was more or less equally correlated with the demographic questionnaire risky driving total, with correlations ranging from .32 to .38 ($p < .01$).

As shown in Table 14, behavioral indicators of experiencing negative emotions while driving correlated significantly with all DDDI scale scores. These two indicators were cursing/yelling at other drivers (in the last two weeks) and honking one's horn at other drivers in frustration (in last two weeks). Being that there were only two items within the domain of negative emotions, these were left as separate variables rather than summed for a total negative emotional score. Aggressive behavior was classified as making rude gestures at other drivers, the frequency of which correlated significantly with all DDDI scale scores (see Table 14, Appendix E). Similarly, there were not enough aggressive indicators to create a total score, beyond the one behavior noted. Perceived negative behaviors directed by other drivers toward oneself were positively and significantly correlated with all DDDI scales (see Table 14, Appendix E).

It was also hypothesized that the DDDI subscale scores would be differentially correlated in a logical manner, with self-reported risky and aggressive driving behaviors, and negative emotional experiences. These hypotheses were variably supported. However, it was the case that when correlations were significant between one item and a DDDI subscale, there were similar significant relationships between the item and the other DDDI subscales as well. Notable exceptions regarding the similarity of strength and significance of the correlations did occur, lending some support to the hypotheses.

For instance, the item dealing with checking one's appearance while driving was correlated weakly, and positively, with the DDDI Risky Driving subscale ($r = .13$, $p < .05$) but not at all with the other subscales. This behavior can be conjectured to be at-risk, due to the fact that in checking one's appearance, one's attention is by definition divided from the task of driving. However, with regard to this item, the weakness of this relationship did little to foster a notion that there is a distinction between the DDDI Risky Driving and the other two DDDI subscales.

Somewhat stronger support for this distinction was found in the relationship between the DDDI Risky Driving subscale and the reported use of safety belts, where the DDDI Risky Driving subscale was related significantly and negatively with use of a safety belt (r = -.24, p < .01). Safety belt use was not at all correlated with the DDDI Aggressive Driving subscale, and was only weakly correlated with the DDDI Negative Emotional subscale (r = -.12, p < .05), indicating a possibly meaningful distinction for the DDDI Risky Driving subscale. This type of risky behavior not only puts oneself at-risk, but also others as one might be thrown from being able to control a vehicle. While few people are likely to view their own lack of safety belt use as potentially endangering others, it is risky nonetheless.

Other distinctively meaningful differences in relationships, were those relating to cursing/yelling at other drivers, where although the relationships were significant and positive for all subscales, the DDDI Negative Emotional and Aggressive Driving correlation coefficients topped that of the DDDI Risky Driving subscale (r's = .28 and .29 versus .20, respectively, p < .01). A similar, but more pronounced trend occurred with the item dealing with honking one's horn at other drivers out of frustration (r's .37 and .35 versus .18, respectively, p < .01).

Yet, while the distinction from the DDDI Risky Driving subscale was clear, the relationships between the items in question and the DDDI Negative Emotional and Aggressive Driving subscales were almost identical. Without additional items pertaining to negative emotionality and aggressive behavior on the demographic questionnaire, total scores were not possible. Most damaging to the hypotheses that DDDI subscales would distinguish themselves in correlational data, was that a risky driving total was derived for the demographic questionnaire items, but the DDDI Risky Driving failed to emerge as being distinctively more related to this total score than the other two DDDI subscales.

No hypotheses were derived with regard to perceptions of negative behaviors by other drivers toward oneself, because there was no way to be sure beforehand whether people would perceive others being negative toward them in enough instances to make for useful variables. However, it turned out that being honked at, being yelled/cursed at, and being negatively/rudely/obscenely gestured at by other drivers, were all significantly related with every DDDI scale. Again, there were not many meaningful distinctions between subscales, but in the categories of being honked at and gestured at, the DDDI Risky Driving and Aggressive Driving correlation coefficients were higher than with the DDDI Negative Emotional subscale.

While the trend was mild, it may be that people are more willing to admit to observing other people's negative behaviors, feeling the other driver to be more at-fault and obnoxious than oneself. Yet being the target of such negative signals might actually be indicative of poorer driving as perceived by others. Whether this is true cannot be known currently, and brings up relevant issues pertaining to the attenuation of anticipated correlational evidence in favor of construct validity.

It was hypothesized that when items from DDDI subscales (i.e., Risky Driving, Negative Emotional, and Aggressive Driving) were subjected to principle components factor analyses, each set would yield a single factor solution with all items loading at .40 or higher. This turned out to be the case for both the DDDI Negative Emotional and Aggressive Driving subscales, but not for the DDDI Risky Driving subscale. The latter had a three-factor solution with Eigenvalues greater than 1.0. However, in the first factor solution, all items loaded at between .41 and .72, lending support to the idea that the DDDI Risky Driving factor is in and of itself, a construct with strong internal linkages.

Not supported however, was the hypothesis that the same analysis, when applied to all items together, would yield three interpretable factors with strong loadings; namely that Risky Driving, Negative Emotional, and Aggressive Driving factors would emerge, each with component items loading at .40 or higher. As it happened, six factors emerged with Eigenvalues greater than 1.0. However, there was no clear interpretable organization to any but the first, which suggested a unitary dangerous driving factor.

One general issue that might provide some qualification for this finding of weak support for hypotheses which asserted that DDDI subscales would be distinct from one another is that the data are based solely on self-report, which has some obvious inherent limitations. Self-report survey data are bound to be imprecise due to memory distortions, and the present demographic questionnaire required recall of a variety of behaviors for the previous two weeks. Many of the behaviors queried in the demographic questionnaire are unremarkably common in the course of daily driving and hardly warrant one being cognitively aware enough of them to store such occasions in long-term memory. Thus, forgetfulness is likely to be a major factor in the report of such behaviors. This is the main rationale for designing Study Four, where drivers were prompted to mark the presence of any behavior/emotion/event that occurred, immediately after a driving trip.

Another major issue mentioned above, which also may attenuate the lack of strong findings in support of the validity hypotheses, is the presence of social desirability biases where respondents address items requiring admission of negative behaviors and/or traits. Lajunen et. al (1997), stated that socially desirable responding is comprised of two types of impression management: one related to deceiving others and one related to deceiving oneself in the way of favorably biased but honestly held self-descriptions (Paulhus & Reid, 1991). Paulhus (1986) observed that healthy people are often prone to self-deceptive positivism. Of course, it is difficult to sort self-deception from motivated impression management in the assessment of personality with regard to prediction of behavior. While deceiving others is not as likely in this type of research as there is no extrinsic reward for doing so, deceiving oneself by presenting a more positive history than is 100% true may be quite common and could have had a dramatic impact on the type of data presented in this study.

Selective attention to positive aspects of self, lack of attendance to disconfirming information, and/or positively biased flexible self-presentation, are well documented phenomena found in the social-cognitive literature (e.g., Fiske, 1995; Jones & Pittman, 1982; Ogilvie, 1987; Sedikides & Strube, 1997; Swann, 1987; Wood, 1989). Some people may in fact use self-report measures to facilitate self-verification of positively held self-schemas, thus enhancing self-views while providing supposedly objective data for researchers. It may be possible that such data enhance one's self-view because the measures are explicitly supposed to be answered honestly and objectively, and with a skewed presentation provided unconsciously, it may allow for an interpretation that one has been very forthright when in fact, that may not be the case. While self-presentation issues will not be overcome in the present body of work, the implication for future research is clear and challenging: there would be great value in developing sound methods for covertly assessing socially desirable responding within the context of measuring dangerous driving phenomena.

Study Two Methods

Purpose and Hypotheses

The purpose of this study was to establish four-week coefficients of stability for the DDDI Dangerous Driving, DDDI Negative Emotional Driving, DDDI Aggressive Driving, and DDDI Risky Driving scales. As the three subcomponent constructs of dangerous driving are

theorized to be relatively stable propensities, it was hypothesized that test-retest correlation coefficients would reach .70 for all DDDI scales.

Participants

Participants included 30 undergraduates from Virginia Tech, a university in southwestern Virginia. Participants received extra credit points for a psychology class for their participation in this research. The average age was 18.6 years, ranging from 18 to 21. Females accounted for 76.7% ($N = 23$) of the sample and males made up 23.3% ($N = 7$). Caucasian American participants made up 86.7% of the sample, 10% were Asian Americans, and making up 3.3% was a Hispanic American.

Procedures

Participants came to two testing sessions, spaced exactly four weeks apart from one another. They completed an informed consent form and then the DDDI and a demographic questionnaire. In order to maintain confidentiality, the last four digits of participants' social security numbers plus the first two letters of their mothers' first names, were used to track individual scores from Time One and Time Two. This tracking code seemed reasonable as the information should be consistent at both administrations.

Participants received one extra credit point for coming to the first administration and two points for returning for the second administration. Participants were sent an e-mail message to prompt them to return to the second administration. Each session lasted less than 45 minutes.

The DDDI Total and subscale scores from Time One and Time Two were correlated as an index of test-retest reliability. Additionally, several self-estimated driver behavior items from the demographic questionnaire were correlated between session one and session two to check the stability of the behavioral estimations.

Study Two Results and Discussion

Sixty three participants filled out surveys at Time One, whereas the final number of participants at Time Two was 30, yielding an attrition rate of 52.4%. There were only 15 male participants at Time One, yielding an attrition rate of 53.3%. Similarly, with 48 females in the first sample, their attrition rate was 52.1% for Time Two. Thus, attrition rate did not vary significantly as a function of gender. The correlation between DDDI Risky Driving scores at Time One and Time Two was .76 ($p < .001$); between DDDI Negative Emotional scores was .68

($p < .001$); between DDDI Aggressive Driving scores was .55 ($p < .01$); and between DDDI Total scores was .73 ($p < .001$).

The means, standard deviations, minimum and maximum values, and correlation coefficients of the DDDI scales, risky and aggressive behaviors, and negative emotions are summarized in Table 19, Appendix F. Means and standard deviations for DDDI scale scores were not significantly different between Time One and Time Two. In this sample, which was predominantly female, no significant gender differences emerged in any of the DDDI scale scores at Time Two. For one participant, there was a floor effect for the DDDI Aggressive Driving scale at Time One where a score of seven was obtained. No ceiling effects were noted for any of the DDDI scales. Correlation coefficients for behaviors and DDDI scales varied somewhat between the Study One sample and the Time One assessment.

Means for all self-reported behaviors and perceived negative behaviors of others were remarkably consistent from Time One to Time Two, as were the means for each DDDI scale. Coefficients of stability ranged from .55 to .76 and represent significant correlations. The number of participants from Time Two appeared to be too small to make use of correlating the DDDI scales with the various reported behaviors. The range was so restricted on many of the behavioral items that with only 30 participants there was not enough power to detect meaningful relationships.

However, with regard to self-report data criticisms mentioned above, the consistency seen in this small sample from Time One to Time Two lends credence to the idea that if behaviors and scales were not responded to 100% honestly or with 100% accuracy of memory, the inference may readily be drawn that the data seen in Study One were reported as reliably as might have been possible given the conditions.

As optimistic as that inference may be, it requires qualification. Indeed the lack of a greater number of participants, and attrition of slightly more than 50% of the original sample, limits the inferences that can be drawn from the data. The self-selection of persons into the Time Two sample may have in fact represented a sub-sample of highly mindful participants who struggled against self-presentation biases to produce the most accurate data they felt themselves capable of rendering. While reminders were provided, at the very least it can be said that in remembering to return at Time Two, participants were demonstrating aspects of a high quality of memory that may not have been as present with those who failed to return, though it is not

possible to determine why participants did not return. One might also make the case that test-retest correlations could be inflated due to participants returning at Time Two being higher in conscientiousness in general. Conversely, it might be that there is no effect of conscientiousness on one's DDDI scores.

Using the larger sample of 63 participants from Time One of the present study to run correlational analyses similar to that in Study One, comparisons were made. With some notable exceptions, similar results were found (see Table 20). The DDDI scales had very similar inter-correlational numbers in both samples, providing evidence that the DDDI has consistent internal reliability across samples. Differences in correlational strength between the DDDI scales and behaviors in Study One and the Study Two Time One samples were likely due to range restrictions in the Study Two Time One sample.

The relatively common occurrence of relevant events and the estimation of their occurrence as a summary of two weeks, one month, and three years worth of previous behavior, by necessity limits the accuracy of estimations. For some, behaviors occur too often to make an impression, and for others, behaviors occur too infrequently to be remembered. Memory is subject to bias and deterioration under normal conditions, in terms of unconscious motivation for a positive self-view and failure to move information from short term to long term memory (which also deteriorates over time and is subject to distortion depending on memory triggers). Thus, Study Four was designed to avoid such memory biases and deteriorations.

Study Three Methods

Purpose and Hypotheses

This study was designed to establish predictive validity and further construct validity for the DDDI Dangerous Driving, Risky Driving Negative Emotional, and Aggressive Driving scales. It was hypothesized that after controlling for video-game liking, video-game learning, and physical comfort, DDDI subscale scores would be significantly and positively correlated with video-game and verbal behaviors indicative of risky, negative emotional, and aggressive driving. It was hypothesized that of all predictor variables in the step-wise regression, the criterion-corresponding DDDI subscales would account for the greatest amount of significant variance in behaviors and negative emotional experiences. It was also hypothesized that of all predictor variables in the step-wise regression, the DDDI Total scale would account for the greatest

amount of significant variance in the total dangerous driving scores obtained while playing the video-game.

Participants

Participants included 37 undergraduates from Virginia Tech, a university in southwestern Virginia. Students received extra credit points for a Psychology class and $5.00 for their participation in this research. There were 14 female (37.8%) and 23 male participants (62.2%). The mean age was 20.03, ranging from 18 to 27. Two participants were African American (5.4%), three were Asian American (8.1%), 26 were Caucasian American (70.3%), two were Hispanic American (5.4%), two were Citizens of a Foreign Country (5.4%), and two identified as Other than listed categories (5.4%).

Procedures

Participants were told they would compete for a $5.00 cash prize in a driving video-game, where their performance was knowingly videotaped and their opponent was unknowingly a confederate research assistant. After purchasing and setting up a Play Station II video-game system in a soundproof booth, several games were piloted by research assistants. As a result, the Midnight Club: Street Racing game by Rockstar Games was chosen. It had the most realistic driving scenes and adjustable settings for traffic and pedestrian density, vehicle type, and time of day. All settings were held constant across participants.

The game was put on free-run mode where one could simply drive without other automatic elements of the game operating (e.g., time limits, imposing scoring on auto-generated video-game goals, and having video-game generated drivers automatically challenging one to a race). However, on-screen video-game generated vehicles and pedestrians operated in a random fashion across all games. For example, on-screen drivers would do such things as pull over into a participant's lane without warning, hit the back of the participant's car at a light, and go slowly in front of a participant prompting him/her to pass. Pedestrians would occasionally wander into the road, but would jump out of the way to avoid being hit.

The background was New York City and a medium traffic and pedestrian density was set. The game was set for windshield view in order to simulate looking directly over the steering wheel. There was no peripheral vision outside of that which could be seen outside of the windshield, but participants could press a button to briefly see the screen as a real-time, rear-view mirror. Figure 1 shows the view of a driver in typical driving mode.

A route was plotted in which participants were instructed to drive, and a hard copy of the map with an outline of the route was posted beside the screen. This matched an onscreen map that was constantly displayed to participants, which rotated orientation with the vehicle as it was driven. Along this predetermined route, road configurations varied from small one-way streets, to open four-lane, divided median highways. To control for differences in seeing the few posted speed-limit signs, all participants were instructed that regardless of the posted speed-limit, they were to drive as though there was a constant maximum speed-limit of 45 miles per hour.

Figure 1: Onscreen Driver's View of Game

Participants signed up for the study online, where open slots were listed in pairs of identical times, giving the impression that two participants would arrive at the same time. Researchers randomly added false names to the first or second of each pair of slots, to eliminate the possibility of two real participants signing up for the same time slot, and to enhance the illusion of participant pairings.

To control for any differences of gender that might play upon a participant's willingness or perceived ability to compete, the confederate was always the same gender as the participant. The research assistant team thus included one male and one female. The two were seated at a table until the participant came, whereupon the assistant of the opposite gender would automatically assume the role of research coordinator, announcing that they could now begin as the second participant had arrived.

The coordinator told them they would complete an informed consent form, the DDDI, and the demographic questionnaire prior to being videotaped while playing the competitive driving video-game. The confederate was apparently escorted into another room to fill out

his/her surveys, under the guise of promoting mutual confidentiality in answering the items. A set of pre-filled out surveys was in the second room so that when the participant completed his/her measures, the confederate could come out shortly thereafter having apparently finished his/hers as well.

The coordinator thanked them both for filling out the surveys and then explained that they would be going to another room where the driving video-game booths were set up. Both participant and confederate were led into an adjacent room with two different sized sound-proof booths and they were told the booths they would use had been pre-selected, based on which one signed up for the first of the two slots. One booth contained: an adjustable seat, an adjustable steering wheel, movable gas and brake pedals, a window in front of the seat (through which the monitor showing the game screen was displayed), infrared headphones to hear the game noises (where the theme music had been turned off and only driving sounds were audible), a small reading light which illuminated a map plotting the prescribed route the participant was to follow, and a video camera set up on a shelf over and behind the participant's right shoulder. The contents of the other, larger booth could not be seen and it contained no such equipment, but participants were led to believe that the same type of gaming and recording systems were inside.

The coordinator then led them to the smaller booth and asked the participant to sit in the seat, whereupon the assistant would explain the details of the race rules and the use of the driving controls, while the confederate looked on appearing to be receiving the instructions as well. The rules included obeying all normal traffic laws, following the map explicitly, driving under 45 miles per hour at all times, and to say out loud "right" or "left" as a signal that they were about to make a turn or change lanes. Once finished with the explanations, the coordinator always directed the following question to the participant first, seemingly in an off-hand way: "Do you have much experience playing these kinds of video-games?" No matter the answer, the coordinator then looked to the confederate and asked: "and you?" The confederate would reply "about the same as him/her," implying that their task-relevant skill levels were roughly equivalent.

Both were then told that after a five minute practice run, they would engage in a series of three timed, five-minute races, where the object was to go as far along the course as possible, following all traffic and game rules, and to accrue as little damage to their vehicle as possible (i.e., to avoid collisions which registered cumulatively on a gauge, though it was not in fact a

precise measuring device). They were simultaneously told by the coordinator that s/he would tell them when to start, and using a stop watch, would call the race over at the end of five minutes. They were told that at the end of each race, the coordinator would determine the winner by checking the final vehicle locations on the on-screen map, and by looking at the on-screen damage meters, would see who had gone the furthest with the least amount of accumulated vehicle damage. Also, they were told the winner of two out the three races would get the $5.00 prize.

The confederate was asked to wait in the larger booth for the coordinator to come adjust the controls, as the coordinator turned on the video camera and the participant got comfortable and began his/her practice run. After seeing the confederate enter the other booth, the door was closed on the participant's booth, to the point it rested on a small cord connecting the Play Station to the controller devices. This cord allowed a crack of light in from the outside and enabled the participant to hear the researcher call the start and stop of the races. A black plastic sheet was lowered over the outside of the door to eliminate outside light as a possible source of distraction. A black plastic sheet had been attached to the edges of the 27-inch television serving as the video-game monitor, blocking out the remaining sources of outside light.

Before each race, a dry-erase board was used to mark the number of the race on the videotape. After the first race, the coordinator pretended to check the confederate's on-screen information, and then the participant's. The coordinator told the participant that s/he lost the first race, but that "it was really close," and s/he was reminded there were still two chances to win. Upon the conclusion of the second race, the participant was informed s/he won and that the last race would determine the winner of the $5.00 prize. After the third race, the participant and confederate were informed that the participant won the race and the $5.00 cash prize, and were thanked for their participation (see Appendix G for the full procedural protocol).

To assess participants' emotional states, they were given a small questionnaire prior to the practice run, before each race, and after the last race. They were asked how they felt regarding their anger, frustration, physical comfort in the booth, liking the driving video-game, and how well they thought they were learning the game. Each item allowed for answers on a seven-point Likert scale with opposing anchors. After the third and last race, participants had additional questions assessing feelings of claustrophobia, feelings of having their behavior recorded by a camera, whether and how much alcohol and marijuana they may have used in the

previous 24 hours, and prompting them to state in writing their perceptions of the purpose of the study (see Appendix H for full copies of the short questionnaires).

A trained research assistant later analyzed the videotaped sessions and coded onscreen behaviors according to risk type, which included: total number of separate instances of speeding greater than five miles per hour over the stated limit, total number of red light runs, total number of collisions, total number of weaving instances (defined as total number of crossing lane lines without clear reason, total number of instances of going off the road, and total number of lane changes), and total number of turns made without signaling. Frequency totals served as the criterion measure for risky behaviors.

On-task, in-room verbal behaviors were coded as either aggressive or non-aggressive (e.g., cursing at onscreen vehicles vs. commenting on the driving scenario) and frequencies were calculated. Sums of aggressive external verbalizations (i.e., negative statements directed toward others and objects) served as the criterion for aggressive driving. And, the sums of items checked on the short questionnaire (i.e., anger and frustration) along with aggressive internal verbalizations (i.e., negative self-statements) served as the criterion measure for negative emotional experiences.

Study Three Results and Discussion

A manipulation check was performed to determine whether participants were aware that the race between them and the confederates was not genuine. Only one participant gave a response indicating that this might be the case. In response to the item "What do you feel was the purpose of this study?" on the short questionnaire administered after the last race, the participant wrote: "To see how racing or pressure effects driving abilities - to see if tasks affected abilities. I wouldn't be surprised if the experimenter telling us it was close was staged. The other driver was probably part of the study." There was no evidence that any other participants were aware the study was not a genuine race between two legitimate participants.

The realism of the driving setting was of relatively good quality, with accurate and proportional animated graphics and real-time game controller response. The various situational factors, such as perception of competition where a prize could be won and the dynamic on-screen driving interactions, combined to produce emotional and behavioral reactivity in participants. Many participants were observed making comments on their own performance and toward the video-game generated drivers and obstacles. Examples of such comments included: "Screw it,"

in response to a realization that a light was turning red and deciding to run it; “Brakes are good in this sucker,” commenting on the game’s foot pedals; “Oh crap, no no no don't hit me!” responding to an encroaching vehicle; “I'm too tense, I need to calm down,” during the second race after being told that s/he lost the first race; and, “Shit a brick sideways!” responding to an on-screen vehicle’s behavior.

Total race times (all three races together, each targeted to be exactly five minutes) ranged from 732 seconds (12.2 minutes) to 937 seconds (15.62 minutes) with a mean of 902.34 seconds (15.04 minutes) and standard deviation of 128.56 seconds (2.14 minutes). Research assistants were well trained. The timing of the races was a crucial aspect of the study, as all participants needed to have driven an equal amount of time to make subsequent comparisons legitimate. Total race times were well controlled given a target of 15 minutes total and finding the range to have been between 12.2 and 15.62, where the mean was 15.04 minutes.

Every race was independently coded by a trained research assistant following a written protocol. Of the 37 videos, nine were randomly selected to be coded by a second research assistant as a reliability check. Thus, 24.3% of the total videos were checked for coding reliability. The vast majority of in-booth physical behaviors could not be observed on videotape as video capture was limited to the area immediately surrounding the monitor. Thus, physical in-booth, off-screen behaviors were not coded. Reliability was computed by dividing the smaller number of specific observations by the larger, to yield a percent agreement coefficient (where an identical number of observations of a specific behavior by both observers yielded a value of 1.0, indicating 100% agreement). Reliability coefficients for on-screen video-game behaviors ranged from .62 to 1.0, with a mean reliability for all behaviors of .89 (SD = .10).

Individual reliability coefficients for on-screen video-game behaviors are listed immediately following the associated behaviors (N = 9): Hitting a Vehicle (.69); Hitting a Person (1.0); Hitting a Wall (.89); Hitting Miscellaneous Objects (1.0); Total Collisions (.85); Red Lights Run (.77); Red Lights Safely Stopped at (.93); Total Red Lights Encountered (.95); Number of Times Speeding Between 50 and 59 MPH (.89), Between 60 and 69 MPH (.84), Between 70 and 79 MPH (1.0), Between 80 and 89 MPH (1.0), and 90 MPH+ (1.0); Total Number of Speeding Events (.91); Total Time Speeding (measured in seconds) (.88); Total Time Racing (all three races together) (.99); Total Number of Lane Changes (.83); Total Number of Lane Deviations (not actual lane change) (.62); Total Number of Times Off Edge of Road (.87);

Total Number of Weaving Events (.76); Total Number of Safe Turns (announcing "turning right" or "turning left" in lieu of not having turn signals) (.94); Total Number of At-Risk Turns (.87); and, Total Number of Turns (.95). Ranges of individual collisions and lane-leaving behaviors were restricted, such that meaningful analyses could only be derived when these variables were summed to arrive at Total Hits and Total Weaving scores.

Reliability coefficients for in-booth verbal behaviors ranged from .56 to .94, with a mean reliability for all behaviors of .76 (*SD* = .14). Individual reliability coefficients for in-booth verbal behaviors are listed immediately following the associated behaviors (*N* = 9): Total Aggressive Utterances (.78); Total Aggressive Utterances Directed at Oneself (.56); Total Aggressive Utterances Directed at Obstacles/Objects (.71); Total Aggressive Utterances Directed Toward Other Video Game Generated Drivers (.94); and, Total Number of Indiscernible Utterances (.81).

Risky Driving Video Game Behavior Totals were derived by summing the total number of collisions, total number of red lights run, total number of speeding incidents, total number of weaving incidents, and total number of at-risk turns. Negative Emotional Video Game Experience Totals were derived in a similar fashion by summing the total number of self-directed aggressive utterances, total of all anger ratings (including prior to practice run rating, all three pre-race ratings, and the last post-race rating), and the total of all frustration ratings (in the same fashion as noted for anger ratings). Aggressive Driving Video Game Behavior Totals were derived by summing two variables: the total number of aggressive utterances directed at obstacles/objects, and the total number of aggressive utterances directed toward other video-game generated drivers. Dangerous Driving Video Game Behavior Totals were derived by summing the total values from all of the above totals. For both speeding and red-light running, percentages of at-risk behaviors were determined to further measure their occurrence. Correlation coefficients were significant, or approached significance, between all Video Game Total scores and at least three DDDI scales.

The following three variables were partialed out of the correlation matrix due to their likely extraneous influence on variables of interest: 1. Average Liking of the Game: based on Likert ratings of 1 to 7, from "Love it" to "Hate it," respectively, assessed before the practice run as an anticipatory emotion and before each race; where *M* = 3.47, *SD* = 1.07, with average scores ranging from 1 to 5.50; 2. Average Learning of the Game: based on Likert ratings of 1 to 7, from

"Very well" to "Not at all well," respectively, assessed in the same fashion as noted above; where $M = 3.82$, $SD = 1.29$, with average scores ranging from 1.5 to 6.25; and, 3. Average Physical Comfort in the Driving Booth: based on Likert ratings of 1 to 7, from "Completely comfortable" to "Couldn't be more uncomfortable," respectively, taken in the same fashion as noted above; where $M = 2.74$, $SD = 1.22$, with average scores ranging from 1 to 6. Subsequent correlation coefficients were significant or approached significance, among all variables of interest and at least two DDDI scales, except for At-risk Turn Total and At-Risk Turn Percentage. See Table 21, Appendix I, for a complete listing of correlation coefficients.

Separate step-wise regression analyses were conducted for each criterion (i.e., frequencies of risky driving behavior, aggressive behavior, negative emotional experiences, and sum totals of categorical behaviors/emotions) for summed race performances on the video-game. Predictor variables included: age, gender, number of years driving experience, average number of miles driven per week, average number of hours driven per week, average number of rush hours experienced per week (on an seven-point ordinal scale ranging from "never" to "twice a day"), number of tickets received in last three years (excluding safety belt violations), number of crashes caused in the last three years, number of estimated times driving under the influence, self-rated level of driving skill/expertise (on seven-point Likert scale ranging from "could not be worse" to "could not be better"), and all DDDI scales.

All three categories of dangerous driving (i.e., risky driving behaviors, aggressive behavior, and negative emotional experiences) were tallied to produce a total dangerous driving score. The same predictor variables were regressed onto the total dangerous driving score. The percentage of variance accounted for in criterion variables by different models ranged from 13.6% to 47.7%. See Tables 22 through 31, Appendix I, for complete regression analysis results pertaining to each criterion variable.

The DDDI Negative Emotional subscale was the only significant predictor accounting for of the variance in Average Negative Emotional ratings and Total Aggressive Driving behaviors, accounting for 17.9% and 14.4% of the variance, respectively. With regard to Total Dangerous Driving behaviors and emotions, the Negative Emotional subscale accounted for 35.6% of the variance, with skill level (again inversely related to the criterion, and significantly so in this case) accounting for an additional 12.1% of the variance. Again, the Negative Emotional subscale was the only significant predictor for the criterion variables of Total Collisions, Total Red Lights

Run, and Total Aggressive Utterances, accounting for 13.6%, 30.1%, and 14.8% of the variance, respectively.

The DDDI Total scale alone accounted for 26.6% of the variance in Total Speeding Incidents. The DDDI Total accounted for 29% of the variance in Total Risky Driving behaviors, with perceived driving skill being inversely related to the criterion and accounting for an additional 9% of variance. Similarly, the DDDI Total scale accounted for 25.3% of the variance in Total Weaving Incidents, with Skill Level positively related to the criterion and accounting for an additional 13.9% of the variance.

The coding of participant behaviors was exceptional given the difficulty of defining variables operationally, the length of requisite per-participant observation, the sometime ambiguous video capture of a monitor filmed through glass window, and the sometime indecipherable sound recordings. The quality of coding was enhanced by being able to pause and rewind the video when necessary and having research assistants use a worksheet with operational definitions written out, to record their observations. The results of an inter-rater reliability check having been performed on 25% of the videos lends credence to the assertion that the observed behaviors were well defined. Coding for on-screen behaviors averaged 89% agreement between independent raters, with an average of 75% agreement for coded verbal behaviors. Unfortunately, physical in-booth behaviors could not be observed on videotape.

While quality data was diligently collected, the limitations of this type of driving simulation must be acknowledged. The use of a video-game where performance must be video recorded and later coded for every specific behavior is laborious and subject to a considerable level of unreliability. A relatively recent high-tech development that will help the study driver behavior in a more realistic manner, are lab-based driving simulators. As mentioned above, Ellison-Potter et al. (2001) used a simulator called the STISIM Drive to study aggressive driving. The simulators made by this company have such features as: three large monitors arranged around the driver's direct and peripheral vision, a rearview mirror screen embedded on the front monitor, full-size steering wheels, brake and accelerator pedals, automatic or manual transmissions, realistic sounds, and active steering columns that give the realistic feel of the car pulling in turns. In addition to increased realism of the driving environment, on-screen driving behaviors can be recorded with precision.

With a professional quality simulator, researchers can consistently manipulate such variables as: traffic (density and generation of specific interactive events), pedestrian behavior, road type (including rural and/or urban), number of red lights/stop signs/intersections appearing, police presence, speed-limit change and sign placement (with automatic recording of response to such changes), weather conditions (rain and fog are possible), and a host of other details. Ellison-Potter et al. (2001) recorded such behaviors as the number of pedestrians hit, the number of vehicles hit, the number of off-road collisions, and the average velocity of the vehicle at fixed intervals. Such innovations will result in highly reliable driving research that is likely to have superior internal validity. In fact, the present author was involved in obtaining a grant that recently resulted in the installation of a STISIM Driving Simulator in the Virginia Tech Department of Psychology. Preparations are underway to allow for a relatively faithful replication of the present study using the simulator.

However low tech the video-game simulation may have been, it was successful in generating meaningful scores in the areas of risky, negative emotional, and aggressive driving. Ross and Nisbett (1991) related that the ability for scientists to predict behavior in novel situations based on knowledge of individual differences is actually quite limited. The "predictability ceiling" is the term used to denote the concept that it is rare to find a correlation greater than .30 between individual differences and measured behavior in a situation that supposedly assesses a personality dimension. While a .30 correlation can convey important information, the majority of the variance is unexplained. Presumably, situational forces account for a great deal of that remaining variance, and it appears the situation was well controlled in this study as significant correlation coefficients ranged from .32 to .63.

Significant relationships were all in the predicted directions. The only variable which failed to produce these results was At-risk Turns, which suffered from restricted range. Essentially, the participants remembered to follow instructions to announce the direction of their turns prior to making them. This was notable given all the information they were taking in: learning to drive a novel video-game, learning an on-screen route, adjusting their position for maximum comfort, racing against a clock to win a prize, and perhaps even thinking about the confederate's performance. However, the complexity of the potential driving routes was such that one could easily become confused since there were no signs labeling the street names, with a multitude of roads stemming off any one course. Therefore, turning was minimized in the game,

resulting in an average of at-risk turns being 0.52, (*SD* = 1.14), ranging from 0 to 6. The number of planned turns on the route was four and participants still got off track and had to figure out how to get back on course. The average number of turns made by participants was 4.28 (*SD* = 1.37), ranging from 1 (a participant who did not follow directions in the first race) to 8.

All other variables of interest were significantly related to DDDI scales, and in regression equations, DDDI scales frequently accounted for highly significant amounts of variance in recorded behaviors despite a great amount of otherwise presumably relevant predictor variables. Tickets received in the last three years and self-rated driving skill levels were the only non-DDDI variables to significantly explain behavioral variance. However, the DDDI scales did not consistently predict variance differentially as hypothesized.

The DDDI Negative Emotional scale accounted for significant variance in almost all behavioral categories, including negative emotional experiences in the video-game which was as predicted. In other categories, if the constructs were measured accurately, the DDDI Risky Driving and Aggressive Driving subscales should have been significant predictors to some degree. In the relevant analyses, when the DDDI Total was eliminated from the predictor variable list, the DDDI Negative Emotional subscale emerged as the significant predictor variable. The DDDI Negative Emotional subscale incurred only a negligible drop in the total amount of variance accounted for previously by the DDDI Total scale. This is a noteworthy finding in that it suggested the entire DDDI is not necessary for predicting dangerous driving behaviors, and moreover that the subscale distinctions may not be as meaningful in practice as previously thought.

Study Four Methods

Purpose and Hypotheses

The purpose of this study was to establish predictive validity and further construct validity for the DDDI Dangerous Driving, DDDI Negative Emotional Driving, DDDI Aggressive Driving, and DDDI Risky Driving scales. It was hypothesized that scores on the relevant corresponding DDDI subscales would be correlated significantly and positively with number of self-recorded risky and aggressive behaviors, and number of negative emotions reported after driving. It was hypothesized that of all predictor variables in the step-wise regression, criterion-corresponding DDDI subscales would account for the greatest amount of significant variance in self-recorded behaviors and negative emotional experiences. It was

hypothesized that of all predictor variables in the step-wise regression, the DDDI Total scale would account for the greatest amount of significant variance in the total dangerous driving scores.

Participants

Participants included 20 undergraduate and four graduate students from Virginia Tech, a university in southwestern Virginia. For their participation in this research, undergraduate students received extra credit for a Psychology class. Graduate students did not receive extra credit, but were entered along with undergraduates in a raffle for cash prizes. Demographic data were as follows: there were 17 female participants (70.8%) and 7 males (29.2%). The mean age of participants was 21.71 years, ranging from age 19 to 27; two participants were African American (8.3%), one was Asian American (4.2%), 20 were Caucasian American (83.3%), and one was Hispanic American (4.2%). The estimated number of hours driving per week reported by participants, ranged on average from 1 to 20 hours ($M = 5.44$, $SD = 4.27$).

Procedures

Participants filled out the DDDI and demographic questionnaire either individually or in small groups. They were then trained to assess their behavior and emotional experiences while driving and to quickly fill out a simple corresponding checklist called a driving diary (see Appendix J). The driving diary checklist prompted simple, accurate estimations of the frequency of various common aggressive and risky driving behaviors, and negative emotional experiences incurred during the day's driving, as well as some positive experiences.

Participants were instructed to drive as they would ordinarily and to fill out a corresponding column in the driving diary checklist after completing a trip, which was operationally defined for them as being from the starting point to the ultimate intended destination. The definition of a trip was clarified with examples like the following: "If you are going to a restaurant and you stop for gas on the way, do not count the gas stop as the end of a trip; count only reaching the restaurant as ending the trip." Likewise, "If you are going to a gas station only, then reaching the gas station would be the end of the trip." To account for longer distances, the following example was given, "If you are making a long-distance trip out of town to a motel or somebody else's home, reaching the motel or home would mark the end of the trip, regardless of any minor stops on the way such as for using the restroom, eating, or getting fuel."

Participants were asked to fill out driving diary checklists representing eight trips each,

over a two-week period. Participants turned in driving diaries when finished. Each driving diary checklist turned in served as a raffle ticket for the participant, for eight $25 bonus prizes. The monetary awards were offered as an incentive to encourage drivers to punctually fill out and return their driving diary checklists. Driver behaviors and emotions were marked only once if an occurrence happened within a category and these were averaged across all trips a participant made during the project. Other variables recorded included: weather and traffic conditions, mileage, date, and trip duration.

Separate step-wise regression analyses were performed on each of the criterion variables (i.e., summed risky driving behaviors, and negative emotional and aggressive behaviors while driving). Predictor variables included: age, gender, number of years driving experience, average number of miles driven per week, average number of hours experienced per week, average number of rush hours driven in per week (on an seven-point ordinal scale ranging from "never" to "twice a day"), number of tickets received in last three years (excluding safety belt violations), number of crashes caused in the last three years, number of estimated times driving under the influence, self-rated level of driving skill/expertise (on seven-point Likert scale ranging from "could not be worse" to "could not be better"), and all DDDI scales.

Relevant reported behaviors and emotional experiences were averaged to produce a Total Risky Driving score, Total Negative Emotional score, and a Total Aggressive Driving score per participant. Relevant individual behaviors and/or emotional experience reports from all three categories of dangerous driving (i.e., risky driving behaviors, aggressive behavior, and negative emotional experiences) were averaged to produce a Total Dangerous Driving score, onto which the same predictor variables were regressed.

Study Four Results and Discussion

Participants varied greatly in terms of the amount of trips on which they recorded data. However, the driving diary checklist data appeared to be relatively complete per trip. This self-report method appears to be an improvement to self-reported data collected by prompting for retrospective estimations of behaviors covering a particular time period. There was adequate variation on the majority of variables, and a wide range of trip times and distances.

Participants turned in driving diaries which represented between a minimum of 7 and a maximum of 23 trips per person ($M = 16.12$, $SD = 4.70$). These trips represented a grand total amount of driving time that ranged from 60 minutes to 1,105 minutes or 18.42 hours ($M =$

339.63, *SD* = 299.84). Grand total distances for all trips ranged from one mile to 980.8 miles (*M* = 247.19, *SD* = 325.13). Participants' data were averaged for the number of trips each recorded, to provide a basis of comparison between subjects.

The average time logged per participant ranged from 6.38 minutes to 60.53 minutes (*M* = 20.54, *SD* = 17.11). The average distance logged for each participant ranged from 0.1 mile to 55.96 miles (*M* = 14.50, *SD* = 18.70). Various individual behaviors and emotions were significantly correlated with the DDDI scales and are presented in Table 32, Appendix K. Weather and traffic conditions, mileage, date, and trip duration were not significantly correlated with any DDDI scales.

The hypotheses were supported that scores on the relevant corresponding DDDI subscales would be significantly and positively correlated with frequencies of risky and aggressive behaviors, and negative emotions reported after driving. However, as can be seen in Table 40, significant correlations did not emerge with seven variables, and with six variables, correlations only approached significance. This is likely due to the low number of participants, evidenced by a failure for the DDDI Aggressive Driving subscale to correlate significantly with the DDDI Risky Driving subscale, which has never been the case with larger sample sizes (i.e., in neither the present work nor the original Dula and Ballard in press sample). Additionally, there were no significant relations between traffic and weather conditions, trip mileage, and trip distance, and the DDDI scales.

Yet, given the lack of a large number of participants, the results suggest the DDDI is associated with some risky and aggressive driving behaviors and negative emotions, particularly those felt toward others. Still, there was a lack of significant relationships in some variables that theoretically should have been related to DDDI scales. For instance, the only negative self-emotion significantly correlated with the DDDI was feeling in a hurry, which was correlated moderately highly with the DDDI Negative Emotional subscale, yielding some mild evidence of predictive validity in this domain. With regard to individual behaviors and emotions, correlations were again not always clearly differential in terms of their specificity with DDDI scales.

Exceptions to this observation included the strong positive correlation between the DDDI Risky Driving subscale and the failure to use a turn signal prior to turning (r = .60, $p < .01$). The DDDI Risky Driving scale also stood out with moderately strong correlations with tailgating (r = .42, $p < .05$), rolling through a stop sign or a late yellow light (r = .54, $p < .01$), and Total Risky

Driving scores ($r = .61$, $p < .01$). There was a trend toward a stand out correlation between the DDDI Risky Driving and pulling out in front of another vehicle without adequate room to do so ($r = .34$, $p < .10$). The separation of the DDDI Risky Driving from the other two subscales in its relation to these variables, demonstrates some evidence for its construct validity.

For all behaviors and average total scores where step-wise regression analyses resulted in significant equations, model summaries are presented in Tables 33 through 53 in Appendix K. The percent of variance accounted for in criterion variables by different models ranged from 22.0% to 65.6%. The DDDI Risky Driving subscale was the only variable to account for significant variance in Average Failures to Use a Turn Signal (27.5%) and Average Tailgating of Another Vehicle (23.4%). The DDDI Risky Driving subscale predicted 32% of the variance in Total Risky Driving Averages, with total number of admitted instances of driving under the influence accounting for an additional 14.5% of the variance. For the criterion of Average Went Through Late Yellow Light and/or Rolled Through Stop Sign, the DDDI Risky Driving subscale accounted for 40.4% of the variance, with number of rush hours experienced per week (being negatively correlated with the criterion) accounting for an additional 11.6%.

With regard to the average instances of Speeding Greater than 10 Miles per Hour Over the Limit, the DDDI Negative Emotional subscale accounted for 29.4% of the variance, while miles driven per week (positively correlated with the criterion) accounted for an additional 14.3%. Similarly, the DDDI Negative Emotional subscale accounted for 33.6% of the variance in average instances of Feeling Friendly Toward Another Driver (being negatively and relatively strongly correlated with one another), and the amount of rush hours experienced in a week accounted for an additional 22.8% of the variance (a weak, positive correlation). The DDDI Negative Emotional subscale alone accounted for significant variance in Total Dangerous Driving Averages (22%), and Wearing a Safety Belt (22.3%).

Other criterion variables of interest were not predicted by the DDDI, which included running: red lights, passing illegally, unintentionally crossing lane lines and/or the road's edge, weaving in and out of traffic, feeling angry toward another driver, honking one's horn as a negative signal, making negative/rude/obscene gestures, feeling in a hurry, total negative emotional averages, and total aggressive driving averages. These were predicted by differing variables, which included: number of crashes caused in the last three years, the number of tickets received in the last three years, the average number of rush hours experienced per week, the

average number of miles driven per week, the average number of hours driven per week, gender, and age.

There was some evidence of predictive validity and construct validity in the regression analyses. The DDDI Risky Driving subscale accounted for 27.5% of the variance in failures to use a turn signal and 23.4% of variance in frequency of tailgating behavior, where it was the only predictor variable to emerge as significant. The DDDI Risky Driving subscale accounted for 40.4% of the variance in rolling through late yellow lights and/or stop signs, with amount of rush hour driving per week accounting for an additional 11.6%. Further and most convincingly for the demonstration of predictive construct validity, the DDDI Risky Driving subscale accounted for 32% of the variance in Total Risky Driving scores, followed by total number of times driving under the influence which accounted for an additional 14.5% of the variance.

There was a lack of clearly independent relationships between the DDDI Negative Emotional scale and variables that should have theoretically been related. Examples of this included feeling angry toward another driver, feeling annoyed by another driver, and less certainly but possibly, feeling another driver was being aggressive, feeling angry in general, and feeling frustrated in general. The DDDI Negative Emotional was negatively related to feeling another driver threatened one's safety, but the relationship was not as strong as with the DDDI Risky Driving. In fact, the DDDI Negative Emotional accounted for 33.6% of the frequency of feeling friendly toward another driver, with a moderately strong inverse relationship (r = -.40, p < .05). If the DDDI Negative Emotional scale is valid, these findings taken together imply that people, who are more prone to negative feelings while driving (as measured by the DDDI Negative Emotional subscale), are less worried about their safety and are less friendly toward other drivers. If this is the case, then negative emotions related to driving may well need to be divided into those associated with feeling intimidated versus those associated with feeling indignantly entitled.

However, that assertion assumes the answer to the DDDI Negative Emotional validity question is affirmative, which may be premature. The DDDI Negative Emotional subscale was highly related to the frequency of risky behaviors seen in Study Three, such that it accounted for far more variance in the risky behavior category than did the DDDI Risky Driving scale, which accounted for none. In the present study, the DDDI Negative Emotional scale more strongly correlated with speeding in excess of ten miles per hour over the limit (r = .57, p < .01), than the

DDDI Risky Driving scale ($r = .51$, $p < .01$). The DDDI Negative Emotional correlation with not wearing one's safety belt also approached significance ($r = -.38$, $p < .10$).

This relationship with failure to wear a safety belt was stronger and more significant than with the DDDI Risky Driving subscale ($r = -.32$, $p > .10$), which theoretically should have had a more robust relationship to this type of unsafe behavior. In fact, the DDDI Negative Emotional subscale was the only predictor to account for significant variance in the regression model, accounting for 22.3% of failure to wear a safety belt. However, there may be a confound at this juncture which implies some other attitudinal component as underlying the lack of the safe behavior, perhaps one of psychological reactivity to mandates or of an increased sense of independence.

Nonetheless, the DDDI Negative Emotional subscale again accounts for much of the variance in types of behaviors one would think should be associated more with the DDDI Risky Driving subscale. For instance, the DDDI Negative Emotional accounted for 29.4% of the variance in speeding (after which came the number of miles driven per week, accounting for an additional 14.3%). It also was the only predictor variable to account for any of the variance in the Total Dangerous Driving scores (22%, with $r = .42$, $p < .05$). Further, there was no regression equation for Total Negative Emotional scores which accounted for significant variance. If the construct being measured is truly valid, the DDDI Negative Emotional subscale should have accounted for some significant amount of variance in that variable, however slight.

Interestingly, the DDDI Aggressive Driving in particular, accounted for no significant variance in any of the criterion variables, not withstanding the relatively independent correlation between the DDDI Aggressive Driving and Total Aggressive Driving scores ($r = .46$, $p < .05$). Another differential stand out relationship was the moderately strong positive correlation between the DDDI Aggressive Driving subscale and flashing one's headlights as a negative signal indicating frustration or anger ($r = .40$, $p < .05$). Making negative/rude/obscene gestures openly, was also related to the DDDI Aggressive Driving subscale distinctively ($r = .33$, $p < .05$). This trend was seen also with honking one's horn as a negative signal ($r = .39$, $p < .10$) and passing illegally ($r = .37$, $p < .10$). Though illegal passing is less clearly related to the construct of aggression, the other three behaviors were defined as fitting aggressive criteria, and the present findings lend support to the idea that the DDDI Aggressive Driving subscale has some predictive validity.

General Discussion

General Validity of Theoretical Dangerous Driving Subdivisions

At hand are two different, but related issues: first, whether there are in fact, three distinctive subcategories of dangerous driving (i.e., risky, negative emotional, and aggressive); and second, whether the DDDI has validity with regard to measuring these constructs. The former theoretical issue will be dealt with first, where it is somewhat more difficult to draw outright conclusions than with regard to the latter issue.

As noted, males scored significantly higher than females on the DDDI Risky Driving, DDDI Aggressive Driving, and DDDI Total scales, while both genders scored similarly on the DDDI Negative Emotional scale. Similarly, as predicted from results by DePasquale et al. (2001), EPQV (Venturesomeness) scores were significantly correlated with the Risky Driving and Aggressive Driving subscales, but not with the Negative Emotional subscale. Males also scored significantly higher on the EPQV. The gender differences and EPQV relationships with the DDDI provided the strongest evidence that dangerous driving is comprised of distinct subcomponents, at least with regard to separating out negative emotionality.

The pattern shown in DDDI subscale gender differences is consistent with known gender differences in more general aggressive and risky behaviors, where males are more likely to demonstrate such behaviors overtly than are females. These particular theoretical divisions are further confirmed in this work by the fact that compared to females, males also reported making significantly more obscene gestures, receiving more tickets, running more red lights, and wearing their safety belt less often. Male drivers also reported speeding and weaving in and out of traffic more, though these differences only approached significance.

Following this trend, it is impossible to say with the current data whether males who are younger would be more likely to engage in risky and aggressive driving practices versus experiencing more negative emotions while driving (e.g., CSC & TSA, 2001; Joint, 1995). If age were more varied in a sample, that would be a reasonable prediction based on other known demographic data with regard to risk-taking and aggression. However, it appears that both genders become equally frustrated and upset in a driving context, which is plausible anecdotally. This finding warrants future research to further delineate differences between genders with regard to more specific aspects of dangerous driving.

There was also some evidence of differential DDDI subscale validity in the present survey work. Although correlations were significant across all DDDI subscales with regard to the 16PF Anxiety Scale, the relationships followed the predicted trend where the correlation with the Negative Emotional subscale was stronger than with the other two subscales. This trend was very similar to the case of relationships between the 16PF Tension scale and the DDDI subscales where the strongest correlation was with the Negative Emotional subscale, again following a trend consistent with the hypotheses. However, the hypotheses were not fully supported, and the other hypotheses regarding the 16PF failed to be supported.

When hypotheses failed to be supported with regard to the DDDI and 16PF scales, it was often the case that the personality concepts measured by the 16PF were either misunderstood or were more emotional in content than previously thought. It was noted above that the DDDI Risky Driving and Aggressive Driving subscales have their own emotional content, contrary to the author's original naïve position. Indeed, there is often an emotional component to risky and aggressive driving, whether it is a feeling of thrill or of anger and frustration.

This common sense notion was unnoticed by the author in the present hypotheses, though it was previously demonstrated by correlations between the DDDI Risky Driving and Aggressive Driving subscales and the IBS and STAXI anger scales. Thus, predictions failed to be supported which might have been if they were better formulated. It follows that it would be premature to conclude that distinct subcategories of dangerous driving did not exist based on the correlational data in the current work.

A further issue regarding using the DDDI as evidence for or against the existence of the theoretical subcomponents deals with the results found in factor analyses. As noted above, only one factor emerged that was interpretable, suggesting a unitary construct was being measured, namely dangerous driving. As rotations failed to produce any reasonable subscale divisions, it is at issue whether there is value to the present division of items into their respective subscales? The author's position was noted above to be a qualified "yes." This position rests on several problems inherent in survey construction and with regard specifically to subscale co-linearity issues.

Burns (2000) critiqued the Psychopathy Screening Device (PSD) which was created to measure psychopathology in children. According to Burns (2000), to achieve content validity, it is required that an unambiguous definition of the construct be provided along with demarcation

from similar constructs, and that items are representative of and specific to the construct. There were two ways listed relevant to this discussion, how items might overlap across rating scales: 1. items can be identical in different scales; 2. general items on one scale represent more specific items on a second scale (e.g., the PSD item "acts without thinking," provides a general label for more specific Attention Deficit/Hyperactivity Disorder (ADHD) impulsivity symptoms); and, 3. the wording of items on a scale is vague enough for the item to be similar to those from a different construct on a second scale (e.g., the PSD Impulsivity item "engages in risky activities," is germane to ADHD as well as to Conduct Disorder). Burns (2000) stated that item overlap can reduce the discriminant validity of a scale due to its close associations with other, supposedly distinctive scales.

Taking these challenges one at a time, the first issue is not relevant to the DDDI, as no items are used on more than one subscale. It is interesting to note that not all researchers feel this common type of overlap is necessarily problematic. For example, Farley and Cohen (1980) in critiquing the factor structure of the California Psychological Inventory, found no negative effects of item overlap. They stated that, "To the contrary, it is concluded that the use of common items is an economical technique for increasing the total number of items in the scales, thus increasing scale internal reliabilities without increasing the overall number of items in the inventory," (p. 207). This idea bolsters the current argument that the DDDI scales are useful in their current categories, as they are conceptually distinct regardless of their inter-correlations.

The second issue is relevant in that the DDDI Total (Dangerous Driving Total) scale is made up of all subscale items, such that all items necessarily represent more specific matter on the subscales. However, presuming that a subscale is individually measuring a pertinent construct, there may well be an additive effect when it is totaled with the other one or two scales. For example, one could be a risky driver who rarely if ever is provoked to anger, and who does not engage in aggressive behaviors. This type of driver, while perhaps rare, would be clinically distinct, and presumably less dangerous, than a driver who was not only risky, but who is often upset and/or aggressive. It is also possible for aggression to be distinct from negative affect in relatively few cases where such behavior may have mood-enhancing qualities, for instance in temporarily boosting self-esteem in a person who identifies with stereotypical "tough" traits.

The third issue is more challenging, where the wording of a few of the items on DDDI subscales is ambiguous enough to be potentially similar to items representing the construct of

one of the other subscales or of a construct not well measured by the DDDI. An example would be the item "I drive when I am angry or upset," which could easily be related to one becoming angry independently of a driving situation, and then driving, which could be potentially dangerous. This versus getting angry or upset while driving and the distinction is left to the test-taker, likely creating some non-specific measurement error. However, the item could also clearly fit with the majority of cases of aggression where the aggressor is angry or upset about some offensive act perceived prior to displaying aggressive behavior. Hence, this item may well fit under both the DDDI Negative Emotional and Aggressive Driving scales, as the differential meanings for the item are not readily apparent to a test-taker.

Another example would be the item "I feel that passive drivers should learn how to drive or stay home," which is labeled as a negative emotional state, assuming that a person who answers "often" or "always" is likely to regularly encounter drivers they consider to be passive. However, this type of person may also be willing to take risks in the service of confirming his/her self-defining as a non-passive driver (i.e., as assertive and/or aggressive driver). Additionally, such a person may direct aggression toward drivers they feel are passive and whom they wish to punish or harm (though this is likely to be a type of psychological aggression in most cases, either verbal or gestural). If this is the case, then for this type of driver, the item in question could represent aspects of all three subscale constructs.

Yet these issues are a challenge for anyone constructing any type of personality test, and are acknowledged as being present in many well-established personality measures (e.g., Burns, 2000; Choca, Peterson, & Shanley, 1986; Farley & Cohen, 1980; Gibertini & Retzlaff, 1988; Hsu, 1994; Nicholls, Licht, & Pearl, 1982; Stark & Laurent, 2001). There is likely to be a partial linear-dependency of the scales for the DDDI, such as noted by Gibertini and Retzlaff (1988) in their work with the scales in the Millon Clinical Multiaxial Inventory (MCMI). Yet it is worth noting that inter-correlation of scales does not prevent the widespread use of the MCMI, and that such inter-item dependency does not necessarily invalidate the usefulness of distinguishing between constructs which may be partially related, but which are by no means identical.

Thus, the argument against disbanding the subscales in their present form is that they are conceptually meaningful divisions, though perhaps they are presently less than ideal in terms of their discriminatory power. As it was found in the above correlational analyses, there is considerable overlap between many behaviors and emotions which are related to dangerous

driving. However, the differential relationships between the EPVQ and 16PF Anxiety and Tension scales and the DDDI subscales were found to be largely as predicted. This indicated there are important differences between the scales, regardless of the interrelations demonstrated in factor analyses.

In Study Three, 17.9% of the variance in Average Negative Emotional ratings was accounted for by the DDDI Negative Emotional subscale. However, in other dangerous driving categories, the DDDI Negative Emotional subscale accounted for significant variance. While this does not bode well in terms of claiming distinctiveness for the DDDI subscales, it does not necessarily detract from the constructs themselves, as the issue may be more a lack of DDDI subscale uniqueness than a problem with the theory. As noted, there are inherent problems with video-game data, however, the operational variables seem to have been adequately measured within their dangerous driving domains, and it appears that the DDDI failed to distinguish between these, though it did on the whole account for significant variance in all relevant criterion variables except one.

In Study Four, the DDDI Risky Driving subscale was the only variable to account for significant variance in failures to use a turn signal and tailgating. The DDDI Risky Driving subscale was the strongest predictor of going through late yellow lights and/or rolling through stop signs, and of total risky driving averages. That this subscale was predictive of relevant criterion variables, lends support to the notion that these risky behaviors are separate constructs from other negative emotional and aggressive driving constructs. Similarly, the DDDI Negative Emotional subscale accounted for significant variance in instances of feeling friendly toward another driver and was inversely correlated with this variable. However, other predicted relationships failed to emerge, providing only weak support for the notion that the DDDI subscales are properly divided in their current form.

The author's conclusion is that the theoretical constructs are useful and likely valid. The failure to provide definitive support for this assertion in the current work is likely attributable to the weakness of the DDDI subscales in differentially measuring the constructs. Even with the replication of Study Three with a driving simulator, and of Study Four with a larger, more diverse sample, the DDDI may still fail to sufficiently distinguish between the three subcomponents of dangerous driving. Nonetheless, the assessment of a self-report measure should not be the standard by which this theory is tested. Thus, systematic investigation is called

for to establish or refute the validity of the dangerous driving subcomponents, and if valid, to understand their relative contributions and directional influences on outcomes. What follows is a discussion of the reliability and validity of the DDDI with regard to the present findings.

Internal Consistency Reliability

The alpha coefficient of .91 for the DDDI Total scale indicated excellent internal reliability for the measure and good internal reliability was demonstrated for its subscales with coefficient alphas equal to .81 for the DDDI Risky Driving subscale, .79 for the DDDI Negative Emotional subscale, and the DDDI Aggressive Driving subscale. This is a finding from previous research, and indicates the DDDI and its subscales have high levels of internal consistency and is thus a highly reliable measurement tool.

Being a highly reliable measure, there are strong inter-item correlations between DDDI subscales. When the DDDI Negative Emotional and Aggressive Driving subscales were subjected to a principle components factor analysis separately, both yielded single factor solutions where all items loaded at .40 or higher. The items on the DDDI Risky Driving subscale yielded a three-factor solution where all items loaded at .40 or higher in the first-factor solution.

However, subjecting the whole DDDI item set to a principle components factor analysis yielded six factors, where there was no clear interpretation available for any but the first, which suggested a single dangerous driving factor. As noted earlier, various rotations failed to suggest reasonable subscale divisions. While this could be interpreted as evidence that each subscale is more or less randomly assembled, the author feels the present subscales are measuring interdependent, but meaningfully separate constructs. Reasons for this interpretation were presented above, and while not conclusive, do suggest directions for further assessment.

Test-Retest Reliability

Coefficients of stability were generated from a four-week test-retest procedure, which were .76 for the DDDI Risky Driving subscale, .68 for the DDDI Negative Emotional subscale, .55 for the DDDI Aggressive Driving subscale, and .73 for the DDDI Total. A major concern was that the attrition rate for Time One was slightly more than 50%. The final set of participants being only 30 in number, limits the inferences that can be drawn. It was noted that a possible confound was participants returning to Time Two sessions might be more conscientious and/or mindful of self-presentation biases, and thus may have inflated correlations somewhat. However,

given a greater retention rate of a new sample from Time One to Time Two, it may be reasonable to expect these coefficients will remain similar.

The test-retest results raise the issue as to whether there is differential stability to the constructs being measured by the subscales. Where the DDDI Aggressive Driving subscale had the lowest test-retest reliability, the case could be made that aggressive behavior in a vehicle is more transient than negative emotionality, which in turn was less stable than risk-taking behavior. The negative correlation between age and feeling in a hurry found in Study Four, suggests that some propensities may wane over time. While the current work is unable to answer the questions raised, it should prompt for further investigation. With more systematic investigation of the stability of these constructs over relatively brief periods of time, longitudinal studies of dangerous driving constructs should follow.

Face Validity

Once reviewed by the reader, it will likely seem unnecessary to assert that the DDDI and its subscales all have excellent face validity, with items representing an adequate sampling of the main construct and its subsidiaries. Indeed, there is a great amount of face validity, but this raises an interesting point. If it is a measure with obvious construct measurement qualities, what good would it be in applied settings where test-takers who would be motivated to "fake good" would be able to easily do so? The answer is that it may be the DDDI will be more useful as a research tool, but being so classified; it can be of use in developing measures that are more practical in applied settings.

Perrino and Saka (1998) revealed that most crash prediction models are focused on prior driver violations, points accumulated, and prior at-fault accidents. The current models used by insurance companies to predict driver risk, include age, gender, region, vehicle type, continuity of insurance coverage, history of prior crashes and different traffic offense conviction categories. While these types of models are reasonably good predictors of future crash risk, they are less than ideal. The chief advantage to these variables is they are difficult to "fake good," unlike a personality-based measure such as the DDDI which has such high face validity it is readily apparent how one needs to answer to appear safe and non-risky.

One problem with these traditional models of risk prediction, is they are not able to discriminate who will actually be a high-risk driver (e.g., males in general). The more significant problem is that prediction is improved only after high-risk driving has already occurred and one

has been "caught." Saka, Perrino, and Hayes (1998) found only 12 of 46 state law enforcement representatives who responded to their survey, said their state had methods to identify high-risk drivers and most states do not have high-risk driver programs. Many states offer remedial programs as a means to reduce "points" on a license, but this gives little incentive to effect remediation of old high-risk behaviors.

Saka, Perrino, and Hayes (1998) favored development of procedures to reliably identify high-risk drivers, and said that "If states have the capability to identify high-risk drivers and proactively implement appropriate treatment programs, accident rates would undoubtedly decrease" (p. 7). Identifying high-risk drivers before high-risk behaviors take place will be crucial to developing proactive programs to reduce dangerous driving. Self-report measures would be the most efficient method, but would be subject to the problems of "faking good" profiles, as well as self-serving and social desirability biases. A self-report measure with ambiguous items that actually predicts crash risk would be ideal. Dula and Geller (2001) have begun development of such a measure, with promising preliminary results.

However, the role of instruments such as the DDDI and PADS will be to provide data that confirm whether such ambiguous items are related to relevant constructs. Thus, the DDDI may have limited use in real-world settings, except where measures of socially desirable responding can be given and analyzed concurrently. However, in the research setting, the DDDI should become very useful in investigations of dangerous driving phenomena.

Criterion-Related Content Validity

The content domain, though being historically highly variable in terms of operational definitions, is otherwise well defined conceptually within the body of this work. Therefore, it is reasonable to assume that all inferences drawn with comparison to established measures and related self-reported behaviors/emotions, are valid. Consistent with known gender differences in more general aggressive and risky behaviors, the gender differences in the self-reported behavioral data, concomitant with the DDDI scales, alongside significant correlational data, is evidence that the DDDI has solid validity in terms of the aforementioned theoretical subdivisions of dangerous driving.

Divergent validity. It has been demonstrated that many times the DDDI subscales share commonalities with the various scales with which they have been paired for correlational analyses. However, frequently enough, there has been divergence as predicted from a subscale

and a construct related to another subscale. For example, venturesomeness was found to be related to the DDDI Risky Driving but was unrelated to the DDDI Negative Emotional, just as theorized by DePasquale et al. (2001). Also, the construct of tough-mindedness as measured by the 16PF, was unrelated to the DDDI Negative Emotional scale as predicted, though it was also not related to the DDDI Risky Driving and Aggressive Driving subscales as was also predicted. However, on closer examination of the actual 16PF items it was determined that the concept being measured was cognitive rigidity more so than the lack of empathy it purportedly also measured, a construct which was not well represented in the scale content. Thus, given that the construct of tough-mindedness is more accurately conceptualized as cognitive rigidity, it should not be related to the DDDI scales, and in fact, it was not.

Convergent and predictive validity. Similarly, there is ample evidence, across time with reference to Dula and Ballard (in press), that the DDDI has convergent validity. The IBS aggression, assertiveness, and three anger scales have shown highly consistent relations with the DDDI scales, as have the four STAXI anger scales. The 16PF AX (Anxiety) scale was significantly, positively correlated with the DDDI Negative Emotional, as was predicted. While it was predicted there would be no significant relationship between the 16PF AX and DDDI Risky Driving scales, that was not the case. However, the relationship was somewhat weaker than it was with the DDDI Negative Emotional scale.

Moreover, there was a great deal of evidence culled from Study Three that suggests the DDDI has predictive validity. The DDDI filled out before participants engaged in the driving video-game races, was highly correlated with many actual behaviors which were videotaped and independently coded against strict operationally defined criteria. In fact, the only non-significant relationship was with at-risk turns where the range of the variable was highly constricted due to a lack of available opportunities in the game to actually performing turning behaviors.

When regressing the DDDI scales, along with a host of additional demographic and driving history predictors, onto the various on-screen and in-booth behaviors, significant variance was often accounted for by the DDDI. Problems inherent in using a video-game in lieu of a professionally designed and constructed simulator have been noted above. Add to that the relatively small number of participants in the study, and there is evidence the DDDI has good predictive validity. As mentioned above, a STISIM Driving Simulator has been purchased by the author's university department and work is underway to replicate this study with a machine

designed to accurately measure many variables that before had to be observed and classified by trained research assistants. As good as they were at doing classifications; the computer data will be far superior in terms of reliability of measurement.

Other types of convergent evidence were found in the relationships between the DDDI scales and the various risky and aggressive driving behaviors and negative emotional driving items, found in the demographic questionnaire and in the driving diary checklist. There were many significant correlations indicating convergence between the DDDI and these various items. The few instances of disconfirming evidence occurred almost exclusively within Study Four driving diary checklists, where only 24 drivers participated to varying degrees. Again, regression analyses demonstrated that the DDDI which was filled out prior to filling out driving diary checklists, predicted dangerous driving behavior adequately, accounting for significant variance in some items over and above many variables traditionally used by insurance companies to predict driver risk.

It is thus asserted that a replication of Study Four with a larger and more diverse sample, over a longer period of time, would produce results more consistent with constructs presumably measured by the DDDI. A study is currently underway that will accomplish that goal, with a projected total of 200 community participants filling out driving diaries at the rate of eight trips per week, for a total of ten weeks. This data should be very interesting in terms of further exploring for evidence of differential validity for each of the DDDI subscales.

Thus, it is concluded that the DDDI is a highly reliable measure with face, construct, and predictive validity. However, the evidence in support of the present division of subscales is weak, though present. Therefore, should further data fail to produce more substantial evidence for the validity of the DDDI subscales, a singular dangerous driving measure would be warranted, and the number of items should be shortened as guided by results from a factorial analysis.

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Appendix A
Table of Driver Aggression Studies

Study	Type of Study	Factors Listed As Representative of Aggressive Driving	Explicit Definition of Aggressive Driving
James & Nahl, 2000	Theoretical	Running stop signals; Blocking intersections; Failing to yield right-of-way; Weaving in/out of traffic; Speeding >5mph above the limit; Tailgating; Failure to use signals; Changing speed erratically; Blocking other vehicles; Communicating threats or insults with voice, gestures, or horn-honking; Intentionally braking suddenly; Chasing other vehicles; Actual use of a gun or gesturing with a gun; Using the vehicle as a battering object	"Aggressive driving is driving under the influence of impaired emotions, resulting in behavior that imposes one's own preferred level of risk on others." (p. 5)
Stradling & Meadows, 2000	Theoretical	Horn-honking to indicate annoyance; Forcing one's way in front of a vehicle that has right-of-way; Being angered by a driver and chasing that driver with intention of "giving him/her a piece of our mind"	None
Lowenstein, 1997	Literature Review	Thinking hostile thoughts toward other drivers; Chasing other drivers; Horn honking*; Angry gestures or language*; Failure to stop for pedestrians*	None
Tasca, 2000	Literature Review	Tailgating; Weaving in/out of traffic; Improper passing and lane changing; Failure to yield right-of-way; Preventing others from passing, changing lanes, or merging into traffic; Speeding in excess of norms; Running stop signs and red lights; Flashing headlights; Sustained horn-honking; Glaring at another driver; Yelling; Gesturing	"A driving behavior is aggressive if it is deliberate, likely to increase the risk of a collision, and is motivated by impatience, annoyance, hostility, and/or an attempt to save time." (pg 8).
Joint, 1995	Base rate Self-report	Tailgating*; Headlight flashing*; Profanity and obscene gestures*; Blocking other vehicles*; Physical assault*; Horn-honking*	None
Mizell, 1997	Base-rate Analysis of media coverage, police and insurance reports	Using weapons or a vehicle to attack others*; (Note: the following behaviors are listed as having provoked violence previously) Lane blocking; Tailgating; Lack of signal use; Obscene gestures; Horn-honking; Failing to turn right on red; Taking up more than one parking space; Headlight flashing; Failure to allow others to merge into traffic; Blocking traffic; Cell phone usage; Offensive bumper stickers; Making direct eye contact	"Aggressive driving is defined for this study as an incident in which an angry or impatient motorist or passenger intentionally injures or kills another motorist, passenger or pedestrian…(or)…intentionally drives his or her vehicle into a building or other structure or property…in response to a traffic dispute, altercation, or grievance" (p. 5).
The Steel Alliance, 1999 (in United States) & The Steel Alliance, 2000 (in Canada)	Base-rate Phone Survey	Tailgating*; Making rude gestures*; Passing on the shoulder*; Failing to yield to merging traffic*; Pulling into a parking space someone else is waiting for*; Flashing high beams at the car in front of you*; Waiting until the last second to merge with traffic on the highway*; Driving through a yellow light that is turning red*; Changing lanes without signaling*; Horn-honking*; Double parking*; Driving 10 mph or more over the speed limit (more than 20 km/hour in Canada)*	None
Sarkar, Martineau, Emami, Khatib, & Wallace, 2000	Base-rate Analysis of calls to police	Speeding*; Tailgating*; Running vehicles off the road*; Weaving in/out of traffic*; Cutting vehicles off*; Running red lights; Headlight flashing*; Excessive horn-honking*; Malicious braking*; Profanity and obscene gestures*; Blocking the passing lane*; Communicating threats*; Threatening with weapons*; Hitting vehicles with objects*; Chasing a vehicle*	None

Table 1: Examples and Definitions of Driver Aggression (studies listed arbitrarily by type, then chronologically, then alphabetically).
*Used as an operational definition of driver aggression.

Study	Type of Study	Factors Listed As Representative of Aggressive Driving	Explicit Definition of Aggressive Driving
Lajunen, Parker, & Stradling, 1998	Correlational Self-report	Racing away from traffic lights; Showing hostility; Forcing one's way into a stream of slow-moving traffic; Running red lights; Speeding	"...driver aggression can be conceptualized as any form of behaviour that is intended to injure or harm other road users physically or psychologically." (p. 108).
Parker, Lajunen, & Stradling, 1998	Correlational Self-report	Racing; Showing hostility; Forcing one's way into a stream of slow-moving traffic	None
Doob & Gross, 1968	Field-based Quasi-Experimental	Horn-honking* (*latency)	None
Turner, Layton, & Simons, 1975	Field-based Quasi-Experimental	Horn-honking* (*latency); Headlight flashing; Profanity and obscene gestures; Chasing a vehicle; Feeling easily irritated and provoked by other drivers; Quickly generated feelings of vengeance toward other drivers	None
Kenrick & MacFarlane, 1986	Field-based Quasi-Experimental	Horn-honking* (*latency); and obscene gestures	None
Ellison, Govern, Petri, & Figler, 1995	Field-based Quasi-Experimental	Obscene gestures; Profanity; Tailgating; Fist fighting; Horn honking*	None
Diekmann, Jungbauer-Gans, Krassnig, & Lorenz, 1996	Field-based Quasi-Experimental	Horn-honking* (*latency); Headlight flashing (*latency)	None
Shinar, 1998	Field-based Correlational and Quasi-Experimental	Tailgating; Flashing lights; Horn-honking*; Weaving in/out of traffic; Cutting in front of other drivers; Running red lights* and stop signs; Obstructing others; Hand gestures*	"...a syndrome of frustration-driven instrumental behaviors which are manifested in: a) inconsiderateness towards or annoyance of other drivers (tailgating, flashing lights, and honking at other drivers), and b) deliberate dangerous driving to save time at the expense of others..." (p. 139)
Hennessy & Wiesenthal, 1999	Field-based Correlational	Horn honking; Yelling at other drivers; Tailgating; Flashing Headlights; Drive-by shootings, Chasing, Vehicular Homicide	None
Ellison-Potter, Bell & Deffenbacher, 2001	Lab-based Experimental	Tailgating; Horn-honking; Weaving in/out of traffic; Excessive speeding; Profanity and obscene gestures; Headlight flashing; Blocking the passing lane; Hitting pedestrians* (note: lab procedure done with driving simulator); Hitting other vehicles or off-road objects*; Red-light running*; Speeding*	"...may be defined as any driving behavior that intentionally (whether fueled by anger or frustration or as a calculated means to an end) endangers others psychologically, physically, or both." (p.432)
Gulian, et al., 1989	Development of a Driver Stress Scale	Irritation about being overtaken and/or failing to overtake; Losing temper; Annoyance at red lights and/or slow moving vehicles; Impatience; Feelings of Frustration; A sense of power/aggressiveness	None

Table 1 (Continued): Examples and Definitions of Driver Aggression (studies listed arbitrarily by type, then chronologically, then alphabetically).
*Used as an operational definition of driver aggression.

Appendix B
Dula Dangerous Driving Index Items and Sub-Scale Divisions

Dula Dangerous Driving Index

Notes: Subscale items are denoted as follows: Aggressive Driving = AD; Negative Emotions While Driving = NE; Risky Driving = RD. Participants responded to the items with the following Likert scale: A. Never, B. Rarely, C. Sometimes, D. Often, and E. Always. Participants received the following written directions:

Please answer each of the following items as honestly as possible. Please read each item carefully and then fill in the bubble/circle of the answer you choose on the form. If none of the choices seem to be your ideal answer, then select the answer that comes closest. THERE ARE NO RIGHT OR WRONG ANSWERS. Select your answers quickly and do not spend too much time analyzing your answers. You may change any answer(s) at any time before completing this form. If you do change an answer please erase the previous mark(s) entirely.

1. I drive when I am angry or upset. - NE
2. I lose my temper when driving. - NE
3. I consider the actions of other drivers to be inappropriate or "stupid." - NE
4. I flash my headlights when I am annoyed by another driver. - AD
5. I make rude gestures (e.g., giving "the finger"; yelling curse words) toward drivers who annoy me. - AD
6. I verbally insult drivers who annoy me. - AD
7. I deliberately use my car/truck to block drivers who tailgate me. - AD
8. I would tailgate a driver who annoys me. - AD
9. I "drag race" other drivers at stop lights to get out front. - RD
10. I will illegally pass a car/truck that is going too slowly. – RD
11. I feel it is my right to strike back in some way, if I feel another driver has been aggressive toward me. - AD
12. When I get stuck in a traffic jam I get very irritated. - NE
13. I will race a slow moving train to a railroad crossing. – RD
14. I will weave in and out of slower traffic. – RD

15. I will drive if I am only mildly intoxicated or buzzed. - RD

16. When someone cuts me off, I feel I should punish him/her. - AD

17. I get impatient and/or upset when I fall behind schedule when I am driving. - NE

18. Passengers in my car/truck tell me to calm down. - NE

19. I get irritated when a car/truck in front of me slows down for no reason. - NE

20. I will cross double yellow lines to see if I can pass a slow moving car/truck. - RD

21. I feel it is my right to get where I need to go as quickly as possible. - RD

22. I feel that passive drivers should learn how to drive or stay home. - NE

23. I will drive in the shoulder lane or median to get around a traffic jam. - RD

24. When passing a car/truck on a 2-lane road, I will barely miss on-coming cars. - RD

25. I will drive when I am drunk. - RD

26. I feel that I may lose my temper if I have to confront another driver. - NE

27. I consider myself to be a risk-taker. - RD

28. I feel that most traffic “laws” could be considered as suggestions. - RD

Appendix C
Tables from Initial Scale Development
(Adapted from Dula & Ballard, in press)

Table 2

Means, SDs, and t-values for DDDI, PADS, IBS and STAXI by Gender

(Adapted from Dula & Ballard, in press)

	Males	Females	t-value
DDDI Total Score	70.73 (11.79)	65.68 (13.74)	1.84
DDDI Aggressive Driving	17.4 (4.98)	15.26 (5.62)	2.19*
DDDI Negative Emotion	26.76 (4.67)	26.53 (6.15)	.23
DDDI Risky Driving	34.53 (7.67)	31.19 (7.96)	2.21*
PADS	54.62 (14.56)	46.47 (13.88)	3.08**
IBS Denial	1.79 (1.45)	2.13 (1.57)	-1.20
IBS General Assertiveness	16.49 (4.17)	14.52 (4.26)	2.50*
IBS General Aggression	10.38 (4.03)	9.27 (4.38)	1.41
IBS Anger Expression	1.62 (1.41)	2.24 (1.97)	-1.96
IBS Physical Aggression	2.34 (1.37)	1.48 (1.28)	3.42***
IBS Verbal Aggression	4.91 (2.28	4.53 (2.21)	.89
STAXI Trait Anger	18.64 (4.09)	19.89 (6.16)	-1.31
STAXI Angry Temperament	5.95 (1.92)	7.15 (3.00)	-2.61**
STAXI Angry Reaction	9.04 (2.39)	9.03 (2.59)	.01
STAXI Anger Out	17.18 (3.09)	17.07 (4.80)	.16

Notes:

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$

SDs are in parentheses; df ranged from 113 to 115 for all analyses.

Table 3

Pearson Product-Moment Correlations Between the IBS and STAXI, and the DDDI and PADS.

(Adapted from Dula & Ballard, in press)

	DDDI Total	DDDI AD	DDDI NE	DDDI RD	PADS
IBS Denial	-.40***	-.38***	-.34***	-.32***	-.26**
IBS General Aggression	.44***	.49***	.35***	.31***	.41***
IBS General Assertiveness	.29**	.32***	.15	.28**	.30***
IBS Anger Expression	.38***	.36***	.46***	.19*	.32***
IBS Physical Aggression	.31***	.32***	.20*	.27**	.35***
IBS Verbal Aggression	.38***	.43***	.31***	.26**	.29***
STAXI Trait Anger	.53***	.50***	.60***	.29***	.39***
STAXI Anger Out	.47***	.55***	.47***	.22*	.48***
STAXI Angry Reaction	.49***	.45***	.55***	.28**	.31***
STAXI Angry Temperament	.39***	.35***	.51***	.17	.34***

Notes:

*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$

DDDI Total Score= DDDI Total

DDDI Aggressive Driving Subscale = DDDI AD

DDDI Negative Emotion Subscale = DDDI NE

DDDI Risky Driving Subscale = DDDI RD

Table 4

Pearson Product-Moment Correlations Between the DDDI, PADS, and Driving Variables.

(Adapted from Dula & Ballard, in press)

	1	2	3	4	5	6	7	8	9	10	11
1. DDDI AD	---	.77***	.55***	.88***	.76***	-.20*	-.09	-.13	-.16	.09	.23*
2. DDDI NE	.77***	---	.52***	.87***	.65***	-.02	-.02	-.06	-.19*	.16	.22*
3. DDDI RD	.55***	.52***	---	.83***	.44***	-.20*	-.19*	-.21*	-.38***	.33***	.37***
4. DDDI Total	.88***	.87***	.83***	---	.71***	-.17	-.12	-.16	-.29***	.24**	.33***
5. PADS	.76***	.65***	.44***	.71***	---	-.28**	-.09	-.13	-.13	.00	.22*
6. Gender	-.20*	-.02	-.20*	-.17	-.28**	---	.15	.15	.05	.01	-.05
7. Age	-.09	-.02	-.19*	-.12	-.09	.15	---	.97***	.09	-.10	-.01
8. # of Years Driving	-.13	-.06	-.21*	-.16	-.13	.15	.97***	---	.13	-.12	.00
9. Ever Caused a Crash?	-.16	-.19*	-.38***	-.29***	-.13	.05	.09	.13	---	-.83***	-.29**
10. Total # of Accidents Caused?	.09	.16	.33***	.24**	.00	.01	-.10	-.12	-.83***	---	.28**
11. # of Tickets (past 2 years)	.23*	.22*	.37***	.33***	.22*	-.05	-.01	.00	-.29**	.28**	---

Notes: *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$

DDDI Total Score= DDDI Total

DDDI Aggressive Driving Subscale = DDDI AD

DDDI Negative Emotion Subscale = DDDI NE

DDDI Risky Driving Subscale = DDDI RD

Coding for items 8 and 10: 1 = yes, 2 = no; item 6: 1 = male, 2 = female

Table 5

Summary of Predictor Variables† Regressed Stepwise onto DDDI Total Scores, F Values, *p* Values, and Unique Variance of Each Predictor (regressed individually onto criterion).

(Adapted from Dula & Ballard, in press)

Total Percentage of Variance Accounted For By All Models = 46.8%

Model	R	R^2	Adj. R^2‡	F	Sig.	Unique Variance
Model 1	.525	.276	.269	41.85	.00	27.1%
STAXI Trait Anger						
Model 2	.628	.395	.384 (+11.5%)	35.55	.00	9.8%
Model 1 + # Of Tickets In Last Two Years						
Model 3	.671	.45	.434 (+5%)	29.42	.00	15.2%
Model 2 + IBS Denial Scale						
Model 4	.698	.487	.468 (+3.7%)	25.43	.00	2%
Model 3 + Gender						

†All IBS Scales, All STAXI Scales, Gender, Age, # of Years Driving, # of Accidents Caused, # of Tickets, only significant predictors were kept in the reported models.

‡R^2 increases incrementally with each additional model, where percentage increased is in parentheses.

Table 6

Summary of Predictor Variables† Regressed Stepwise onto DDDI Aggressive Driving Scores, F Values, *p* Levels, and Unique Variance of Predictors (regressed individually onto criterion).

(Adapted from Dula & Ballard, in press)

Total Percentage of Variance Accounted For By All Models = 45.8%

Model	R	R^2	Adj. R^2‡	F	Sig.	Unique Variance
Model 1	.549	.302	.295	47.52	.00	29.3%
STAXI Anger Out						
Model 2	.611	.373	.362 (+6.7%)	32.47	.00	23.1%
Model 1 +						
IBS General Aggression						
Model 3	.655	.429	.413 (+5.1%)	27.00	.00	4.5%
Model 2 +						
# Of Tickets						
In Last Two Years						
Model 4	.675	.456	.435 (+2.2%)	22.38	.00	19.9%
Model 3 +						
STAXI Angry Reaction						
Model 5	.694	.482	.458 (+2.3%)	19.74	.00	3.1%
Model 4 + Gender						

†All IBS Scales, All STAXI Scales, Gender, Age, # of Years Driving, # of Accidents Caused, # of Tickets only significant predictors were kept in the reported models.

‡R^2 increases incrementally with each additional model, where percentage increased is in parentheses.

Table 7

Summary of Predictor Variables† Regressed Stepwise onto DDDI Negative Emotion Driving Scores, F Values, *p* Values, and Unique Variance of Predictors (regressed individually onto criterion).

(Adapted from Dula & Ballard, in press)

Total Percentage of Variance Accounted For By All Models = 42.5%

Model	R	R^2	Adj. R^2‡	F	Sig.	Unique Variance
Model 1	.598	.357	.351	61.16	.00	35.8%
STAXI Trait Anger						
Model 2	.643	.414	.403 (+5.2%)	38.50	.00	3.9%
Model 1 + # Of Tickets In Last Two Years						
Model 3	.664	.440	.425 (+2.2%)	28.33	.00	10.5%
Model 2 + IBS Denial Scale						

†All IBS Scales, All STAXI Scales, Gender, Age, # of Years Driving, # of Accidents Caused, # of Tickets; only significant predictors were kept in the reported models.

‡R^2 increases incrementally with each additional model, where percentage increased is in parentheses.

Table 8

Summary of Predictor Variables† Regressed Stepwise onto DDDI Risky Driving Scores, F Values, Significance Levels, and Unique Variance of Predictors (regressed individually onto criterion). (Adapted from Dula & Ballard, in press)

Total Percentage of Variance Accounted For By All Models = 27.1%

Model	R	R^2	Adj. R^2‡	F	Sig.	Unique Variance
Model 1	.368	.136	.128	17.28	.00	12.8%
# Of Tickets In Last Two Years						
Model 2	.493	.243	.230 (+10.2%)	17.54	.00	9%
Model 1 + IBS General Aggression						
Model 3	.539	.291	.271 (+4.1%)	14.76	.00	10.2%
Model 2 + # Of Accidents Caused						

†All IBS Scales, All STAXI Scales, Gender, Age, # of Years Driving, # of Accidents Caused, # of Tickets only significant predictors were kept in the reported models.

‡R^2 increases incrementally with each additional model, where percentage increased is in parentheses.

Appendix D
Demographic Questionnaire

Demographic Questionnaire (Confidential)

Please answer all of the questions frankly and honestly. Remember that your answers will be anonymous. There is no way anyone can connect your name with this survey.

1. Age (write in # years old): ____

2. Gender: (circle 1) A. Female B. Male

3. Racial/Ethnic/Cultural Identity: (circle 1)

A. African American/Black
B. American Indian
C. Asian American
D. European American/White
E. Hispanic American
F. Citizen of Foreign Country
G. Other

4. Class: (circle 1) A. Freshman B. Sophomore C. Junior D. Senior E. Graduate

5. Current estimated, cumulative Grade Point Average (GPA) on a 4-point scale: (write in): _____

6. Overall total Scholastic Aptitude Test (SAT) score (please estimate if you can't remember): (write in): _____

7. How many semester hours are you currently taking? (write in #): ____

8. How many hours do you work (non-academic, for pay) per week? (write in #): ____

9. On a scale of 1-7, rate your current level of stress right now (stress you feel today) (circle a # below):

(no stress at all) 1 2 3 4 5 6 7 (could not be more stressed)

10. On a scale of 1-7, rate your current level of life stress (total stress you feel overall) (circle a # below):

(no stress at all) 1 2 3 4 5 6 7 (could not be more stressed)

11. On a scale of 1-7, rate the current level of social support you feel you receive from family, friends, significant others, co-workers, etc. (circle 1):

(no support) 1 2 3 4 5 6 7 (maximum support)

12. How many years have you been driving? (write in #): ____

13. When do you do most of your driving? (circle 1): A. between 5 am and 7 pm B. between 7 pm and 5 am

14. How much do you drive on average? (circle 1):

A. 0 – 30 min. per day
B. 30 min. – 60 min. per day
C. 60 min. – 90 min. per day
D. 90 min. – 120 min. per day
E. 120 min. – 150 min. per day
F. 150 min – 180 min. per day
G. more than 3 hours per day

15. How many days a week do you drive on average? (circle 1):

A. one B. two C. three D. four E. five F. six G. seven

16. How often do you usually drive in rush hour traffic? (circle 1):

A. never
B. once a week
C. twice a week
D. three times a week
E. four times a week
F. once a day
G. twice a day

17. How many hours a week do you drive on average? (write in #): _____

18. How many miles a day do you drive on average? (write in #): _____

19. How many miles a week do you drive on average? (write in #): _____

20. In the last 3 years, how many accidents have you been in while you were driving (whether or not it was your fault)? (write in #): _____

21. In the last 6 years, how many accidents have you been in while you were driving (whether or not it was your fault)? (write in #): _____

22. In the last 3 years, how many accidents have you caused while you were driving? (write in #): _____

23. In the last 6 years, how many accidents have you caused while you were driving? (write in #): _____

24. In the last 3 years, how many accidents that occurred while you were driving, were reported to your insurance company? (write in #): _____

25. In the last 6 years, how many accidents that occurred while you were driving, were reported to your insurance company? (write in #): _____

26. In the last 2 weeks, how many times would you estimate you have been stuck in heavy traffic while you were driving? (write in #): _____

27. In the last 2 weeks, how many times would you estimate you have honked your horn because you were frustrated while you were driving? (write in #): ____

28. In the last 2 weeks, how many times would you estimate you have tailgated another vehicle while you were driving? (write in #): ____

29. In the last 2 weeks, how many times would you estimate you have cut off another vehicle while you were driving? (write in #): ____

30. In the last 2 weeks, how many times would you estimate you have gone more than 5 miles an hour over the posted speed limit while you were driving? (write in #): ____

31. In the last 2 weeks, how many times would you estimate you have run a red light while you were driving? (write in #): ____

32. In the last 2 weeks, how many times would you estimate you have yelled or cursed at another driver while you were driving? (write in #): ____

33. In the last 2 weeks, how many times would you estimate you have made an "obscene" gesture at another driver while you were driving ? (write in #): ____

34. In the last 2 weeks, how many times would you estimate you have weaved in and out of traffic while you were driving? (write in #): ____

35. In the last 2 weeks, how many times would you estimate you have been honked at by another driver while you were driving? (write in #): ____

36. In the last 2 weeks, how many times would you estimate you have been tailgated by another driver while you were driving? (write in #): ____

37. In the last 2 weeks, how many times would you estimate you have been cut off by another driver while you were driving? (write in #): ____

38. In the last 2 weeks, how many times would you estimate you have had another driver yell or curse at you while you were driving? (write in #): ____

39. In the last 2 weeks, how many times would you estimate you have had another driver make an "obscene" gesture at you while you were driving? (write in #): ____

40. How many moving violation tickets have you been given over the last 3 years? (write in #): ____

41. How often do you wear a seat belt while driving? (circle 1):

A. never B. rarely C. sometimes D. often E. always

42. How many vehicle crashes have you been in during your entire life (at all ages, whether or not you were the driver)? (write in #): ____

43. Do you own the vehicle you drive? (1 you drive most often if drive >1) (circle 1): A. Yes B. No

44. Have you ever driven while intoxicated (i.e., under the influence of alcohol/drugs)? (circle 1): A. Yes B. No

44a. If yes to 44, how many times would you estimate you have driven intoxicated since you started driving? (write in #): ____

44b. How many times would you estimate you have driven intoxicated in the last year? (write in #): ____

44c. How many times would you estimate you have driven intoxicated in the last month? (write in #): ___

44d. What types of substances have you been under the influence of when you have driven intoxicated? PLEASE WRITE IN ALL THAT APPLY:_____

45. In the last 2 weeks, how many times do you estimate you have talked on the phone while you are driving? (write in #): ____

46. In the last 2 weeks, how many times do you estimate you have checked your appearance in the mirror while you were driving? (write in #): ____

47. In the last 2 weeks, how many times do you estimate you have eaten food while you were driving? (write in #): ____

48. In the last 2 weeks, how many times do you estimate you have adjusted the radio/cassette player/CD player while you were driving? (write in #): ____

49. In the last 2 weeks, how many times do you estimate you have read while you were driving? (write in #): ____

50. In the last 2 weeks, how many times do you estimate you have written something down while you were driving? (write in #): ____

51. On a scale of 1-7, rate the current level of your skill as a driver. (circle 1):

(beginner) 1 2 3 4 5 6 7 (expert)

Appendix E
Study One Tables

Hypotheses	Supported?	Summary of Details
EPQV scores would be significantly, positively correlated with DDDI Risky Driving scores	Yes	r = .25**
EPQV scores would not be significantly correlated with DDDI Negative Emotional Driving scores	Yes	r = .06
IM scores would be significantly and negatively correlated with scores on each of the DDDI scales	Yes	DDDI Risky Driving: r = -.29** DDDI Negative Emotional: r = -.35** DDDI Aggressive Driving: r = -.30** DDDI Total: r = -.36**
EX scores would be significantly, positively correlated with DDDI Risky Driving scores	No	DDDI Risky Driving: r = -.19**
EX scores would not be significantly correlated with DDDI Negative Emotional Driving scores	No	DDDI Negative Emotional: r = -.17**
AX scores would be significantly, positively correlated with DDDI Negative Emotional Driving scores	Yes	DDDI Negative Emotional: r = .37**
AX scores would not be significantly correlated with DDDI Risky Driving scores	No, qualified	DDDI Risky Driving: r = .14*
TM scores would be significantly, positively correlated with DDDI Aggressive Driving and DDDI Risky Driving scores	No	DDDI Risky Driving: r = .07 DDDI Aggressive Driving: r = .03
TM scores would not significantly correlated with DDDI Negative Emotional Driving scores	Yes	DDDI Negative Emotional: r = .04
IN scores would be significantly, positively correlated with DDDI Risky Driving and Aggressive Driving scores	Yes	DDDI Risky Driving: r = .16** DDDI Aggressive Driving: r = .24**
IN scores would not significantly correlated with DDDI Negative Emotional Driving scores	No, qualified	DDDI Negative Emotional: r = .13*
SC scores would be significantly, negatively correlated with DDDI Risky Driving and Aggressive Driving scores	Yes	DDDI Risky Driving: r = -.27** DDDI Aggressive Driving: r = -.17**
SC scores would not be significantly correlated with DDDI Negative Emotional Driving scores	No, qualified	DDDI Negative Emotional: r = -.14*
ES scores would be significantly, negatively correlated with DDDI Negative Emotional Driving and DDDI Aggressive Driving scores	Yes, qualified for DDDI Aggressive Driving	DDDI Negative Emotional: r = -.33** DDDI Aggressive Driving: r = -.14*
ES scores would not be significantly correlated with DDDI Risky Driving scores	No	DDDI Risky Driving: r = -.18**
RC scores would be significantly, negatively correlated with DDDI Risky Driving and DDDI Aggressive Driving scores	Yes	DDDI Risky Driving: r = -.29** DDDI Aggressive Driving: r = -.20**
RC scores would not be significantly correlated with DDDI Negative Emotional Driving scores	No	DDDI Negative Emotional: r = -.18**
TN scores would be significantly, positively correlated with DDDI Negative Emotional Driving scores and DDDI Aggressive Driving scores	Yes	DDDI Negative Emotional: r = .35** DDDI Aggressive Driving: r = .24**
TN scores would not be significantly correlated with DDDI Risky Driving scores	No, qualified	DDDI Risky Driving: r = .15*
Alpha coefficients would exceed .75 on all DDDI scales	Yes	DDDI Risky Driving: ά = .81 DDDI Negative Emotional: ά = .79 DDDI Aggressive Driving: ά = .85 DDDI Total: ά = .91
When each subscale was subjected to a principle components factor analysis, there would be a single interpretable factor where each item would load at .40 or higher	Yes for DDDI Negative Emotional Yes for DDDI Aggressive Driving No for DDDI Risky Driving	See Tables 20, 21, and 22
When subjected to a principle components factor analysis, three interpretable factors would emerge from the DDDI Dangerous Driving Total scale, where constituent items loading at .40 or higher, would belong to their respective predetermined subscales	No	The first factor emerged with all items loading at .3 or higher; 5 other factors emerged with combinations of all subscales being represented in content
DDDI subscale scores would be correlated with self-estimated risky, negative emotional, and aggressive driver behavior items from the demographic questionnaire as a further measure of each subscale's concurrent and convergent validity	Yes, qualified	See Table 19

Table 9: Summary of Study One Hypotheses and Support Statuses

Scale	Males	Females	*t* value
DDDI Risky Driving	25.46 (6.58)	22.04 (5.30)	4.72**
DDDI Negative Emotional	25.09 (5.05)	24.30 (4.82)	1.29
DDDI Aggressive Driving	15.68 (5.40)	13.91 (4.30)	2.88**
DDDI Total	66.22 (15.13)	60.25 (12.34)	3.56**
Propensity for Angry Driving Scale	47.88 (13.52)	42.52 (11.56)	3.51**
EPQ Venturesomeness	7.37 (1.41)	6.54 (1.69)	4.41**
16PF Impression Management	8.89 (4.00)	9.57 (4.59)	-1.24
16PF Extraversion	58.19 (14.54)	67.32 (17.57)	-4.53**
16PF Anxiety	58.25 (16.18)	62.09 (17.48)	-1.78†
16PF Tough-Mindedness	58.59 (16.61)	48.89 (17.21)	4.50**
16PF Independence	58.52 (16.81)	59.54 (21.21)	-0.43
16PF Self-Control	38.93 (12.47)	44.55 (17.05)	-3.04**
16PF Emotional Stability	5.31 (1.74)	5.36 (1.83)	-0.20
16PF Rule-Consciousness	4.33 (1.55)	4.84 (1.84)	-2.32*
16PF Tension	5.41 (1.64)	5.86 (1.55)	-2.25*
STAXI Trait Anger	19.00 (5.18)	18.02 (4.61)	1.63†
STAXI Angry Temperament	6.20 (2.44)	5.88 (2.24)	1.09
STAXI Angry Reaction	9.18 (2.44)	9.08 (2.36)	0.35
STAXI Anger Out	16.63 (3.56)	15.74 (3.83)	1.92†
IBS Denial	2.04 (1.48)	2.08 (1.58)	-0.21
IBS General Assertiveness	15.05 (4.04)	14.45 (4.23)	1.17
IBS General Aggressiveness	10.93 (4.05)	8.78 (3.99)	4.33**
IBS Anger Expression	2.04 (1.81)	1.60 (1.65)	2.10*
IBS Physical Aggression	2.40 (1.34)	1.32 (1.17)	7.06**
IBS Verbal Aggression	5.25 (2.29)	4.02 (2.24)	4.40**
At-Fault Crashes (Last 3 Yrs)	0.31 (0.64)	0.48 (0.86)	-1.78†
Cut Off Another Driver (Last 2 Wks)	0.96 (1.25)	1.02 (1.54)	-0.33
Honked Horn in Frustration (Last 2 Wks)	0.80 (1.62)	0.70 (1.48)	0.55
Made “Obscene” Gesture (Last 2 Wks)	0.54 (1.60)	0.17 (0.59)	2.28*
Received Moving Violation (Last 3 Yrs)	1.36 (0.13)	0.64 (1.03)	3.21**
Running Red Lights (Last 2 Wks)	0.71 (1.57)	0.39 (0.92)	1.96*
Speeding >5 MPH Over Limit (Last 2 Wks)	13.38 (14.90)	10.19 (12.33)	1.92†
Tailgating Another Driver (Last 2 Wks)	1.25 (2.48)	1.55 (2.69)	-0.91
Total Driving Under Influence (Ever)	8.93 (17.77)	12.48 (86.08)	-0.43
Wearing Safety Belt (In General)	4.53 (0.84)	4.75 (0.67)	-2.43*
Weaved In/Out of Traffic (Last 2 Wks)	3.14 (7.32)	1.90 (2.79)	1.71†
Yelled/Cursed Another Driver (Last 2 Wks)	2.16 (6.00)	1.70 (3.12)	0.83

Table 10: *M's*, *SD's*, and *t* Values for DDDI, PADS, EPQV, 16PF, IBS and STAXI by Gender.
Note: * = $p \leq .05$; ** = $p \leq .01$; † = $p \leq .10$ (approached statistical significance);
SD's are in parentheses; *df's* ranged from 253 to 270 for all analyses.

Scale	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.60**	.65**	.88**
DDDI Negative Emotional (DDDI NE)	.60**	---	.69**	.86**
DDDI Aggressive Driving (DDDI AD)	.65**	.69**	---	.88**
DDDI Total (DDDI DDT)	.88**	.86**	.88**	---
EPQ Venturesomeness	.25**	.06	.18**	.20**
16PF Impression Management	-.29**	-.35**	-.30**	-.36**
16PF Extraversion	-.19**	-.17**	-.13*	-.19**
16PF Anxiety	.14*	.37**	.18**	.25**
16PF Tough-Mindedness	.07	.04	.03	.05
16PF Independence	.16**	.13*	.24**	.20**
16PF Self-Control	-.27**	-.14*	-.17**	-.23**
16PF Emotional Stability	-.18**	-.33**	-.14*	-.25**
16PF Rule-Consciousness	-.29**	-.18**	-.20**	-.26**
16PF Tension	.15*	.35**	.24**	.28**

Table 11: Correlations Between Newly Used Measures (Study One) and DDDI Scales.
Note: * = $p \leq .05$; ** = $p \leq .01$

Scale	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.60**	.65**	.88**
DDDI Negative Emotional (DDDI NE)	.60**	---	.69**	.86**
DDDI Aggressive Driving (DDDI AD)	.65**	.69**	---	.88**
DDDI Total (DDDI DDT)	.88**	.86**	.88**	---
Propensity for Angry Driving Scale	.63**	.61**	.70**	.74**
STAXI Trait Anger	.34**	.59**	.49**	.53**
STAXI Angry Temperament	.27**	.52**	.45**	.46**
STAXI Angry Reaction	.26**	.47**	.33**	.40**
STAXI Anger Out	.35**	.49**	.49**	.50**
IBS Denial	-.25**	-.19**	-.23**	-.25**
IBS General Assertiveness	.18**	.15*	.26**	.22**
IBS General Aggressiveness	.46**	.38**	.47**	.50**
IBS Anger Expression	.38**	.50**	.52**	.53**
IBS Physical Aggression	.40**	.31**	.40**	.42**
IBS Verbal Aggression	.32**	.30**	.40**	.39**

Table 12: Correlations Between Previously Used Measures (Dula & Ballard, in press), and DDDI Scales.
Note: * = $p \leq .05$; ** = $p \leq .01$

Scale	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.60**	.65**	.88**
DDDI Negative Emotional (DDDI NE)	.60**	---	.69**	.86**
DDDI Aggressive Driving (DDDI AD)	.65**	.69**	---	.88**
DDDI Total (DDDI DDT)	.88**	.86**	.88**	---
16PF Openness to Change	.06	-.04	.05	.03
16PF Infrequency	-.02	-.04	.03	-.01
16PF Artistic	.01	-.01	.05	.02
16PF Conventional	-.13*	-.09	-.07	-.11
16PF Enterprising	.10	.04	.14*	.11
16PF Leadership Potential	-.12	-.19**	-.05	-.14*
16PF Creative Potential	.12	.08	.19**	.15*

Table 13: Correlations Between DDDI Scales and Selected 16PF Scales.
Note: * = $p \leq .05$; ** = $p \leq .01$

Scale/Behavior/Emotion	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.60**	.65**	.88**
DDDI Negative Emotional (DDDI NE)	.60**	---	.69**	.86**
DDDI Aggressive Driving (DDDI AD)	.65**	.69**	---	.88**
DDDI Total (DDDI DDT)	.88**	.86**	.88**	---
Risky Behavior/Event	---	---	---	---
Adjusted Music (in last 2 wks.)	.05	.04	.02	.04
At Fault Crashes (in last 3 yrs.)	.05	.11	.09	.10
Checked Appearance (in last 2 wks.)	.13*	.12	.08	.12*
Cut Off Others (in last 2 wks.)	.29**	.24**	.31**	.32**
DWI (in last Month)	.20**	.06	.12*	.15*
Eaten Food (in last 2 wks.)	.17**	.27**	.22**	.24**
Ran Red Lights (in last 2 wks.)	.30**	.24**	.25**	.31**
Read (in last 2 wks.)	.10	.00	.08	.07
Safety belt Use (in general)	-.24**	-.12*	-.08	-.18**
Sped < 5mph Over Limit (in last 2 wks.)	.22**	.21**	.20**	.24**
Tailgated (in last 2 wks.)	.28**	.23**	.30**	.31**
Talked on Phone (in last 2 wks.)	.13*	.18**	.15*	.17**
Tickets (in last 3 yrs.)	.29**	.20**	.30**	.30**
Weaved in Traffic (in last 2 wks.)	.24**	.17**	.23**	.25**
Written (in last 2 wks.)	.18**	.21**	.24**	.24**
Risky Driving Total Score	.34**	.32**	.34**	.38**
Negative Emotions	---	---	---	---
Cursed/Yelled at Others (in last 2 wks.)	.20**	.28**	.29**	.29**
Honked Horn from Frustration (in last 2 wks.)	.18**	.37**	.35**	.33**
Aggressive Behaviors	---	---	---	---
Gestured Rudely/Obscenely to Others (in last 2 wks.)	.27**	.29**	.30**	.33**
Perceived Negative Behaviors Toward Self	---	---	---	---
Was Honked at (in last 2 wks.)	.28**	.23**	.29**	.31**
Was Cursed/Yelled at (in last 2 wks.)	.15*	.17**	.25**	.21**
Was Gestured Rudely/Obscenely at (in last 2 wks.)	.19**	.13*	.19**	.20**

Table 14: Correlations Between Risky and Aggressive Driving Behaviors, Negative Emotions Expressed While Driving, Perceived Negative Behaviors Toward Self, and DDDI Scales.
Note: * = $p \leq .05$; ** = $p \leq .01$

Scale Item	Factors		
	1	2	3
DDDI9RD	.42	.35	-.10
DDDI10RD	.56	.30	-.33
DDDI13RD	.41	.32	.64
DDDI14RD	.58	-.03	-.31
DDDI15RD	.59	-.63	.11
DDDI20RD	.72	.12	-.10
DDDI21RD	.64	.06	-.09
DDDI23RD	.63	.19	.34
DDDI24RD	.65	.15	.32
DDDI25RD	.52	-.67	.20
DDDI27RD	.53	-.14	-.34
DDDI28RD	.56	.04	-.22

Table 15: Principal Components Factor Analysis of DDDI Risky Driving Subscale Items (a,b,c)
a. Factor 1 Eigenvalue = 3.96; b. Factor 2 Eigenvalue = 1.26;
c. Factor 3 Eigenvalue = 1.07

Scale Item	Factor
	1
DDDI1NE	.47
DDDI2NE	.73
DDDI3NE	.59
DDDI12NE	.62
DDDI17NE	.68
DDDI18NE	.58
DDDI19NE	.68
DDDI22NE	.56
DDDI26NE	.66

Table 16: Principal Components Factor Analysis of DDDI Negative Emotional Subscale Items (a)
a. Factor 1 Eigenvalue = 3.49

Scale Item	Factor 1
DDDI4AD	.63
DDDI5AD	.76
DDDI6AD	.72
DDDI7AD	.73
DDDI8AD	.68
DDDI11AD	.75
DDDI16AD	.81

Table 17: Principal Components Factor Analysis of DDDI Aggressive Driving Subscale Items (a)
a. Factor 1 Eigenvalue = 3.70

Scale Item	Factors					
	1	2	3	4	5	6
DDDI1NE	.38	-.20	.32	-.37	.16	.28
DDDI2NE	.60	-.40	.07	-.15	.08	.13
DDDI3NE	.49	-.25	.10	.02	-.27	.11
DDDI4AD	.59	-.03	-.16	-.03	.40	.10
DDDI5AD	.66	-.13	-.35	-.22	.25	-.13
DDDI6AD	.58	-.29	-.37	-.15	.18	-.07
DDDI7AD	.59	-.14	-.30	-.29	-.21	.19
DDDI8AD	.63	.00	-.01	-.30	-.30	.17
DDDI9RD	.36	.23	-.20	-.05	-.29	.35
DDDI10RD	.55	.03	-.06	.19	-.03	.03
DDDI11AD	.72	.06	-.14	.02	-.14	.11
DDDI12NE	.45	-.38	.33	.40	.03	.07
DDDI13RD	.32	.29	-.11	.39	-.08	.36
DDDI14RD	.56	.02	.19	-.02	-.25	-.17
DDDI15RD	.45	.38	.55	-.21	.20	.05
DDDI16AD	.78	-.05	-.10	-.05	-.09	.12
DDDI17NE	.50	-.42	.29	.33	.03	-.02
DDDI18NE	.51	-.16	-.10	.12	.45	-.05
DDDI19NE	.52	-.42	.22	.04	-.22	-.22
DDDI20RD	.65	.25	.05	.06	-.01	.05
DDDI21RD	.63	.07	.19	.28	-.10	-.20
DDDI22NE	.62	.06	.04	-.01	-.22	-.21
DDDI23RD	.55	.38	-.11	.22	.14	.12
DDDI24RD	.48	.51	-.11	.27	.06	-.01
DDDI25RD	.38	.41	.51	-.29	.20	.11
DDDI26NE	.68	-.02	-.11	.15	.25	-.14
DDDI27RD	.45	.28	-.03	-.30	-.01	-.45
DDDI28RD	.49	.26	-.08	-.01	-.18	-.40

Table 18: Principal Components Factor Analysis of all DDDI Items (a,b,c,d,e,f)
a. Factor 1 Eigenvalue = 8.55; b. Factor 2 Eigenvalue = 1.99; c. Factor 3 Eigenvalue = 1.52; d. Factor 4 Eigenvalue = 1.32; e. Factor 5 Eigenvalue = 1.18; f. Factor 6 Eigenvalue = 1.10

Appendix F
Study Two Tables

Scale/Behavior/Emotion	Time One Mean (*SD*) (Min/Max)	Time Two Mean (*SD*) (Min/Max)	*r* Value
DDDI Risky Driving	22.90 (6.02) (13/35)	22.67 (5.26) (15/35)	.76**
DDDI Negative Emotional	25.29 (5.23) (19/42)	25.13 (5.16) (15/38)	.68**
DDDI Aggressive Driving	14.26 (3.85) (7/24)	13.33 (3.45) (9/23)	.55*
DDDI Total	62.45 (13.22) (45/93)	61.13 (12.28) (44/89)	.73**
Risky Behavior/Event			
Adjusted Music (in last 2 wks.)	14.43 (19.98) (0/100)	15.86 (21.79) (0/100)	.80**
At Fault Crashes (in last 3 yrs.)	0.37 (0.61) (0/2)	0.43 (0.73) (0/3)	.87**
Checked Appearance (in last 2 wks.)	3.33 (3.97) (0/10)	2.78 (3.51) (0/10)	.65**
Cut Off Others (in last 2 wks.)	1.37 (2.94) (0/15)	0.97 (1.45) (0/5)	.76**
DWI (in last Month)	0.40 (0.52) (0/1)	0.27 (0.65) (0/2)	.00
Eaten Food (in last 2 wks.)	1.67 (1.94) (0/6)	1.27 (1.31) (0/5)	.59**
Ran Red Lights (in last 2 wks.)	0.13 (0.35) (0/1)	0.20 (0.55) (0/2)	.58**
Read (in last 2 wks.)	0.07 (0.37) (0/2)	0.10 (0.31) (0/2)	-.06
Safety belt Use (in general, on 5 point Likert)	4.70 (0.70) (2/5)	4.77 (0.63) (2/5)	.86**
Sped < 5mph Over Limit (in last 2 wks.)	7.77 (8.06) (0/25)	7.67 (8.30) (0/30)	.45*
Tailgated (in last 2 wks.)	1.40 (3.74) (0/20)	1.37 (2.11) (0/10)	.42*
Talked on Phone (in last 2 wks.)	3.9 (6.9) (0/30)	3.6 (6.4) (0/30)	.74**
Tickets (in last 3 yrs.)	0.67 (0.88) (0/4)	0.63 (0.85) (0/4)	.89**
Weaved in Traffic (in last 2 wks.)	2.37 (4.23) (0/15)	1.67 (3.72) (0/20)	.39*
Written (in last 2 wks.)	0.34 (1.04) (0/5)	0.20 (0.55) (0/2)	.61**
Negative Emotions			
Cursed at Others (in last 2 wks.)	1.73 (3.15) (0/10)	0.87 (1.28) (0/5)	.56**
Honked Horn (in last 2 wks.)	0.20 (0.55) (0/2)	0.37 (0.81) (0/3)	-.29
Aggressive Behaviors			
Gestured at Others (in last 2 wks.)	0.07 (0.25) (0/1)	0.07 (0.25) (0/1)	.46**
Perceived Ill Behaviors Toward Self			
Was Honked at (last 2 wks.)	0.24 (0.51) (0/2)	0.23 (0.50) (0/2)	.04
Was Cursed/Yelled at (last 2 wks.)	0.38 (1.86) (0/10)	0.33 (0.55) (0/2)	.25
Was Gestured Rude at (last 2 wks.)	0.03 (0.19) (0/1)	0.07 (0.25) (0/1)	-.05

Table 19: Time One and Time Two Correlations, Means, Standard Deviations, and Minimum and Maximum Values for the DDDI Scales, Risky and Aggressive Behaviors and Negative Emotions.
Note: * = $p \leq .05$; ** = $p \leq .01$

Scale/Behavior/Emotion	DDDI RD S1/S2	DDDI NE S1/S2	DDDI AD S1/S2	DDDI DDT S1/S2
DDDI Risky Driving (DDDI RD)	---	.60**/.58**	.65**/.53**	.88**/.83**
DDDI Negative Emotional (DDDI NE)	.60**/.58**	---	.69**/.68**	.86**/.89**
DDDI Aggressive Driving (DDDI AD)	.65**/.53**	.69**/.68**	---	.88**/.84**
DDDI Total (DDDI DDT)	.88**/.83**	.86**/.89**	.88**/.84**	---
Risky Behavior/Event	---	---	---	---
Adjusted Music (last 2 wks.)	.05/.19	.04/.19	.02/.13	.04/.20
At Fault Crashes (last 3 yrs.)	.05/.36**	.11/.26*	.09/.26*	.10/.35**
Checked Appearance (last 2 wks.)	.13*/.41**	.12/.29*	.08/.38**	.12*/.42**
Cut Off Others (last 2 wks.)	.29**/.19	.24**/.24*	.31**/.08	.32**/.21†
DWI (last Month)	.20**/.12	.06/.02	.12*/.06	.15*/.08
Eaten Food (last 2 wks.)	.17**/.13	.27**/-.01	.22**/.07	.24**/.08
Ran Red Lights (last 2 wks.)	.30**/.21†	.24**/-.02	.25**/-.01	.31**/.07
Read (last 2 wks.)	.10/.28*	.00/.33**	.08/.50**	.07/.42**
Safety belt Use (general)	-.24**/-.19	-.12*/.03	-.08/-.01	-.18**/-.07
Sped < 5mph Over Limit (last 2 wks.)	.22**/.04	.21**/.06	.20**/.09	.24**/.07
Tailgated (last 2 wks.)	.28**/.22†	.23**/.21†	.30**/.12	.31**/.22†
Talked on Phone (last 2 wks.)	.13*/.26*	.18**/.19†	.15*/.15	.17**/.23†
Tickets (last 3 yrs.)	.29**/.36**	.20**/.22†	.30**/.15	.30**/.29*
Weaved in Traffic (last 2 wks.)	.24**/.37**	.17**/.32**	.23**/.15	.25**/.33**
Written (last 2 wks.)	.18**/.18	.21**/.19	.24**/.16	.24**/.21†
Risky Driving Total Score	.34**/.26*	.32**/.24†	.34**/.19	.38**/.27*
Negative Emotions	---	---	---	---
Cursed/Yelled at Others (last 2 wks.)	.20**/.37**	.28**/.19	.29**/.27*	.29**/.32*
Honked Horn -Frustration (last 2 wks.)	.18**/.22†	.37**/.35**	.35**/.35**	.33**/.36**
Aggressive Behaviors	---	---	---	---
Gestured Rude to Others (last 2 wks.)	.27**/.20	.29**/.24†	.30**/.44**	.33**/.33**
Perceived Ill Behaviors Toward Self	---	---	---	---
Was Honked at (last 2 wks.)	.28**/.27*	.23**/.24†	.29**/.14	.31**/.26*
Was Cursed/Yelled at (last 2 wks.)	.15*/.29*	.17**/.22†	.25**/.22†	.21**/.28*
Was Gestured Rude at (last 2 wks.)	.19**/.31*	.13*/.23†	.19**/.16	.20**/.28*

Table 20: Correlations Between Risky and Aggressive Driving Behaviors, Negative Emotions Expressed While Driving, Perceived Negative Behaviors Toward Self, and DDDI Scales: Comparisons Between the Sample from Study One (S1, N ranging from 269 to 274) and the First Sample from Study Two (S2, $N = 63$)

Note: * = $p \leq .05$; ** = $p \leq .01$; † = $p \leq .10$ (approached statistical significance)

Appendix G
Researcher Protocol for Study Three

Driving Simulator Protocol

1. Before subject gets there have experimenter set up booth.
    a. plug steering wheel into first slot at left of Playstation
    b. turn play station on in back
    c. press eject button to put game in
    d. turn on TV FIRST button on right when looking at TV
    e. after game goes through credits hit "**X**"
    f. choose "**ARCADE**" mode (press "**X**")
    g. choose "**NEW YORK**" (press "**X**")
    h. choose "**CRUISE**" (press "**X**")
    i. choose "**ONE PLAYER**" (press "**X**")
    j. choose the **ORANGE** car by hitting right using keypad in middle of steering wheel (press"**X**")
    k. press "X" twice to keep the same color and auto transmission
    l. choose **LAUNCH** (press "**X**")
    m. press "**B**" (on left side of steering wheel) until windshield view is as if inside the car
    n. make sure cover is over window where TV is to block out distractions
    o. turn on video recorder (power only)
2. Greeter greets subject and **WAITS** till confederate is present to fill out forms
    a. gives informed consent asks them to fill one out and keep one (noting that they must put their social security/student id number and e-mail so we can assign credit)
    b. gives both "participants" the questionnaire packet (have them put at the very top of the page their subject number which is **FIRST TWO LETTERS OF THE CITY THEY WERE BORN IN and LAST 4 DIGETS OF THIER STUDENT ID/SOCIAL SECURITY NUMBER**
3. After both have completed surveys experimenter will take both into the lab
4. Explain project to both subjects **AT THE SAME TIME while both are looking at THE SMALL BOOTH**
    a. " what you will be doing tonight is competing for a $5 prize"
    b. "the point of the competition is to see who can get the farthest on the map with the lowest damage. We will give you a practice run to get use to the game then have 3 races with whoever wins best two out of three being the winner"
    c. "follow all rules we give you and drive as you **NORMALLY** would"
    d. "we have randomly assigned you both to a booth (confederate gets big one subject gets small one)"
    e. "I will show you both what you will be doing then get you each set up in your own booth"
    f. show them the booth point out the posted rules (emphasize that they should say turning right and turning left and that they should ignore any speed limits posted on the game) and the map – turn on the map light!

g. show them the headphones turn them on for them and show them how to adjust the volume
h. show them how to use the rearview mirror (its is R2 on the right side of the steering wheel)
i. mention that if they are hit from behind or by any other vehicles on the road that they will not be penalized for that
j. mention that if they get off the assigned rout to not worry just try to get back on the rout and keep going because they are never sure how the other person is doing they are still in the race
k. tell both participants that when you say "go" and "stop" that they are to hit the **START** button
l. TURN ON VIDEO RECORDER (hit record button but first make sure standby button is not on)
m. have subject get settled in their booth and give them the first **SHORT QUESTIONAIRE**
n. while they fill that out WITH THE DOOR CLOSED place confederate in their booth
o. after about a minute go back to subject collect the questionnaire and then ask if they have any questions
p. fill out the wipe board with their participant number and the race number PRACTICE (MAKE SURE INSIDE LIGHT IN BOOTH IS ON SO BOARD CAN BE READ"
q. close the door pull down the tarp
r. once you are ready to go ask "can you both hear me" once participant says "yes" say GO and start timer
s. after 5 minutes check first on participant telling them they can turn on the light and asking them to fill out the SECOND **SHORT QUESTIONAIRE**
t. close the door then and "check" on the confederate take about 3 minutes to do this
u. go back to participant take their questionnaire RESET THIER GAME so they start at the same place
v. say that this will begin the competition it will be another 5 minute session
w. before turning off the light in the booth hold up the wipe board to the camera with participant number on it and RACE 1
x. turn off light close door pull down tarp
y. ask "can you both hear me" then when they say yes say GO and time them for 5 minutes
z. after 5 minutes say stop enter participants booth have them turn on the light and fill out the THIRD **SHORT QUESTIONAIRE** HIT START BUTTON TO CHECK THIER STATS!!!
aa. close the door and "check" on confederate for about 3 minutes
bb. return to participant take questionnaire from them RESET THIER GAME so they start at the same point

cc. inform them that the **other person** won that race but just barely, "it was really close" then remind them they still have two chances to win
dd. before turning off the light in the booth hold up the wipe board to the camera with participant number on it and RACE 2
ee. turn off inside light, close the door, pull down the tarp
ff. ask if they can both hear you, say GO and start the timer
gg. after 5 minutes say stop enter participants booth have them turn on the light and fill out the FORTH **SHORT QUESTIONAIRE** HIT START BUTTON TO CHECK THEIR STATS!!!
hh. after about 3 minutes return to participant collect their questionnaire RESTART THEIR GAME so they start at the same place
ii. inform them that **THEY** won this race and that the last race will determine the winner
jj. before turning off the light in the booth hold up the wipe board to the camera with participant number on it and RACE 3
kk. turn off light, close door, pull down tarp
ll. ask if they can both hear you say GO and start timer
mm. after 5 minutes say stop enter participants booth have them turn on the light and fill out the FIFTH **SHORT QUESTIONAIRE** HIT START BUTTON TO CHECK THIER STATS!!!
nn. Check on confederate then have them step out
oo. Tell participant after they are through filling out the questionnaire they can come out
pp. Inform them that the participant won the last race thank both for participating and make sure they know they will both receive their two points of extra credit

5. When new participant is here make sure greeter lets experimenter know sex of next participant and leave whoever will be experimenter to reset up booth and then have confederate quietly enter CABS

Appendix H
Short Questionnaire for Study Three

Note: These questionnaires were given to participants to fill out in the booth where they were playing the video-game. They are labeled as to which set of questions was given at each particular time.

Before Practice Run

How do you feel at this moment?
Anger:

1 2 3 4 5 6 7
(1 = None) (7 = Couldn't be more angry)

Frustration:

1 2 3 4 5 6 7
(1 = None) (7 = Couldn't be more frustrated)

Physical Comfort:

1 2 3 4 5 6 7
(1 = Completely comfortable) (7 = Couldn't be more uncomfortable)

How much do you think you will like the driving simulator?

1 2 3 4 5 6 7
(1 = Love it) (7 = Hate it)

How well do you think you will do in learning the game in the next 5 minutes?

1 2 3 4 5 6 7
(1 = Very well) (7 = Not at all well)

After Practice Run

How do you feel at this moment?
Anger:

1 2 3 4 5 6 7
(1 = None) (7 = Couldn't be more angry)

Frustration:

1 2 3 4 5 6 7
(1 = None) (7 = Couldn't be more frustrated)

Physical Comfort:

1 2 3 4 5 6 7
(1 = Completely comfortable) (7 = Couldn't be more uncomfortable)

How do you feel about the driving simulator?

1 2 3 4 5 6 7
(1 = Love it) (7 = Hate it)

How well do you think you've learned the game so far?

1 2 3 4 5 6 7
(1 = Very well) (7 = Not at all well)

After Race One

How do you feel at this moment?

Anger:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more angry)

Frustration:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more frustrated)

Physical Comfort:

1 2 3 4 5 6 7

(1 = Completely comfortable) (7 = Couldn't be more uncomfortable)

How do you feel about the driving simulator?

1 2 3 4 5 6 7

(1 = Love it) (7 = Hate it)

How well do you think you've learned the game so far?

1 2 3 4 5 6 7

(1 = Very well) (7 = Not at all well)

After Race Two

How do you feel at this moment?

Anger:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more angry)

Frustration:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more frustrated)

Physical Comfort:

1 2 3 4 5 6 7

(1 = Completely comfortable) (7 = Couldn't be more uncomfortable)

How do you feel about the driving simulator?

1 2 3 4 5 6 7

(1 = Love it) (7 = Hate it)

How well do you think you've learned the game so far?

1 2 3 4 5 6 7

(1 = Very well) (7 = Not at all well)

After Race Three

How do you feel at this moment?

Anger:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more angry)

Frustration:

1 2 3 4 5 6 7

(1 = None) (7 = Couldn't be more frustrated)

Physical Comfort:

1 2 3 4 5 6 7

(1 = Completely comfortable) (7 = Couldn't be more uncomfortable)

How do you feel about the driving simulator?

1 2 3 4 5 6 7

(1 = Love it) (7 = Hate it)

How well do you think you've learned the game so far?

1 2 3 4 5 6 7

(1 = Very well) (7 = Not at all well)

Did you feel at all claustrophobic? Yes ____ No ____

IF yes, how claustrophobic did you feel?

1 2 3 4 5 6 7

(1 = Almost not at all) (7 = Almost unbearable)

Did the camera affect your performance? Yes ____ No ____

IF yes, did it affect your performance in a good or bad way? Good ____ Bad ____

How much did it affect your performance?

1 2 3 4 5 6 7

(1 = Almost not at all) (7 = Couldn't have affected it more)

Have you drunk alcohol in the last 24 hours? Yes ____ No ____

IF yes, how many drinks did you have? _____

Do you have any hangover effect now? Yes ____ No ____

IF yes, did it affect your performance in a good or bad way? Good ____ Bad ____

How much did it affect your performance?

1 2 3 4 5 6 7

(1 = Almost not at all) (7 = Couldn't have affected it more)

Have you smoked marijuana in the last 24 hours? Yes ____ No ____

IF yes, how many times did you have a hit/draw/drag/puff of marijuana? _____

Do you feel any effect now? Yes ____ No ____

IF yes, did it affect your performance in a good or bad way? Good ____ Bad ____

How much did it affect your performance?

1 2 3 4 5 6 7

(1 = Almost not at all) (7 = Couldn't have affected it more)

What do you feel was the purpose of this study?_____

_____

_____

Appendix I
Study Three Tables

Scale/Behavior	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.60**	.45**	.84**
DDDI Negative Emotional (DDDI NE)	.60**	---	.65**	.88**
DDDI Aggressive Driving (DDDI AD)	.45**	.65**	---	.80**
DDDI Total (DDDI DDT)	.84**	.88**	.80**	---
Driver Skill (7-point Likert scale from "Beginner" to "Expert")	-.20	-.24	-.31*	-.31†
Hit Total (including hitting pedestrians, vehicles, and other objects)	.10	.38*	.32*	.30†
Red Light Running Total (total # of lights run, yellows not counted))	.48**	.53**	.49**	.61**
Red Light Running Percentage (lights run/total lights encountered)	.42*	.46**	.48**	.53**
Speeding Total (total number of instances going over the speed limit)	.41*	.49**	.54**	.56**
Speeding Percentage (amt of time speeding/total amt of time racing)	.60**	.37*	.43*	.56**
Weaving Total (including lane deviations, changes, and going off road)	.42*	.56**	.41*	.54**
At-risk Turns Total (failing to state "right" or "left" prior to a turn)	.18	-.07	-.01	.05
At-risk Turns Percentage (at-risk turns/total turns)	.17	-.11	-.07	-.02
Risky Driving Game Total	.45**	.58**	.50**	.60**
Negative Emotional Game Total	.38*	.38*	.12	.36*
Aggressive Driving Game Total	.30†	.44**	.22	.38*
Dangerous Driving Game Total	.50**	.62**	.49**	.63**

Table 21: Correlations Between Observed Risky and Aggressive Driving Behaviors, and Emotions Felt While Driving in a Video Game, and DDDI Scales.

Note: * = $p \leq .05$; ** = $p \leq .01$; † = $p \leq .10$ (approached statistical significance); total scores, averages, and percentages, are for all three races combined; correlation matrix represents relationships after partialing out average liking of the game, average learning of the game, and average physical comfort during the game.

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.558	0.312	0.290	14.48	.001
(DDDI Total, r =.54**)					
Model 2	0.646	0.417	0.380	11.10	.000
(Model 1 + Skill Level, r = -.32)					
Total Percentage of Variance Accounted For By All Models = 38.0%					

Table 22: Predictor Variables† Regressed Stepwise onto Total Risky Driving Video Game Behaviors

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

‡R2 increases incrementally with each additional model.

Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.451	0.204	0.179	8.18	.007
(DDDI Negative Emotional, r = .46**)					
Total Percentage of Variance Accounted For By Model = 17.9%					

Table 23: Predictor Variables† Regressed Stepwise onto Total Negative Video Game Emotions
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.412	0.170	0.144	6.55	.015
(DDDI Negative Emotional, r = .38*)					
Total Percentage of Variance Accounted For By Model = 14.4%					

Table 24: Predictor Variables† Regressed Stepwise onto Total Aggressive Video Game Behaviors
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.613	0.376	0.356	19.25	.000
(DDDI Negative Emotional, r =.59**)					
Model 2	0.713	0.509	0.477	16.06	.000
(Model 1 + Skill Level, r = -.32*)					
Total Percentage of Variance Accounted For By All Models = 47.7%					

Table 25: Predictor Variables† Regressed Stepwise onto Total Dangerous Driving Video Game Behaviors/Emotions
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.404	0.163	0.136	6.04	.020
(DDDI Negative Emotional, $r = .38$*)					
Total Percentage of Variance Accounted For By Model = 13.6%					

Table 26: Predictor Variables† Regressed Stepwise onto Total Collisions (Hit Total)
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.568	0.323	0.301	14.80	.001
(DDDI Negative Emotional, $r = .38$*)					
Total Percentage of Variance Accounted For By Model = 30.1%					

Table 27: Predictor Variables† Regressed Stepwise onto Total Red Lights Run
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.537	0.288	0.266	12.57	.001
(DDDI Total, $r = .56$**)					
Total Percentage of Variance Accounted For By Model = 26.6%					

Table 28: Predictor Variables† Regressed Stepwise onto Total Speeding Incidents
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.526	0.276	0.253	11.84	.002
(DDDI Total, r =.54**)					
Model 2	0.656	0.430	0.392	11.32	.000
(Model 1 + Skill Level, r = .20					
Total Percentage of Variance Accounted For By All Models = 39.2%					

Table 29: Predictor Variables† Regressed Stepwise onto Total Weaving Incidents
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.446	0.199	0.174	7.72	.009
(Tickets in Last 3 Yrs, r = .37*)					
Total Percentage of Variance Accounted For By Model = 17.4%					

Table 30: Predictor Variables† Regressed Stepwise onto Total At-risk Turns
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.418	0.175	0.148	6.57	.015
(DDDI Negative Emotional, r = .38*)					
Total Percentage of Variance Accounted For By Model = 14.8%					

Table 31: Predictor Variables† Regressed Stepwise onto Aggressive Utterances Directed at Video Game Generated Drivers
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Appendix J
Driving Behavior/Emotion Checklist (Driving Diary Form) for Study Four

Important: Please ***read directions and categories carefully***. Check here if odometer/tripometer does not record tenths of a mile ___ (if not, don't use last blank below).

Within each trip column to the right, please *place a check mark* for everything you felt and/or did *even once* during each trip. (Leave blank if doesn't apply). Put trip comments on back.	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	For *every* trip, clearly write in: date and start/end times; last 4 digits of odometer (*include 10ths of a mile*); circle all weather conditions; and, gauge traffic on a scale of 1 to 5
----Driving Behaviors/Events----	#1	#2	#3	#4	#5	#6	#7	#8	*PLEASE PRINT VERY CLEARLY!*
Completely ran red light or stop sign									Trip 1: Date: _____ / _____ (mm/dd)
Went through a late yellow light or rolled through a stop sign									Start _____am/pm; Stop _____am/pm
Tailgated (less than 2 seconds following distance on open road)									Odometer digits Start: __ __ __ . __
Went more than 10 mph above the posted limit									Odometer digits End: __ __ __ . __
Weaved (changed to another lane and back in under 30 seconds)									Circle all weather and average traffic:
Did not use turn signal before a turn									Dry Fog Rain Snow Ice Wet Glare
Pulled out in front of someone without enough space									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Let another vehicle come in front of me									Trip 2: Date: _____ / _____ (mm/dd)
Did not let another vehicle in front of me									Start _____am/pm; Stop _____am/pm
Waved to driver/cyclist/pedestrian (e.g., in thanks, to be friendly)									Odometer digits Start: __ __ __ . __
Flashed headlights as a negative signal (e.g., anger or annoyance)									Odometer digits End: __ __ __ . __
Honked my horn as a positive signal (e.g., in thanks, to warn)									Circle all weather and average traffic:
Honked my horn as a negative signal (e.g., in anger or annoyance)									Dry Fog Rain Snow Ice Wet Glare
Unintentionally crossed lane line or over the edge of the road									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Made negative/rude/obscene gestures to a driver openly									Trip 3: Date: _____ / _____ (mm/dd)
Made negative remarks about a driver quietly or to myself									Start _____am/pm; Stop _____am/pm
Talked on cell phone (*put a Check Plus √+ if it's a Hands-Free*									Odometer digits Start: __ __ __ . __
Changed the: radio station, a CD, and/or a cassette tape									Odometer digits End: __ __ __ . __
Wore my safety belt									Circle all weather and average traffic:
Smoked while driving									Dry Fog Rain Snow Ice Wet Glare
Had food/drink while driving									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Encountered road work									Trip 4: Date: _____ / _____ (mm/dd)
Saw police/sheriff/state trooper vehicle									Start _____am/pm; Stop _____am/pm
Passed illegally (e.g., crossed solid line or went onto shoulder)									Odometer digits Start: __ __ __ . __
Write in Other here:									Odometer digits End: __ __ __ . __
Write in Other here:									Circle all weather and average traffic:
---- Self Feelings While Driving----	#1	#2	#3	#4	#5	#6	#7	#8	Dry Fog Rain Snow Ice Wet Glare
Felt happy									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Felt in a hurry									Trip 5: Date: _____ / _____ (mm/dd)
Felt anxious									Start _____am/pm; Stop _____am/pm
Felt angry									Odometer digits Start: __ __ __ . __
Felt frustrated									Odometer digits End: __ __ __ . __
Felt impatient									Circle all weather and average traffic:
Felt sick/was in pain									Dry Fog Rain Snow Ice Wet Glare
Felt relaxed									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Felt sleepy/tired									Trip 6: Date: _____ / _____ (mm/dd)
Felt depressed									Start _____am/pm; Stop _____am/pm
---Feelings About Others While Driving----	#1	#2	#3	#4	#5	#6	#7	#8	Odometer digits Start: __ __ __ . __
Felt friendly toward another driver									Odometer digits End: __ __ __ . __
Felt annoyed by another driver									Circle all weather and average traffic:
Felt angry toward another driver									Dry Fog Rain Snow Ice Wet Glare
Felt my/our safety was threatened by another driver									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
Felt another driver was being aggressive toward me/us									Trip 7: Date: _____ / _____ (mm/dd)
Felt annoyed/angry with a passenger									Start _____am/pm; Stop _____am/pm
Felt annoyed/angry with a pedestrian or bicyclist									Odometer digits Start: __ __ __ . __
---Write Feeling Toward Self/Other Not Listed Above---	#1	#2	#3	#4	#5	#6	#7	#8	Odometer digits End: __ __ __ . __
Write in Other here:									Circle all weather and average traffic:
Write in Other here:									Dry Fog Rain Snow Ice Wet Glare
									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)
									Trip 8: Date: _____ / _____ (mm/dd)
									Start _____am/pm; Stop _____am/pm
									Odometer digits Start: __ __ __ . __
									Odometer digits End: __ __ __ . __
									Circle all weather and average traffic:
									Dry Fog Rain Snow Ice Wet Glare
									(Traffic Light) 1 2 3 4 5 6 7 (Heavy)

Note: The table above has been modified and made smaller to fit this page. Some minor instructions and details have been deleted.

Please write in any comments that would help us to understand your behaviors/feelings on any trip. Please write in the trip date. If you need to, feel free to add another sheet; just be sure to label the trip number and trip date.

Comments for Trip #1 (Date __/__ mm/dd):

Comments for Trip #2 (Date __/__ mm/dd):

Comments for Trip #3 (Date __/__ mm/dd):

Comments for Trip #4 (Date __/__ mm/dd):

Comments for Trip #5 (Date __/__ mm/dd):

Comments for Trip #6 (Date __/__ mm/dd):

Comments for Trip #7 (Date __/__ mm/dd):

Comments for Trip #8 (Date __/__ mm/dd):

Appendix K
Study Four Tables

Scale/Behavior/Emotion	DDDI RD	DDDI NE	DDDI AD	DDDI DDT
DDDI Risky Driving (DDDI RD)	---	.47**	.28	.79**
DDDI Negative Emotional (DDDI NE)	.47**	---	.42**	.84**
DDDI Aggressive Driving (DDDI AD)	.28	.42**	---	.69**
DDDI Total (DDDI DDT)	.79**	.84**	.69**	---
----Risky and Aggressive Driving Behaviors----				
1. Completely ran red light or stop sign	.23	.25	.36†	.34†
2. Did not let another vehicle in front of me	.39†	.31	-.13	.28
3. Did not use turn signal before a turn	.60**	.35†	.08	.47*
4. Flashed headlights as a negative signal (e.g., anger or annoyance)	.13	.30	.40*	.33
5. Honked my horn as a negative signal (e.g., in anger or annoyance)	.00	.20	.39†	.19
6. Made negative/rude/obscene gestures to a driver openly	-.06	.18	.33*	.15
7. Passed illegally (e.g., crossed solid line or went onto shoulder)	.04	.11	.37†	.19
8. Pulled out in front of someone without enough space	.34†	.14	-.23	.15
9. Tailgated (less than 2 seconds following distance on open road)	.42*	.27	.16	.37†
10. Unintentionally crossed lane line or over the edge of the road	.29	.36†	.49*	.46*
11. Weaved (changed to another lane and back in under 30 seconds)	.20	.15	.23	.24
12. Went more than 10 mph above the posted limit	.51**	.57**	.03	.51**
13. Went through a late yellow light or rolled through a stop sign	.54**	.35†	.22	.49*
14. Wore my safety belt	-.32	-.38†	-.19	-.39†
---- Self Feelings While Driving----				
15. Felt angry	.29	.05	-.08	.13
16. Felt frustrated	.27	.16	-.14	.15
17. Felt in a hurry	.20	.45*	-.14	.25
---Feelings About Others While Driving----				
18. Felt friendly toward another driver	-.09	-.05	-.40*	-.20
19. Felt angry toward another driver	.24	.15	-.13	.14
20. Felt annoyed by another driver	.27	.33	-.24	.20
21. Felt another driver was being aggressive toward me/us	.19	.03	-.14	.06
22. Felt my/our safety was threatened by another driver	-.52**	-.34†	-.24	-.48*
---Total Average Scores (of selected items)----				
Total Risky Driving (items 1, 3, 7, 8, 9, 10, 11, 12, 13)	.61**	.47*	.23	.58**
Total Negative Emotional (items 2, 15, 16, 19, 20, 21, 22)	.29	.22	-.22	.16
Total Aggressive Driving (items 4, 5, 6)	.05	.29	.46*	.31
Total Dangerous Driving (all items except 14, 17 & 18)	.52**	.42*	.11	.47*

Table 32: Correlations Between Self-Reported Risky and Aggressive Driving Behaviors, and Emotions Felt While Driving, and DDDI Scales.

Note: * = $p \leq .05$; ** = $p \leq .01$; † = $p \leq .10$ (approached statistical significance)

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.543	0.295	0.248	6.27	.024
(Tickets in Last 3 Yrs, r = .48*)					
Model 2	0.786	0.786	0.562	11.28	.001
(Model 1 + Crashes Caused in Last 3 Yrs, r = .31)					
Model 3	0.849	0.720	0.656	11.16	.001
(Model 2 + Rush Hrs Driven/Wk, r = -.17)					
Total Percentage of Variance Accounted For By All Models = 65.6%					

Table 33: Predictor Variables† Regressed Stepwise onto Running Red Lights and/or Stop Signs
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.566	0.320	0.275	7.07	.018
(DDDI Risky Driving, r = .60**)					
Total Percentage of Variance Accounted For By Model = 27.5%					

Table 34: Predictor Variables† Regressed Stepwise onto Failure to use Turn Signal
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.660	0.435	0.398	11.57	.004
(Crashes Caused in Last 3 Yrs, r = .51**)					
Total Percentage of Variance Accounted For By Model = 39.8%					

Table 35: Predictor Variables† Regressed Stepwise onto Honking Horn as a Negative Signal
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.551	0.304	0.258	6.55	.022
(Crashes Caused in Last 3 Yrs, r = .37)					
Total Percentage of Variance Accounted For By Model = 25.8%					

Table 36: Predictor Variables† Regressed Stepwise onto Making Negative/Rude/Obscene Gesture to Another Driver

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.574	0.330	0.285	7.38	.016
(Crashes Caused in Last 3 Yrs, r = .45*)					
Total Percentage of Variance Accounted For By Model = 28.5%					

Table 37: Predictor Variables† Regressed Stepwise onto Passing Illegally

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.531	0.282	0.234	5.90	.028
(DDDI Risky Driving, r = .42*)					
Total Percentage of Variance Accounted For By Model = 23.4%					

Table 38: Predictor Variables† Regressed Stepwise onto Tailgating Another Vehicle

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.571	0.326	0.282	7.27	.017
(Crashes Caused in Last 3 Yrs, r = .41*)					
Model 2	0.753	0.567	0.506	9.18	.003
(Model 1 + Tickets in Last 3 Yrs, r = .41*)					
Total Percentage of Variance Accounted For By All Models = 50.6%					

Table 39: Predictor Variables† Regressed Stepwise onto Unintentionally Crossing Over Lane Lines and/or Road Edge

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

‡R2 increases incrementally with each additional model.

Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.508	0.258	0.208	5.21	.037
(Crashes Caused in Last 3 Yrs, r = .28)					
Model 2	0.699	0.489	0.416	6.70	.009
(Model 1 + Miles Driven/Wk, r = .32)					
Total Percentage of Variance Accounted For By All Models = 41.6%					

Table 40: Predictor Variables† Regressed Stepwise onto Weaved in and out of Traffic

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

‡R2 increases incrementally with each additional model.

Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.581	0.338	0.294	7.66	.014
(DDDI Negative Emotional, r = .57**)					
Model 2	0.713	0.508	0.437	7.22	.007
(Model 1 + Miles Driven/Wk, r = .38)					
Total Percentage of Variance Accounted For By All Models = 43.7%					

Table 41: Predictor Variables† Regressed Stepwise onto Speeding Greater than 10 MPH Over Limit

†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.

‡R2 increases incrementally with each additional model.

Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.664	0.441	0.404	11.84	.004
(DDDI Risky Driving, r = .54**)					
Model 2	0.762	0.580	0.520	9.67	.002
(Model 1 + Rush Hrs Driven/Wk, r = -.23)					
Total Percentage of Variance Accounted For By All Models = 52.0%					

Table 42: Predictor Variables† Regressed Stepwise onto Went Through Late Yellow Light and/or Rolled Through Stop Sign
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.521	0.272	0.223	5.60	.032
(DDDI Negative Emotional, r = -.38)					
Total Percentage of Variance Accounted For By Model = 22.3%					

Table 43: Predictor Variables† Regressed Stepwise onto Wearing Safety Belt
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.519	0.269	0.220	5.52	.033
(Gender {Males M = .11, SD = .16; Females M = .02, SD = .04})					
Total Percentage of Variance Accounted For By Model = 22.0%					

Table 44: Predictor Variables† Regressed Stepwise onto Feeling Angry
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.605	0.366	0.323	8.65	.010
(Miles Driven/Wk, r = .44*)					
Model 2	0.735	0.540	0.474	8.22	.004
(Model 1 + Age, r = -.30)					
Model 3	0.827	0.683	0.610	9.36	.001
(Model 2 + Hrs Driven/Wk, r = .07)					
Total Percentage of Variance Accounted For By All Models = 61.0%					

Table 45: Predictor Variables† Regressed Stepwise onto Feeling in a Hurry
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.615	0.378	0.336	9.10	.009
(DDDI Negative Emotional, r = -.40*)					
Model 2	0.786	0.618	0.564	11.34	.001
(Model 1 + Rush Hrs Driven/Wk, r = .12)					
Total Percentage of Variance Accounted For By All Models = 56.4%					

Table 46: Predictor Variables† Regressed Stepwise onto Feeling Friendly Toward Another Driver
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.592	0.351	0.307	8.10	.012
(Miles Driven/Wk, r =.58**)					
Model 2	0.756	0.571	0.510	9.32	.003
(Model 1 + Hrs Driven/Wk, r = .01)					
Total Percentage of Variance Accounted For By All Models = 51.0%					

Table 47: Summary of Predictor Variables† Regressed Stepwise onto Feeling Angry Toward Another Driver
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.628	0.394	0.354	9.77	.007
(Miles Driven/Wk, r = .51**)					
Total Percentage of Variance Accounted For By Model = 35.4%					

Table 48: Predictor Variables† Regressed Stepwise onto Feeling Annoyed By Another Driver
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictors was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.528	0.279	0.231	5.81	.029
(Miles Driven/Wk, r = .55**)					
Total Percentage of Variance Accounted For By Model = 23.1%					

Table 49: Predictor Variables† Regressed Stepwise onto Feeling Another Driver was Aggressive Toward Oneself
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2‡	F	Sig.
Model 1	0.602	0.362	0.320	8.53	.011
(DDDI Risky Driving, r =.61**)					
Model 2	0.729	0.532	0.465	7.95	.005
(Model 1 + Total DWIs, r = -.19)					
Total Percentage of Variance Accounted For By All Models = 46.5%					

Table 50: Predictor Variables† Regressed Stepwise onto Total Risky Driving Averages
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
‡R2 increases incrementally with each additional model.
Note: only significant predictors were kept in the reported models; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.571	0.326	0.282	7.27	.017
(Miles Driven/Wk, r = .51**)					
Total Percentage of Variance Accounted For By Model = 28.2%					

Table 51: Predictor Variables† Regressed Stepwise onto Total Negative Emotional Averages
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.644	0.415	0.376	10.64	.005
(Crashes Caused in Last 3 Yrs, r = .46*)					
Total Percentage of Variance Accounted For By Model = 37.6%					

Table 52: Predictor Variables† Regressed Stepwise onto Total Aggressive Driving Averages
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

Model # (Predictor)	R	R^2	Adj. R^2	F	Sig.
Model 1	0.518	0.268	0.220	5.50	.033
(DDDI Negative Emotional, r = .42*)					
Total Percentage of Variance Accounted For By Model = 22.0%					

Table 53: Predictor Variables† Regressed Stepwise onto Total Dangerous Driving Averages
†age, gender, # of yrs driving, # of miles/week, # of hrs/week, # of rush hours/week, # of tickets received in last 3 yrs, # of crashes caused in last 3 years, total # of times driving intoxicated, self-rated driving skill level, and all DDDI scales.
Note: only significant predictor was kept in the reported model; for r, * = $p \leq .05$; ** = $p \leq .01$

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EDUCATION:

Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA.

Currently completing the requirements for the Doctor of Philosophy degree in Adult Clinical Psychology. GPA = 3.9

Virginia Tech Honors:

-Graduate Student of the Year for College of Arts & Sciences (2002).
-Virginia Tech Graduate Student of the Month (September, 2001).
-Recipient of $500 Research Grant from Graduate Student Assembly (Fall 2001).
-Selected as mentor to first year clinical practicum students.
-Selected to co-create Psychological Perspectives of Diversity senior seminar.

Doctoral Dissertation: Validity and reliability assessment of a dangerous driving self-report measure. Estimated date of completion: May 2003.

Appalachian State University (ASU), Boone, NC.

Master of Arts, Clinical Psychology (2000); GPA = 4.0

ASU Honors:

-Jon Hagaseth Intern of the Year Award from the ASU Counseling & Psychological Services Center (2000).
-President of Alpha Epsilon Lambda, The Honor Society of Graduate and Professional School Students, Pi Chapter (2000).
-Who's Who Among Students (2000).
-National Dean's List (1999).
-Cratis D. Williams Graduate School Thesis Grant -provided complete funding.
-Recipient of ASU Psychology Department's Terrant Scholarship (1998-1999).
-Recipient of ASU Alumni Scholarships (1997-1999, entire duration of program).

Master's Thesis: Analysis of general aggression and anger as elements of driver aggression. Defended at ASU in Spring 2000; accepted at Virginia Tech in Fall 2000. In conjunction, developed the Dula Dangerous Driving Index (©1999), a self-report measure of dangerous driving history/propensity.

University of North Carolina at Charlotte (UNCC).

Bachelor of Science, Psychology (1996); Overall GPA = 3.9
Bachelor of Arts, Philosophy (1996); Overall GPA = 3.9

UNCC Psychology Honors:

-Magna Cum Laude.
-Recipient of the Department's Outstanding Senior of the Year Award (1996).
-Cumulative Psychology GPA= 4.0 (41 sem. hours).

-Research article published in UNCC's Journal of Psychology.
-Member of Psi Chi, National Honor Society of Psychology.
UNCC Philosophy Honors:
-Magna Cum Laude.
-Member of Phi Sigma Tau, International Honor Society of Philosophy.
UNCC General Honors:
-Member of The Honor Society of Phi Kappa Phi.
-Member of Golden Key National Honor Society.
-Chancellor's List in Spring 1996 (24 sem. hours) and Fall 1995 (17 sem. hours).
-Dean's List in Spring 1995 and Fall 1994.

Central Piedmont Community College (CPCC), Charlotte, NC.
Associate in Arts (1994); GPA = 3.9

PEER REVIEWED PUBLICATIONS:

Dula, C.S., & Ballard, M.E. (2001). Development and evaluation of a measure of dangerous, aggressive, negative emotional, and risky driving. Journal of Applied Social Psychology, in press.

Dula, C.S., & Geller, E.S. (2002). Risky, aggressive, or emotional driving: Addressing the need for consistent communication among researchers. Journal of Safety Research, in press.

Four manuscripts currently in preparatory stages, to be submitted within a year to peer-reviewed journals.

OTHER PUBLICATIONS:

Dula, C.S. (2002). Are we really junior colleagues? American Psychological Association of Graduate Students Spring Newsletter.

Fox, L., Whiteley, J., Williams, C., Chandler, H., & Dula, C.S. (2001). Anger and stress management program manual. Virginia Tech Department of Psychology.

Dula, C.S. (2001). Interview with Tim Copeland, part two. APEX, Official Newsletter of the Virginia Tech Graduate Student Assembly, 8.2, 1-2.

Dula, C.S. (2001). Interview with Tim Copeland, part one. APEX ,Official Newsletter of the Virginia Tech Graduate Student Assembly, 8.1, 1-2.

Dula, C.S. (2001). Graduate student assembly community service. APEX ,Official Newsletter of the Virginia Tech Graduate Student Assembly, 8.1, 3.

Dula, C.S., & Geller, E.S. (2001). The road rage reducer: An intervehicular communication system. Behavior Analysis Digest, Summer 13, 4.

Dula, C.S. (2001). Graduate students' perception of faculty diversity sensitivity and APA ethical guidelines. The Virginia Psychologist Newsleter, 45, 2. Virginia Psychological Association (Reprinted at request of Dr. J.L. Clark, VPA President).

Dula, C.S. (2001). Graduate students' perception of faculty diversity sensitivity and APA ethical guidelines. American Psychological Association of Graduate Students, Winter Newsletter, 13, 1, 24.

Dula, C.S. (November 22, 2000). External funding for aggressive driving research. Global Web Conference on Aggressive Driving Issues at: http://www.aggressive.drivers.com/board/messages/26/202.html?974914042.

Dula, C.S. (November 22, 2000). Reader's comments on: Félix, B., Kluppels, L., Meulemans, C., Vandenreijt, B., & Wiseur, A. (2000). An educational programme for aggressive drivers. Global Web Conference on Aggressive Driving Issues at: http://www.aggressive.drivers.com/board/messages/25/48.html.

Dula, Chris S. (February 1997). Gender and Sense of Direction Differences. Undergraduate Journal of Psychology, 10, 13-15. University of North Carolina at Charlotte.

PRESENTATIONS:

Dula, C.S., & Geller, E.S. (2002). Development of an ambiguous self-report measure to assess driver risk. Paper presented at the Fall Convention of the Virginia Psychological Association, Richmond, VA.

Krepinevich, S.M., Dula, C.S., Ramsey, D.J., & Franks, J.G. (2002). Social influence: Consideration of special interest groups. Paper Presentation at the Annual Meeting of the Virginia Academy of Science.

Lehman, P.K., Dula, C.S., Geller, E.S., & Grandin, D. (2002). Social influence profiles: Emerging patterns in student populations. Paper Presentation at the Annual Meeting of the Virginia Academy of Science.

Ramsey, D.J., Dula, C.S., & Krepinevich, S.M. (2002). The test-retest reliability of a dangerous driving measure. Paper Presentation at the Annual Meeting of the Virginia Academy of Science.

Dula, C. S. (2002). Drawing on social psychological and personality perspectives to formulate a theoretical model of driver aggression. Paper presentation at the Spring Convention of the Virginia Psychological Association, Virginia Beach, VA.

Grandin, D. A., Dula, C. S., & Lehman, P. K. (2002, April). Cultural effects on social influence survey scores. Paper presentation at the Spring Convention of the Virginia Psychological Association, Virginia Beach, VA.

Ramsey, D., & Dula, C.S. (Spring, 2002). Dangerous driving behaviors and the test-retest reliability. Poster Presentation at the 18th Annual Research Symposium of Virginia Polytechnic Institute and State University.

Dula, C.S., Moroge, J., & Vande Linde, H. (2001). Developing a social influence survey. Paper presentation at the Fall Convention of the Virginia Psychological Association, Richmond, VA.

Moroge, J., Vande Linde, H., & Dula, C.S. (2001). Social influence profiles of undergraduate university students. Poster presentation at the Fall Convention of the Virginia Psychological Association, Richmond, VA.

Ramsey, D., Cagle, S., & Dula, C.S. (2001). Determining the test-retest reliability of an aggressive driving measure. Poster presentation at the Fall Convention of the Virginia Psychological Association, Richmond, VA.

Fox, L.D., Chandler, H., Whiteley, J.A., Williams, C.D., England, K., Dula, C.S., & Eisler, R.M. (2001). Effects of a manualized cognitive-behavioral anger management program on pre-post changes in self-reported cognitions and behaviors. Poster presentation at the World Congress of Behavioral and Cognitive Therapies (July).

Dula, C.S., Ballard, M.E., Cagle, S. (2001). Continued empirical development of an aggressive driving measure. Paper presentation at the Spring Convention of the Psychological Association, Roanoke, VA.

Cagle, S. & Dula, C.S. (2001). An aggressive driving self-report measure: A study replication. Poster presentation at the Spring Convention of the Psychological Association, Roanoke, VA.

Dula, C.S., & Ballard, M.E. (2000). Empirical development of an aggressive driving measure. Paper presentation at the Fall Convention of the Virginia Psychological Association, Williamsburg, VA.

Dula, C.S., & Ballard, M.E. (2000). Analyzing general aggression and anger as determinants of risky driving. Paper presentation at the 26th Annual Convention of the Association for Behavior Analysis, Washington, D.C.
*Also presented at the 2000 Annual Conference of the Southeastern Psychological Association, New Orleans, LA.

Lopez, N.L., Dula, C.S., & Schneider, H.G. (1999). The Behavioral Transgression Scale: Parental discipline styles as a function of type of transgression. Poster presentation at the 1999 2nd International Conference: The Changing Family and Child Development, Banff, Canada.

Lopez, N.L., Dula, C.S., & Schneider, H.G. (1999). Behavioral Transgression Scale: Preliminary item development. Poster presentation at the 1999 Annual Conference of the Southeastern Psychological Association, Savannah, GA.

Childs, H.F., Schneider, H.G., & Dula, C.S (1998). Predicting Adolescent Adjustment: Maternal depression and social competency. Presented at the 1998 North Carolina Psychological Association/Foundation Spring Conference, Asheville, NC.

Dula, C.S., & Fox, P.A. (1998). The effects of impulsive personality on computerized multiple-choice tests. Poster presentation at the 1998 20th Annual National Institute on the Teaching of Psychology, St. Petersburg, FL.
*Also presented at the 1998 1st Annual ASU Research Day.

RESEARCH EXPERIENCE:

Graduate Research Associate at the Center for Applied Behavior Systems (CABS) at Virginia Tech from July 5, 2000 to Present. Current Project Manager for an National Institutes of Health (NIH) Small Business Innovation Research grant, titled Testing an Inter-vehicular Courtesy-Based Communication System ($99,105). Was principal author on the NIH grant resubmission. Current principal author and co-Principal Investigator on application to American Automobile Association Traffic Safety Foundation for grant to study a teen driver safety intervention (between $120,000 & $140,000). Was Project Manager and principal author for a Virginia Tech ASPIRES (A Support Program for Innovative Research Strategies) grant to buy a STISIM Driving Simulator ($49,950). CABS responsibilities have included: organizing and conducting various research activities with undergraduate research assistants; developing two self-report measures of dangerous driving; developing a measure of Cialdini's (e.g., 2001) six social influence principles; collaborating on research to test an inter-vehicular communication system, and its courtesy-based message code; organizing and leading two undergraduate research groups from Dr. Geller's Principles of Psychological Research (PSYC 2094) in conjunction with on-going CABS research; co-authoring six grant applications, including primary authorship on three; co-authoring and editing various scholarly works; co-authoring papers/posters for presentation at professional conferences; writing and submitting various IRB applications; general brainstorming and team participation. References: Dr.

E. Scott Geller (540) 231-6223, esgeller@vt.edu, and Dr. Kent Glindemann (540) 231-8145, kglindem@vt.edu.

Independently conducted a Master's Thesis at ASU (unanimously accepted by Virginia Tech Department of Psychology in Fall 2000) from Fall 1999 to Spring 2000. Thesis Chairperson: Dr. Mary E. Ballard (828) 262-2714, ballardme@appstate.edu.

Graduate Research Associate: Worked with Dr. Paul A. Fox in the ASU Educational Psychology Laboratory on the production of the paper entitled, "The Effects of Impulsive Personality on Computerized Multiple-Choice Tests." Responsibilities included: research design, data collection, data analysis.

Graduate Research Associate: Worked with Nestor Lopez (ASU Graduate Student) on the development of the Behavioral Transgression Scale (BTS, 1999) which assesses parental disciplinary styles and editing the paper produced from the initial and additional research that utilized the BTS. Responsibilities included: research design, item construction, data collection.

Graduate Research Associate: Worked with Dr. Henry G. Schneider editing the thesis of Holly F. Childs into journal article format. Responsibilities included: principal editing of existing manuscript.

Undergraduate Research Assistant: Worked under the supervision of Dr. Stanley-Hagan in research project on the Success-By-Six-Program. Responsibilities included: Administering Dial-R diagnostic tests (used as assessments only) to over 30 pre-school children; administering parent questionnaires (also used as assessments); data coding, data entry, literature review.

CLINICAL EXPERIENCE:

Currently on American Psychological Association (APA) Approved Clinical Internship at the Thomas E. Cook Counseling Center (CCC) at Virginia Tech. Full-time position from August 10, 2002 to present. Responsibilities include: conducting intake interviews; conducting general and referred assessments; conducting individual and group therapy; participating in supervision (primary, secondary, and group); participating in training seminars (Assessment, Diversity, Psychotherapy, Supervision of Supervision); participating in weekly staff meetings and case conferences; conducting research within and outside the center; conducting outreach programs (e.g., International Student orientation to counseling, National Depression and Eating Disorder Screening Days, Relaxation Training, Resident Assistant Training); writing notes, reports, and other charting; participation in the CCC Measurement Workgroup which is beginning to establish electronic web- interface intake processes, clinical assessment, and records management; teaching Study Skills class; teaching Reality Check, an alcohol abuse reduction program; participation in APA site visit; and, participation in intern interviews and selection for next year. Spring 2003 Primary Supervisor: Dr. Gary Bennett, gabennet@vt.edu; Spring 2003 Co-Secondary Supervisor: Dr. Charlotte Amenkhienan, camen@vt.edu; Spring 2003 Co-Secondary Supervisor: Dr. Reliford Sanders, resande1@vt.edu; Fall 2002 Primary Supervisor: Dr. Rita Klein, rfklein@vt.edu; Fall 2002 Secondary Supervisor: Dr. Michael Gore, gore@vt.edu; Group Supervisor and Training Director: Dr. Jane Keppel-Benson, (540) 231-8164, jabenson@vt.edu. All can be reached at (540) 231-6557, Fax: (540) 231-2104

Completed Advanced Summer Practicum at the Psychological Services Center of Virginia Tech. One of five advanced graduate students voluntarily continuing with existing clients throughout the summer months. Responsibilities included: conducting marital therapy and individual therapy with a member of the couple; participation in group supervision; charting. Clinical Supervisor: Dr. Lee Cooper, Director, (540) 231-7709, ldcooper@vt.edu.

Completed 4th Year Clinical Practicum (Fall 2001; Spring 2002) at the Psychological Services Center of Virginia Tech. Selected as one of two graduate student mentors. Responsibilities included: co-facilitation of group meetings of the 1st year clinical practicum team; provision of instruction in basic clinical interviewing and intervention skills; supervision and evaluation of 1st year graduate students in clinical development; individual therapy with 2 clients; participation in individual supervision; charting. Clinical Supervisor: Dr. George Clum (540) 231-5701, gclum@vt.edu.

Completed Clinical Externship in Summer 2001 with Respond of Lewis-Gale Medical Center as Crisis Clinician. Responsibilities included: on-call night duty; triage-style assessment of 19 adults, adolescents, and children; initiation of Temporary Detainment Orders when appropriate; initiation of voluntary hospitalization when appropriate; referrals to community services when appropriate; therapeutic crisis management; completion and proper filing of relevant paper work. Supervisor: Jeanie Ayers, M.A. (540) 953-5324.

Completed Clinical Practicum in Summer 2001 at the Psychological Services Center of Virginia Tech. Responsibilities included: individual therapy with 4 clients; family therapy with 4 families; formal comprehensive intellectual and psychological evaluations of 2 clients; psychological assessment; participation in individual supervision and group supervision; charting. Clinical Supervisor: Dr. Lee Cooper, Director, Psychological Services Center (540) 231-7709, ldcooper@vt.edu.

Completed 2nd Year Clinical Practicum (Fall 2000; Spring 2001) at the Psychological Services Center of Virginia Tech. Responsibilities for the 2000 Fall Semester included: individual therapy with 4 clients; co-facilitation of Anger and Stress Management group therapy; recruitment for the group; psychological assessment; participation in individual supervision and group supervision; charting. Responsibilities for the 2001 Spring Semester included: individual therapy with 4 clients; family therapy with 3 families; psychological assessment; participation in individual supervision and group supervision; charting; editing the Anger and Stress Management Group Manual. Clinical Supervisor: Dr. Richard Eisler (540) 231-7001, eisler@vt.edu.

M.A. Level Clinical Psychologist Intern (Fall 1999; Spring 2000) at the ASU Counseling and Psychological Services Center (CPSC). Program was approved by the APA in August 2001. This internship was 30 hours/week for 9 months and was a paid position. Recieved the Jon Hagaseth Intern of the Year Award. Responsibilities included: individual therapy; group therapy; walk-in assessment; general assessment; co-consultation with on-campus housing staff; participation in supervision and group supervision; attending weekly staff meetings; charting; development of an Eating Disorders/Body Image Issues web site; miscellaneous Internet work; some outreach; limited biofeedback experience. Primary Supervisors: Susie Greene, M.A., (828) 262-2060, greenesl@appstate.edu (now ASU's Dean of Students) and Dr. Thomas Stanger, (906) 227-2980 tstanger@nmu.edu (now at Northern Michigan University). Group Therapy Supervisor: Dr. Susan Jones. Group Supervisor: Dr. Denise Lovin, lovindm@appstate.edu; (828) 262-3180.

Clinical Psychology Graduate Assistant during Summer 1999 for Appalachian Cardiopulmonary Rehabilitation Program (ACRP). Average of 5 hours/week. Responsibilities included: supervised psychological assessment of patients; providing weekly relaxation and stress reduction education and training in a group setting; providing supportive relationships to patients; being a trained member of the CPR Response Team; giving case presentations at monthly program meetings; general program assistance. Clinical Supervisor: Dr. Denise M. Martz (828) 265-1529. Program Supervisor: Al Burleson, ACRP Program Director (828) 262-6305.

Completed Clinical Practicum in Fall 1998 at Broughton State Hospital in Morganton, N.C. Assigned to an Adolescent Unit for the 1st half of the semester, and an Adult Admissions Unit the 2nd half. Activities included: individual therapy with patients on all wards; group therapy co-facilitation; administering, scoring and recording of assessment measures; charting therapy sessions (S.O.A.P. format); clinical report writing. Received 1 hour of supervision per week with Steve Barron, Pre-Doctoral Intern. Practicum Supervisor: Dr. Henry G. Schneider, (828) 262-2713, schneiderhg@appstate.edu.

Completed Clinical Practicum in Spring 1998 at Broughton State Hospital in Morganton, N.C. Assigned to an Adult Admissions Unit during the first half of the semester, and an Adult Long Term Unit (with majority schizophrenic and some legal status patients) as well as an Adult Dual Diagnosis Unit for the second half. Activities included: individual therapy with patients on all wards; group therapy; administering, administering, scoring and recording of assessment measures; charting therapy sessions (S.O.A.P. format); clinical report writing; attending weekly 1.5 hour professional seminar. Received 1 hour of supervision per week with Elizabeth Huddleston, Pre-Doctoral Intern. Practicum Supervisor: Dr. Henry G. Schneider (828) 262-2713, schneiderhg@appstate.edu.

Completed Clinical Practicum in Fall 1997 at Appalachian State University Counseling Center: Individual Psychotherapy given to 8 volunteer clients and 1 official client (privilege awarded based on therapist readiness and appropriate client availability as judged by supervising Ph.D. faculty). Received 1 hour of supervision per week by Paula Wagner, Pre-Doctoral Intern. Clinical Supervisor: Dr. Robert W. Hill (828) 262-2723, hillrw@appstate.edu.

Senior Mental Health Technician at Sunshine Behavioral Health Services, Inc. (a non-profit partial hospitalization program for the chronically mentally ill) from December 1996 to August 1997. Responsibilities included: arranging and supervising client transportation; creating and co-facilitating a Music Therapy Group session twice weekly; participating as member of the Treatment Team; distributing and monitoring the consumption of, self administered medications; monitoring and filing paperwork placed in client's medical records; administering the SCL-90-R; administration of reinforcement for positive behavioral changes; monitoring clients' vital signs and weight; procurement and service of meals and snacks for and to clients; maintaining superior sanitary conditions throughout the facility; ordering all office supplies. References: Chris Sangster, Program Director (Direct Supervisor) and Scott Todd, Regional Administrator (704) 522-0056.

Part-time Relief Counselor at The Relative's, Inc. (a non-profit 24 hours/7 days a week Crisis Shelter and Family Counseling Center) from January 1996 to December 1996 (8 to 36 hours a week). Responsibilities included: supervision of up to 13 youths at any given time; providing individual, group, family and phone crisis counseling; planning, implementing, and supervising group activities; keeping accurate client records in both

hard files and computer files; transporting residents to and from the program, to necessary appointments and school; being a positive, supportive, and critical yet nonjudgmental role model at all times. Interned until April 1996, and then became paid employee at the request of the Program Director. Reference: Shirley Bennett, Program Director (704) 377-0602.

Experienced in administration, scoring, and interpreting the following:

Anxiety Disorders Interview Schedule for DSM-IV; Beck Anxiety Inventory; Beck Depression Inventory II; Bender-Gestalt; Brief Symptom Inventory; Current Life Functioning Checklist; Current Symptom Checklist; Masculine Gender Rating Scale; SNAP Checklist (Parent and Teacher); Child Behavior Checklist (Youth, Parent, and Teacher Report); Child Depression Inventory; Conners' Adult ADHD Rating Scale (Self and Other); Conners' Continuous Performance Test II; Interpersonal Behavior Survey; Michigan Alcoholism Screening Test; Millon Clinical Multiaxial Inventory III; Minnesota Multiphasic Personality Inventory II; Minnesota Multiphasic Personality Inventory-Adolescent; Paced Auditory Serial Attention Test; Retrospective Structured Clinical Interview for ADHD; Revised Children's Manifest Anxiety Scale; Revised Conflict Tactic Scales; Reynolds Adolescent Depression Scale; Rotter's Incomplete Sentences Test; Rotter Locus of Control Scale; State Trait Anger Expression Inventory II; Structured Clinical Interview for DSM-IV Axis II Personality Disorders; Symptom Checklist 90, Revised; Thematic Apperception Test; Wechsler Adult Intelligence Scale, 3rd Edition; Wechsler Individual Achievement Test; Wechsler Intelligence Scale for Children, 3rd Edition; Wechsler Memory Scale, 3rd Edition; Wender Utah Rating Scale (Self and Parent); Woodcock-Johnson Achievement Test, 3rd Edition; and, the 16 Personality Factors Inventory.

TEACHING EXPERIENCE:

Ratings for all Virginia Tech classes were collected as required. Average overall ratings for those classes were as follows (n = 121, scale of 1 = poor to 4 = excellent): Knowledge of Subject: 3.85 (range 3.8 to 3.9); Success Communicating: 3.825 (range 3.8 to 3.9); Subject Stimulating: 3.675 (range 3.6 to 3.9); Concern and Respect: 3.9 (range 3.8 to 4.0); Grading Fairness: 3.95 (range 3.9 to 4.0); Class Administration: 3.725 (range 3.7 to 3.8); Overall Rating: 3.9 (range 3.9 to 3.9).

Classes Taught:

-Introductory Psychology (Virginia Tech, Summer 2002).
-Psychological Perspectives of Diversity (Men's Issues, Virginia Tech, Spring 2002).
-Psychology of Learning (Virginia Tech, Spring 2001).
-Introductory Psychology Recitation (two sections, Virginia Tech, Fall 2000).
-Psychology of Personality (ASU, Spring 2000).
-Introductory Psychology (ASU, Fall 1998, Spring 1999, Fall 1999).

Invited guest lecturer for Dr. E. Scott Geller, Virginia Tech Department of Psychology. Presented 5 lectures on topics of Learning (Classical & Operant Conditioning, Observational Learning), Motivation and Emotion to two separate Introductory Psychology classes in Fall 2002.

Invited guest lecturer for Dr. Joan Riessen, Virginia Tech Department of Human Development. Presented lecture on topic of Risky Behavior in Adolescence and Young Adulthood to Introduction to Human Development class in Fall 2002.

Introductory Psychology Coordinator for Virginia Tech Department of Psychology from May 2001 to August 2002. Responsibilities included: managing tests, grades, and disability accommodations for 1200 students per semester; attending to the course instructors; maintaining the extra-credit research participant pool; oversight of related experiment registration; maintaining the course web site; supervision of 14 Graduate Teaching Assistants who are recitation instructors in up to 38 sections; supervision of 5 office staff members; developing course and recitation syllabi; general records management; editing new recitation text; occasional guest lecturer. References: Dr. Jack W. Finney, Department Chair (540) 231-6670, finney@vt.edu; Dr. E. Scott Geller, (540) 231-6223, esgeller@vt.edu; and Dr. David W. Harrison, (540) 231-4422, dwh@vt.edu.

Graduate Teaching Assistant for the Virginia Tech Department of Psychology from August 2000 to August 2002. Taught Introductory Psychology in Summer 2002. Taught Men's Issues section of Psychology of Diversity in Spring 2002 (helped develop the class with three other graduate students who each taught a fourth of the class). Taught Psychology of Learning in Spring 2001. Taught Introductory Psychology Recitation (two sections) in Fall 2000. Responsibilities included: developing and writing lectures; use of various media for class presentations; assisting/tutoring students; writing and giving tests; assessing final grades. Responsibilities during the 2000 Fall semester included: teaching two recitation sections for General Psychology; lecture preparation; test construction, administration and grading; record keeping. Reference: Dr. Jack W. Finney, Department Chair (540) 231-6670, finney@vt.edu; Dr. E. Scott Geller (540) 231-6223, esgeller@vt.edu.

Instructor of Psychology at ASU from August 1998 to May 2000 (four consecutive semesters). Most recently employed as an adjunct faculty member (last two semesters), formerly as a graduate teaching assistant. Responsibilities included: teaching Psychology of Personality (one semester) and General Psychology (three semesters); developing and writing lectures; use of various media for class presentations; assisting/tutoring students; writing and giving tests; assessing final grades. Reference: Dr. Paul A. Fox (828) 262-2735, foxpa@appstate.edu.

Invited guest speaker for Stroke Support Group at the Watauga Wellness Center. Made educational presentation on topic of Stress and Relaxation and demonstrated relaxation techniques at their April 1999 monthly meeting.

Invited guest lecturer for Dr. Matthew B. Robinson, Political Science/Criminal Justice Department of ASU. Presented lecture on topic of Aggression to two Criminal Justice classes in Fall 1998.

OTHER PROFESSIONAL INFORMATION:

Student Affiliate of the American Psychological Association.

Student Affiliate of the American Psychological Society.

Student Affiliate of the Southeastern Psychological Association.

Student Affiliate of the Virginia Psychological Association.

Student Affiliate of the Virginia Academy of Clinical Psychologists (VACP).

Serving as Graduate Student Member of the VACP Task Force on Prescriptive Authority.

Served as the Virginia Tech Department of Psychology Graduate Student Representative to the American Psychological Association of Graduate Students.

Served as the Department of Psychology Representative to the Virginia Tech Graduate Student Assembly (VT GSA).
Served as the VT GSA Community Service Committee Chairperson.
Served as the VT GSA Representative to the Virginia Tech University Commission on Outreach.
Served as Editor of the APEX, the official VT GSA Newsletter (Spring 2001- Spring 2002).
Served as the Virginia Tech Department of Psychology 2nd year graduate student representative to Clinical Faculty meetings.
Served as the ASU Psychology Department Senator to the ASU Graduate Student Association Senate (GSAS) for the 1998/1999 academic year.
Served on the ASU Belk Library Assessment team; the GSAS Travel/Research Grant Award Allocation Committee; and the GSAS Constitution Revision Committee.
Served as co-founder of the ASU Psychology Graduate Student Organization (PGSO). Served as liaison between the PGSO and GSAS for the 1998/1999 academic year.
Served as co-author of the original PGSO Constitution. Served on the Fund Raising Committee.
Served as student member of the ASU Psychology Department Terrant Scholarship Selection Committee, to assist in selection of 1999/2000 recipients.
One of four invited guest panelists for the ASU Graduate Teaching Assistant Orientation held on August 13, 1999. Reference: Dr. Edelma D. Huntley, Assistant Dean of Graduate Studies (828) 262-2130.
Designed, organized and implemented a Homeless Person's Self Advocacy Group at the Charlotte Uptown Men's Shelter as project for Senior Seminar on Community Psychology, under the direction of Dr. James Cook. Reference: Dr. James Cook, Associate Professor at UNCC. (704) 547-4758.
Served 90 hours with UNCC Disability Services as note-taker for a handicapped student.
American Heart Association Certified for Basic Life Support (Adult, Child, and Infant CPR and Electronic Defibrillation).
Red Cross Certified for Standard First Aid.
Completed certified program in Techniques for Effective Aggression Management (TEAM).
Completed certified program in Applied Suicide Intervention Skills Training (ASIST).
Fully vaccinated against Hepatitis B.

COMPUTER EXPERIENCE:
Proficient in current versions of Windows; Microsoft Word, Excel, and PowerPoint; SPSS; Netscape Communicator and WS_FTP (web site construction, publishing, and maintenance); Astra, Visioneer PaperPort, and other scanner software; Paint Shop Pro, Microsoft Imaging, and other image editing software; OmniPage and OmniForm; and other miscellaneous software programs.

PERSONAL INFORMATION:
Proud husband of Karen King-Dula for nine years.
Proud father of Courtney Nikila Dula, age nineteen.
Proud father of Daelin Mason Dula, age six.
Member of the National Parent Teacher Association.
Member of the Gilbert Linkous Elementary School Climate Design Team.
Red Cross VIP Blood Donor (2.5 gallons donated to date).