DISSERTATION

PEER AND PARENTAL CORRELATES OF DRIVING ANGER AND ITS EXPRESSION

Submitted by

Megan M. Adams

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, CO

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY MEGAN M. ADAMS ENTITLED PEER AND PARENTAL CORRELATES OF DRIVING ANGER AND ITS EXPRESSION BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Committee on Graduate Work

Tammi Vacha-Haase, PhD

Benjamin Clegg, PhD

David MacPhee, PhD

Jerry L. Deffenbacher, PhD
Adviser

Ernest Chavez, PhD
Department Head/Director

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ABSTRACT OF DISSERTATION

PEER AND PARENTAL CORRELATES OF DRIVING ANGER AND ITS EXPRESSION

A large body of literature has shown that parents and peers serve as models and reinforcers of an individual's general anger and aggression. A small but growing body of literature has indicated that peers and parents likewise influence driving behaviors through modeling, reinforcement, and monitoring. This study added to understanding the development of driving anger and aggression by exploring the relationship of driving-related emotions, emotional expression, and behaviors to perceived influence of parents and peers.

Participants were 329 undergraduate students (*M* age = 18.8) who completed the Driving Anger Scale (Deffenbacher et al., 1994), the Driving Anger Expression Inventory (Deffenbacher et al., 2002), Driving Survey (Deffenbacher, Deffenbacher, et al., 2003), Trait Anger Scale (Spielberger, 1988), Anger Expression Inventory (Spielberger, 1988), and Scales of Peer and Parental Influence, developed for this study.

Reliable measures of peer (modeling, encouragement, and discouragement) and parent influence (modeling, encouragement, discouragement, and monitoring) were developed (αs = .85 to .99).

Gender contributed a significant amount of variance to the prediction of adaptive/constructive anger expression, aggressive expression, aggressive and risky behavior but did not contribute to prediction of driving anger. Women reported more use of positive, constructive anger expression, whereas men reported more aggressive

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expression, aggression, and risky behaviors. Modeling and encouragement by peers and parents predicted driving anger, aggression, and risky behaviors. Discouragement was largely unrelated or actually positively related. The inclusion of an individual's general anger and anger expression in the models reduced the contributions of peer and parental influence variables. However, once variance was accounted for by the general anger measures, at least one influence variable contributed to prediction of driving anger and anger expression. Parental monitoring was the most consistent factor in the prediction of participants' driving anger and anger expression while modeling and encouragement by parents and peers also contributed.

Findings replicated past studies on gender differences on driving anger expression and parental monitoring of roadway behavior. Findings strengthened the literature on the influence of parents and peers as models for the development of anger, aggression, and/or risky behaviors. Results have potential value for prevention efforts utilizing peer and parent education programs.

Megan M. Adams
Department of Psychology
Colorado State University
Fort Collins, CO 80523
Fall 2006

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CHAPTER 1

INTRODUCTION

Anger and Aggression on the Road

Aggressive acts and angry emotions on the road have become common occurrences. In 1997, for example, the American Automobile Association (AAA) reported that incidents of road violence increased 51% in the period from 1990 to 1995. In 2000, 39% of respondents to a survey of the Bureau of Transportation Statistics indicated that aggressive driving was the highest safety concern on the roadways. A large majority (76%) of urban college students indicated that drivers were more aggressive and dangerous than what they had been five years ago (Rasmussen, Knapp & Gardner, 2000).

Although many of us may have been the recipients of more benign forms of roadway aggression such as angry gestures, news items concerning more violent forms of aggression on the road are all too frequent. A recent study indicated that aggressive acts while driving that may seem minor are in fact significantly correlated with the presence of firearms in vehicles (Miller, Azrael, Hemenway & Solop, 2002). The researchers found that 11% of the drivers in their study had carried a gun in their car over the past year and that these drivers were also the ones significantly more likely to make obscene gestures, curse and shout at other drivers, impede progress of other drivers, and aggressively follow other drivers too closely. Additionally, these drivers were also found to perceive others on the road as being more aggressive and hostile toward them.

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Twenty-two percent of a sample of urban college students reported possession of a weapon in their automobiles meant for protection from other drivers (Rasmussen et al., 2000). A related study documented the cases of fatal road rage occurring in an Oregon county over a 36 year period from 1963-1998 (Batten, Penn & Bloom, 2000). Interestingly, the first documented case of fatal road rage did not occur in that county until 1981. Of these deaths, 40% were caused by shooting, 40% resulted from motor vehicle accidents, and another 20% were due to health-related complications (e.g., heart attack). The significance of these scientific findings coupled with the anecdotal evidence so prevalent in the news media support the importance of continued research and prevention efforts in the areas of roadway anger and aggression.

During the past decade, researchers across the globe have focused attention in the area of driving anger. Driving anger is defined as frequent and intense anger while operating a motor vehicle (Deffenbacher, Oetting & Lynch, 1994). Road rage has been defined as aggressive behavior by the driver or passenger of one vehicle against the driver or passengers of another vehicle on a roadway (Miller et al., 2002). Initial studies demonstrated that driving anger is a personality trait that is related to trait anger but is closely tied to roadway situations (Blanchard, Barton & Malta, 2000). Subsequent studies have shown an interaction between person and situation in regard to driving anger that is analogous to Spielberger's state-trait theory of general anger (Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000; Deffenbacher, Oetting, Lynch & Morris, 1996; Spielberger, 1988). The presence of driving anger in a situation (state) is a function of that person's level of trait driving anger and the presence of a provocative or frustrating event. These findings have been reinforced by convergent evidence coming from studies

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of high and low anger drivers using multiple methods (e.g., self-report surveys, data from computerized driving simulations, and field logs of driving behaviors). Deffenbacher and colleagues have demonstrated that differences in levels of driving anger are not due to differential exposure to anger-provoking situations, because high and low anger drivers drive equally often and as far (Deffenbacher, Deffenbacher, Lynch & Richards, 2003; Deffenbacher et al., 2000; Deffenbacher, Lynch, Oetting & Yingling, 2001; Deffenbacher, Richards, Filetti & Lynch, 2003). Another study by Miller and colleagues (2002) corroborated the findings that driving frequency had no significant impact on the frequency of aggressive behaviors behind the wheel. The Deffenbacher studies have shown that high trait anger drivers are angry more often in day-to-day driving and are more frequently engaged in aggressive and risky behaviors behind the wheel. High anger drivers report anger across a range of anger-provoking situations and are significantly more likely to receive tickets for moving violations and be involved in minor traffic accidents and "close calls" (Deffenbacher et al., 2000).

The instrument developed by Deffenbacher and colleagues to study this issue, the Driving Anger Scale (DAS), has been adapted for use by a group of European researchers (Lajunen, Parker & Stradling, 1998; Lajunen, Parker & Summala, 1999; Parker, Lajunen & Summala, 2002). The findings of this research group using participants in the United Kingdom, Finland, and the Netherlands parallel the findings of the Deffenbacher team. Specifically, the European group demonstrated consistency in the level of anger provoked by situations while driving across the three countries as well as consistency among the types of situations that caused anger. Another group of researchers replicated the findings that a propensity toward driving anger as measured by the DAS predicted both

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risky and aggressive driving behaviors (Dahlen, Martin, Ragan & Kuhlman, 2004). Interestingly, several studies have shown that gender has a very minimal effect on roadway aggression (Adams, Zakoscielna, Savage & Deffenbacher, 2003). Others have demonstrated that male gender correlates with higher levels of roadway aggression (Miller et al., 2002; Parker et al., 2002; Shinar & Compton, 2004). Younger age of driver predicts a higher frequency of driving aggression (Adams et al., 2003; Parker et al., 2002; Shinar & Compton, 2004). While frequency of aggression may change as a function of age of driver, findings have shown that there is no difference in the pattern of aggression among younger and older drivers (Adams et al., 2003).

The way that a driver expresses driving anger makes a significant difference. High anger drivers are more likely to use verbal behaviors (e.g., I yell questions like, "Where did you get your license?"), physical behaviors (e.g., I give the other driver the finger), and the car (e.g., I bump the other driver's bumper with mine) to express anger. They are also less likely to engage in adaptive or constructive expression of anger (e.g., I think things through before I respond) (Deffenbacher, Lynch, Deffenbacher & Oetting, 2001; Deffenbacher, Lynch, Oetting & Swaim, 2002).

Another factor that has been shown to contribute to aggression on the road is a driver's angry thoughts. Drivers who engage in judgmental (e.g., They are going to get someone killed), revengeful (e.g., I'm going to slow them up on purpose), pejorative/verbally aggressive (e.g., What an idiot!) or physically aggressive (e.g., I want to kick their ass) cognitions while driving are more likely to exhibit driving anger and aggression, whereas those who engage in coping cognitions (e.g., Just back off and relax)

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are less likely to aggress on the road (Deffenbacher, Petrilli, Lynch, Oetting & Swaim, 2003).

The research conducted thus far has demonstrated the impact of age, gender, trait driving anger, anger expression, and drivers' angry thoughts on roadway aggression. It is clear that anger and aggression on the road are problematic, and that there are large individual differences within these constructs. Surprisingly, we know little about the development of driver's anger and aggression. How or why do some people become angry, aggressive drivers whereas others do not?

Development of Anger and Aggression Behind the Wheel

The dearth of research and theory that focuses directly on the development of driving anger necessitates a more general theoretical approach. It has previously been demonstrated that the construct of driving anger parallels Spielberger's state-trait model of general anger (Deffenbacher, Deffenbacher, et al., 2003). An understanding of the development of driving anger, therefore, could feasibly be extrapolated from an understanding of the development of general anger and its expression. Additionally, at this point, it is important to distinguish between the concepts of anger and aggression. According to Lewis (1993), aggression is a harmful behavior that is directed outward against others, while anger is an emotion that remains within an individual. Anderson and Bushman (2002) write that anger often influences aggression by providing a justification for behavior and by interfering with judgment and moral reasoning, as well as priming aggressive thoughts and behaviors. Anger and aggression often go hand in hand; however, it is possible to experience one without the other. There is a great deal of

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overlap in the research and theory of anger and aggression. For this reason, both concepts will be explored further.

As with most psychological constructs, theorists have suggested that both biological and environmental factors play a role in the development and expression of anger. It is thought that a genetic predisposition to certain hormonal, neurological or physiological characteristics affects expression of emotions such as anger (Huesmann, 1988). High levels of testosterone in both men and women have been shown to correlate with aggressive behaviors (Archer, 1994; Dabbs, Ruback, Frady & Hopper, 1988). It is believed that androgens like testosterone contribute to an increase in aggression by stimulating neural pathways for aggressive thoughts and behaviors (Carlson, 1998). Studies have also shown that overactivation of the amygdala, the brain's emotional center, in concert with decreased activation of the prefrontal cortex is correlated with an increase in aggression (Pliszka, 2003). It is thought that this combination increases an individual's propensity toward emotionally charged, impulsive responses to his or her environment. Additionally, low levels of the neurotransmitter, serotonin, have been shown in both animal and human studies to correlate with increases in aggression (Pliszka, 2003). Serotonin levels are subject to both genetic and environmental factors such as an individual's diet and seasonal changes. Individuals prone to aggressiveness have also been shown to have a decreased autonomic nervous system response, i.e., a measurably lower resting heart rate, decreased skin conductance response, and lowered brain activity as measured by EEG (Pliszka, 2003). Researchers believe that this decreased autonomic response is linked to a general decrease in fearfulness and inhibition.

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There appears to be increasing evidence that heredity factors into the development and expression of aggressive behaviors by both adults and children (DiLalla, 2002). Pliszka (2003) reviewed numerous adoption and twin studies that demonstrated a significant hereditary basis for the expression of anger and aggression; however, researchers note that the actual heritability of aggression is small. Importantly, the studies also demonstrated that the expression of aggression is tied to an interaction between genetics and environment. Aggression will be expressed when those who have a genetic predisposition toward aggression are chronically exposed to an aggression-provoking environment (Pliszka, 2003). Given these findings, researchers suggest that environment and internal thought processes likely play a greater role in anger expression than does genetics (Huesmann, 1988). In fact, Pliszka (2003) suggested that much of the neurobiology of aggression is attributable to the impact of early environmental experiences as opposed to genetic influences. Parents, peers, and others play a significant role in shaping a child's environment and influencing the development of anger and aggression.

Generally, anger is considered to be an emotion that humans develop at a very young age. The majority of studies in the realm of developmental psychology have documented anger expression in children as early as four to six months old (Lemerise & Dodge, 1993). Another study demonstrated a reliable expression of anger in children as young as two months old (Lewis, 1993). In these studies, anger is defined as an emotional consequence of the interruption or frustration of goal-directed action. It is believed to be a primitive, inborn mechanism meant to help organisms overcome obstacles. In this way, anger serves an evolutionary purpose as a means to enhance

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survival of humankind (Lemerise & Dodge, 1993). Lemerise and Dodge suggest that the reason anger may be first reliably expressed in children around four to six months of age is because this is the time that researchers (notably Jean Piaget) theorize that children acquire an understanding of cause-and-effect relationships.

Once children develop the capacity for anger and anger expression, their environments begin to shape the circumstances under which the expression of anger is likely. Several learning theories have been proposed to explain the mechanism by which children are influenced to express anger or behave aggressively. One well-known theory, the social learning theory, was proposed by Albert Bandura in the 1960's (Bandura, Ross & Ross, 1963; Kandel & Andrews, 1987). Bandura's theory is composed of two principles by which a person's behavior can be influenced: modeling and social reinforcement. Modeling, also termed observational learning, is the idea that individuals will learn and imitate behaviors that they observe from the significant others in their lives. These observational experiences are encoded into long-term memory and have an enduring impact on behavior (Bandura, 1979). Bandura's theory also indicates that lessons learned from observational learning are generalized to go above and beyond what an individual specifically saw or heard. Social reinforcement is the idea that individuals' behaviors will also be influenced by what they perceive as appropriate according to their significant others and their cultural context (Kandel & Andrews, 1987). Thus, in addition to observational learning, an individual also learns to behave in certain ways through the reinforcement or punishment of his or her own direct experience, or in other words, through trial and error performance. Bandura's social learning theory suggests that modeling and social reinforcement act together to influence aggressive behaviors. He

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indicates that aggression is initially learned through modeling and is subsequently clarified through practice and reinforcement.

Research supports the strong influence of modeling on the development of anger by demonstrating that parental socialization is a key component of children's anger expression from a very young age (Lemerise & Dodge, 1993). By a child's first or second year, studies show that he or she can form previously undisplayed facial expressions when angry such as wrinkled brow or lip biting. These expressions had been exhibited beforehand by a parent in response to the infant's negative emotional expression. The child is gradually learning healthy emotional control from imitating his or her parents' behaviors (Malatesta-Magai, 1991; Malatesta, Culver, Tesman & Shepard, 1989). Another study showed that parents who treat their children angrily are more likely to have children who engage in consistently angry, noncompliant behavior (Crockenberg, 1985). Conversely, parents who demonstrate empathic behaviors toward their children are more likely to have children who do the same (Crockenberg, 1985). Further support comes from a study that showed a significant relation between negative exchanges parent-child exchanges and increased parent and teacher ratings of antisocial behavior in children (Dishion, Duncan, Eddy, Fagot & Fetrow, 1994). Toddlers (aged 16 to 18 months) in naturalistic observations have demonstrated aspects of angry behavior imitated from a parent (Radke-Yarrow & Kochanska, 1990).

Numerous studies have also demonstrated parents' influence on cognitive aspects of anger expression by providing emotional labels, understanding of societal norms, and language with which to communicate anger (Camras, 1985; Lutz, 1985; Malatesta & Haviland, 1985; Michalson & Lewis, 1985; Miller & Sperry, 1987). A naturalistic study

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by Power and Parke (1986) used in-home observation of parents and children of 11, 14, and 17 months to explore the impact of parental socialization on offspring. The researchers found that parents were, indeed, a significant source of cognitive socialization and short-term behavioral regulation for their children. Parents in the study worked to enforce household rules, discourage aggression, and encourage prosocial behaviors such as assisting in household chores and taking turns during games. Lewis and Saarni (1985) summarized the impact of parental socialization on children's anger expression by stating that parents influence children directly through reinforcement, punishment, and teaching as well as indirectly through modeling.

Research evidence also demonstrates that parents' aggressive behaviors influence their children to behave in a subsequently more aggressive way toward others. One study found that kindergartners were significantly more likely to behave aggressively toward their peers when their parents engaged in highly aggressive parental punishment practices ranging from spanking their buttocks with an open hand to beating the child up (Strassberg, Dodge, Pettit & Bates, 1994). There is also a significant correlation between severe physical punishments doled out by parents and male high school students' propensity toward aggressive behaviors such as fist fighting, using a weapon, using force to steal money, and beating someone up for no reason (Neapolitan, 1981). Two longitudinal multisite studies demonstrated that increases in parental rejection of children, as well as use of aggressive punishment, were correlated with increased aggression in childhood and adulthood of offspring (Eron, Huesmann & Zelli, 1991). The study showed that severity of punishment by parents was moderately correlated with how aggressive the children were in school and as 30-year-old adults. Another study

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using a large national database demonstrated that individuals were more likely to approve of interpersonal violence as adults if they had experienced this type of violence as children (Owens & Straus, 1975).

Further research establishes the effect that parents can have on their children's propensity toward risky behaviors such as alcohol and tobacco use. One longitudinal study followed individuals from age 15 to 28 and demonstrated that parental modeling of alcohol use, especially maternal alcohol use, was a significant predictor of heavy alcohol use among offspring (White, Johnson & Buyske, 2000). Numerous other studies support the hypothesis that parental drinking behavior influences their offspring's use of alcohol as adolescents and as adults (Harburg, DiFranceisco, Webster, Gleiberman & Schork, 1990; Harburg, Gleiberman, DeFranceisco, Schork & Weissfeld, 1990; Jennison & Johnson, 1998). Other studies show that parents and children often display analogous drinking rituals or patterns (Ellis, Zucker & Fitzgerald, 1997). Intergenerational transmission of alcohol use is thought to occur through direct modeling of parental behaviors as well as learned perspectives on societal norms and values (White et al., 2000). This theory accounts, in part, for the increased likelihood that children of alcoholics will become alcoholics themselves (Ellis et al., 1997; Jacob & Johnson, 1997). Likewise, studies have shown that adolescents' use of tobacco is correlated with parental use of tobacco (Bailey, Ennett & Ringwalt, 1993; Bauman, Foshee, Linzer & Koch, 1990; Chassin, Presson, Sherman, Montello & McGrew, 1986; Chassin, Presson, Todd, Rose & Sherman, 1998; Kandel & Wu, 1995).

The research concerning parents' influence on their children's anger and aggression is substantial. The studies summarized above show that parents play

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significant roles in children's development of anger expression, angry thoughts, aggressive behaviors and propensity toward risky behaviors such as use of alcohol and tobacco. While family often plays a large role in a child's environment, he or she is also exposed to many other factors that potentially contribute to the development of anger and aggression. Another factor could be the influence of peers.

Peers would seem to be an important source of socialization for driving anger and aggression. Adolescents, on the whole, typically spend large amounts of time in each others' presence. The relative freedom that comes with procurement of driver's licenses and cars around the age of 16 would seem to only increase the amount of time adolescent peers spend together. Developmentally, adolescence is also a time of heightened influence from others. Research on general anger and aggression has shown that peers significantly influence an individual's propensity toward aggression through modeling and reinforcement (Cohen, 1971; Dishion et al., 1994). A longitudinal study of children from the third through fourth grades demonstrated that children who befriend aggressive peers become more aggressive themselves (Werner, 2001). Research also indicates that adolescents develop friendships with peers who have similar propensities toward aggression (Mariano & Harton, 2005). This phenomenon is referred to as "niche picking." A large literature has also documented the strong influence peers have on adolescents' propensity toward risky behaviors such as use of alcohol, tobacco, drugs, drunk driving, delinquency, and unprotected sex (e.g., Arnett, 1992; Bailey & Hubbard, 1991; Flannery, Vazsonyi, Torquati & Fridich, 1994; Huba, Wingard & Bentler, 1979; Musher-Eizenman, Holub & Arnett, 2003; Oetting & Beauvais, 1986; Tolson & Urberg, 1993).

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Other studies have shown that both parents and peers can have a significant influence on adolescents' use of alcohol and marijuana (Halebsky, 1987; Kandel & Andrews, 1987). Interestingly, these studies showed that parents had the greatest influence on teens prior to initiation into alcohol or drug use. Once a teen used alcohol or drugs, peer influence became the dominant force in his or her behaviors and related attitudes. Kandel and Andrews echoed the work of past researchers when stating that during adolescence, parents may have greater influence on teens' long-term goals (i.e. career choices), while peers exert greater influence on more immediate lifestyle choices such as drug and alcohol use. Perhaps these findings can be extrapolated to hypothesize that peers would exert greater influence on teens' development of driving anger and aggression than parents' because some driving behaviors could be thought of as lifestyle choices. This hypothesis gains additional credence through numerous research findings indicating that models we perceive as most similar to ourselves exert the greatest influence (Hallenback & Kauffman, 1995).

Studies on the social influence of parents and peers on the driving anger and aggressive behaviors of adolescents are scarce. Several related studies have demonstrated a more general influence that parents have on their children's driving behaviors and attitudes. One early study explored the impact of familial socialization on delinquent driving behaviors of college males (Carlson & Klein, 1970). The researchers found a significant positive correlation between the records of traffic convictions and accidents for college-aged sons and their biological fathers. A more recent study also found that adolescents' (both male and female) driving records were significantly correlated with those of their parents (Ferguson, Williams, Chapline, Reinfurt &

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DeLeonardis, 2001). Adolescents in the study were more likely to have an accident or traffic violation on their record if at least one of their parents also had a crash or violation. The researchers of both studies concluded that the results demonstrate the significant influence that parents have as models for their children's driving behaviors. Most recently, a pair of Finnish researchers revisited the theory that parents' driving behaviors could serve as modeling and influence for their adolescent children (Bianchi & Summala, 2004). They surveyed 123 Brazilian college students and one or both of their parents to assess the relationship between the two generations on risk-related driving behaviors. The findings indicated that significant relationships existed between parents and their college-aged children on the four factors of the driver behavior questionnaire (DBQ): errors (i.e., pulling out without enough room), ordinary violations (i.e., speeding), aggressive violations (i.e., honking your horn), and lapses (i.e., switching on lights when wipers are needed instead). Sequential regression models demonstrated that parents' driving style explained their children's driving errors and ordinary violations but had no impact on lapses and aggressive violations. Aggressive violations were predicted by children's amount of exposure to driving and lifestyle factors including their reasons for and motivation for driving.

Additional studies add support to the theory of parents as monitors for their children's driving behaviors. More importantly, a review of the literature demonstrated that a lack of parental monitoring is both a common occurrence and a factor that is significantly related to teens' risky behavior, aggression, and motor vehicle crashes (Beck, Hartos & Simons-Morton, 2002). Fifty-two thousand high school students completed self-response questionnaires concerning family life, driving behavior, views

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concerning driving-related laws, social activities and driving-related attitudes (Preusser, Williams & Lund, 1985). The results indicated that the high school students perceived their parents as exercising a great deal of influence over their driving activities such as prohibiting driving under the influence of alcohol and affecting when, where, and with whom students are driving. The students also strongly indicated that if restrictions were violated, then parents dealt out punishments like suspending driving privileges. In the second study, high school students were interviewed over the telephone about their risky driving behaviors, history of traffic violations and crashes, as well as their parents' influence through monitoring and restricting driving behaviors (Hartos, Eitel, Haynie & Simons-Morton, 2000). The study demonstrated that lower levels of parental monitoring and lenient driving restrictions were related to higher incidences of risky driving behaviors, traffic violations, and minor traffic accidents among the adolescents. A third study found that negative parental influences on adolescent children were related to increased risk of serious traffic offenses and crashes by these children during the first seven years of driver's licensure (Shope, Waller, Raghunathan & Patil, 2001). Fifteen year olds' self-report of their parents' permissiveness, substance use and leniency about adolescent substance abuse contributed to an increased risk of crashes and traffic violations as measured by subsequent state traffic records.

A pair of recent studies conducted by Beck and colleagues used telephone interviews with adolescents and one of their parents to explore the parental factors that contribute to teen driving risk (Beck, Raleigh & Shattuck, 2001; Beck, Shattuck & Raleigh, 2001). The results showed that the adolescents, who were on provisional licensure at the time of the study, were engaged in frequent risky driving behaviors

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including driving distracted by friends or loud music, driving too fast, and driving aggressively. Generally, parents were found to be underinformed as to the extent of their children's risky driving behaviors, but those parents who placed more restrictions and increased supervision on their children's driving had less risky teen drivers. For instance, parents who allowed unsupervised access to a car several times a week or more were significantly more likely to have teens who were high-risk drivers (Beck, Raleigh et al., 2001). Interestingly, the results from these studies showed that specific teaching from parents had little impact on teens' driving behaviors; monitoring, however, proved to be a much greater influence on reducing risky driving behavior. Hartos and colleagues (Hartos, Eitel & Simons-Morton, 2002) conducted a telephone survey with 261 Maryland adolescents to assess the influence of parental monitoring on adolescents' risky driving behaviors. The teens were interviewed on two occasions, three months apart, and asked questions concerning risky driving behaviors, parental restrictions on driving, parental monitoring and control of teens' driving, and teens' acceptance of deviant behaviors (i.e., using drugs, cheating in school, and bullying other teens), frequency of friends' problem behaviors, self-control, and sensation-seeking. Results showed that teens' participation in risky behaviors was stable across the three-month time period. Risky driving was predicted both by teens' propensity for sensation seeking and low parental influence. Importantly, teens engaged in high-risk driving behaviors were twice as likely to report low parental restrictions on their driving and three times more likely to report low parental monitoring of their driving behaviors.

A few studies have been conducted to assess the influence of peers on driving behaviors. One set of studies compared young, working-class males in Australia and the

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United States who had been involved in at least one automobile accident with those who had not. Those who were suggestible to negative peer influences for risky and illegal driving behaviors were significantly more likely to have had at least one accident (Clark, 1976; Clark & Prolisko, 1979; Mookherjee & Hogan, 1980). A qualitative study using focus group interviews with Hispanic American adolescent males indicated the influence of peers on use of alcohol and drinking and driving (Beck & Bargman, 1993). The participants indicated that they drank to "fit in" and be part of the crowd. A similar study used focus groups to explore lifestyle factors contributing to driving behaviors among a group of Danish teenagers (Møller, 2004). Four factors emerged as contributors to the teens' general behavior while driving: visibility, status, control, and mobility. Embedded within the factor of status was recognition by friends. The participants indicated that they felt pressure to drive in a way that would seem "cool" to other teens. These so-called "cool" behaviors included risky and aggressive driving. A focus group study conducted in Pennsylvania echoed these results (McKay & Coben, 2002). Adolescents reported a belief that high crash rates among adolescent drivers were due to teens' tendency to want to drive in risky and aggressive ways in order to impress their friends.

Data from a longitudinal study in New Zealand demonstrated the influence of peers and parents on risky driving behaviors (Gulliver & Begg, 2004). At ages 15 and 18, the researchers asked participants about their exposure to parents' and peers' roadway aggression and episodes of driving under the influence of alcohol. At 21, they asked these same participants about their own alcohol-related driving behaviors. The results indicated that men who were exposed to others' aggressive behaviors behind the wheel and had ridden with a peer under the influence of alcohol were significantly more likely

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to also drive under the influence of alcohol at age 21. The men were also less likely to safely predict the difference between the legal limit of blood alcohol and their perceived "safe" amount of alcohol consumption before driving. Women in the study who had been exposed to others' aggression behind the wheel and had ridden with a peer who was under the influence of alcohol were also significantly less able to predict the difference between perceived safe and estimated legal alcohol consumption limit. The authors concluded that exposure to aggressive and risky roadway behaviors in mid- to late-adolescence predicted participants' subsequent risky behavior while driving.

While it is clear from these studies that parents and peers can influence an individual's driving behaviors and attitudes, these studies tell us little about the relation of parents and peers specific to the expression of anger and aggression behind the wheel.

An approach that would increase understanding of these issues would measure the correlation of parental modeling to offspring's driving anger, angry thoughts, driving anger expression, frequency of risky and aggressive behavior, and general anger and anger expression. One study surveyed college students in an introductory psychology class and their parents to explore these relationships (Deffenbacher, Adams & Richards, 2006). The study showed that parents' behavior did correlate, but not highly, with their offspring's driving anger, anger expression, angry thoughts, and behaviors. The findings suggested that parental influence may be conveyed to college-age children directly through modeling of driving emotions, thoughts, and behaviors, as well as indirectly through the impact of parents' general trait anger and anger expression. At the same time, the findings of this study indicated that correlations with children's driving-related and general anger constructs were small and suggested that other factors must be studied.

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Study Goals

The current study aimed to broaden understanding of the development of anger and aggression while driving. Past studies strongly support the role of parents as models and reinforcers of their children's general anger expression, aggression, and risky behavior. It has been shown that parents' driving anger and aggression has a significant though statistically small relation to offspring's driving anger and aggression. Other research demonstrated that parental monitoring of their children's driving-related behavior is a significant moderator of these behaviors. The literature suggests that peers are a significant source of social modeling and reinforcement of aggression and risky behaviors like drug and alcohol use. There is a growing literature showing correlations between peers and their friends' driving-related behaviors.

In order to foster further understanding in this area, the present study sought to develop measures of perceived parental and peer influence on driving anger and then use the scales to provide initial reliability and validity data as well as information on hypothesized peer and parental influence on driving-related variables. Two goals guided scale development in this study. The first goal was to increase our knowledge of the correlation of parents and peers to an individual's driving anger and aggression. Secondly, the study provided an opportunity to increase understanding of the relative contributions of each construct and provide a "big picture" view of the problem of anger and aggression behind the wheel. This knowledge will contribute to interventions designed to increase the effectiveness of driving anger prevention programs and drivers' education courses. There is value in looking jointly at peer and parental influences on driving anger. Unlike much of the related literature, this study and its measures were

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specific to driving and therefore may have increased external validity. Additionally, the study brought together elements from past studies such as the relation of peer behaviors, peer encouragement, peer discouragement, parental behaviors, parental encouragement, parental discouragement, and parental monitoring to risky and aggressive behaviors.

This study contributed in another way. A prior study (Deffenbacher et al., 2006) correlated student behavior with parents' reported behavior. However, children's perceptions of their parental behaviors may serve as better predictors of the behaviors than parental self-report (Michaels, Messe & Stollak, 1983). The present study, therefore, assessed participants' perceptions of parental behavior, rather than parental self-report.

It was hypothesized that individuals learn driving anger and aggression, in part, through the principles of social learning theory. If so, then one would expect to find significant relationships between participants' driving-related variables and their parents' and peers' perceived behaviors behind the wheel (modeling), perceived encouragement of participants' risky and aggressive behaviors (social reinforcement), parents' and peers' perceived discouragement (social punishment/negative sanctions) of the same variables, and parental monitoring of driving-related variables. Specifically, one would expect significant correlations between perceptions of parents' driving behaviors with participants': (a) total score and the six subscales of the Driving Anger Scale (Deffenbacher et al., 1994); (b) four forms of expressing anger while driving derived from the Driving Anger Expression Inventory (Deffenbacher et al., 2002); (d and e) three-month reports of aggression and risky behavior behind the wheel as well as three-month reports of three accident-related behaviors, and lifetime reports of moving

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violations, minor accidents, and major accidents from the Driving Survey (Deffenbacher et al., 2000). Significant correlations would be expected for like analyses of these participant factors and measures of peer modeling, peer encouragement, peer discouragement, parental encouragement, parental discouragement, and parental monitoring.

It was hypothesized that participants' general anger and anger expression characteristics would further describe the relationships at hand. To explore this, correlations were computed between participants' reports on the Trait Anger Scale and Anger Expression Inventory (Spielberger, 1988) and peer and parental measures.

It was hypothesized that peer and parental influence variables would be significant predictors of participants' driving anger and aggression. Hierarchical regression models were computed using subsets of peer and parental characteristics to determine the best predictors of participants': (a) level of driving anger, (b) aggressive and adaptive/constructive anger expression, (c) aggression on the road, and (d) risky roadway behavior. Gender was entered in Step 1, parent and peer measures were entered in Step 2, and centered interactions were entered in Step 3. In contrast to the correlational analyses, regression models provided a broader picture of the relative contributions of peer and parental factors predictive of participants' driving-related anger, aggressive expression, and behaviors.

It was hypothesized that the influence of parents and peers would contribute to participants' driving anger and aggression above and beyond the influence of gender and that individual's trait anger and general anger expression. To test this hypothesis, an additional set of hierarchical regression models were computed using subsets of peer and

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parental characteristics as well as participants' general anger measures to best predict participants': (a) level of driving anger, (b) aggressive and adaptive/constructive anger expression, (c) aggression on the road, and (d) risky roadway behavior. Gender was entered in Step 1, general anger measures in Step 2, parent and peer measures in Step 3, and centered interactions in Step 4.

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CHAPTER 2

METHODS

Participants

The participants were 329 (128 male, 201 female) undergraduate students (*M* age = 18.8, *SD* = 1.1) at Colorado State University enrolled in the introductory psychology course during the fall semester of 2005. All were volunteers and earned one of four research credits for participation. The ethnicity of the student participants was 0.3% Native American, 1.2% African American, 1.2% Asian American, 3.6% Latino/Hispanic American, 89.1% White, non-Hispanic, and 4.6% other or mixed ethnicity. Of these, 71.1% were freshmen, 18.8% were sophomores, 6.1% were juniors, and 3.9% were seniors.

Instruments

Demographic information. Participants provided demographic information at the beginning of the questionnaire including age, gender, year in school, and ethnicity (Native American; African American; Asian American; Hispanic/Latino; White, Non-Hispanic; or Other). Participants also provided information concerning their usual driving practices including times driven per day, number of miles driven per day, and number of miles driven per day in heavy traffic.

For each of the following measures, alpha reliabilities were calculated using the current sample. These are reported in the description of each measure.

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Driving Anger Scale. Participants completed the 33-item long-form Driving Anger Survey (DAS) (Deffenbacher et al., 1994) to provide a multifaceted measure of anger behind the wheel. DAS items assess participants' tendency to become angry when driving and are self-rated on a five-point scale (1 = not at all, 5 = very much) based on the amount of anger experienced if the situation occurred. Examples of items are, "You are stuck in a traffic jam" and "You are driving behind a large truck and cannot see around it." The DAS includes six scales that measure driving anger in different situations. One scale is a seven-item Traffic Obstructions (α = .81, reported α = .78) with items like, "You encounter road construction and detours." The nine-item Discourtesy scale (α = .82, reported α = .81) includes items like, "Someone cuts in right in front of you on the freeway." The Slow Driving scale (α = .80, reported α = .81) has six items like, "Someone is slow in parking and holding up traffic." The four-item Police Presence scale (α = .80, reported α = .79) has items such as, "You pass a radar speed trap," and the four-item Illegal Driving scale (α = .72, reported α = .80) has items like, "Someone is driving too fast for the road conditions." The Hostile Gestures scale (α = .88, reported α = .87) has three items like "Someone yells at you about your driving." Reported alpha reliability of the long-form DAS is .90 (Deffenbacher et al., 1994). Alpha reliability with the current sample was .92. The DAS correlates positively with frequency and intensity of driving anger and aggression, as well as risky driving and some crash-related outcomes (Blanchard et al., 2000; Dahlen et al., 2005; Deffenbacher, Deffenbacher et al., 2003; Deffenbacher, Lynch, Oetting et al., 2001; Deffenbacher, Richards et al., 2003).

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Driving Anger Expression Inventory. The Driving Anger Expression Inventory (DAX) was used to assess the manner in which study participants express their anger while driving (Deffenbacher, Lynch, Deffenbacher et al., 2001; Deffenbacher et al., 2002). Participants reported the frequency with which they express anger while driving on a four-point scale (1 = almost never, 4 = almost always). The 49 items in the DAX break down into four different forms of anger expression. The 12-item Verbal Aggressive Expression (α = .89, reported α = .88) assesses verbally aggressive forms of anger expression with items like, "I swear at the other driver aloud." The 11-item Personal Physical Aggressive Expression (α = .76, reported α = .84) assesses a person's utilization of his or her physical presence for aggressive expression of anger with items like, "I shake my fist at the other driver." The 11-item Use of the Vehicle to Express Anger (α = .87, reported α = .86) assesses a person's likelihood of using his or her vehicle or driving behavior to aggressively express anger with items like, "I slow down to frustrate the other driver." The 15-item Adaptive/Constructive Expression (α = .91, reported α = .90) assesses use of cognitive and behavioral strategies for safe, non-aggressive expression of anger with items like, "I tell myself to ignore it." The three aggressive forms of anger expression correlate positively with each other (*r*s = .39 to .50) and negatively with Adaptive/Constructive Expression (*r*s= -.10 to -.36). Additionally, the three aggressive forms of anger expression correlate positively with driving anger, aggression, and risky behavior behind the wheel, whereas Adaptive/Constructive Expression correlates negatively with these variables (Deffenbacher, Lynch, Deffenbacher et al., 2001; Deffenbacher et al., 2002, Deffenbacher et al., 2004).

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Driving Survey. The Driving Survey (Deffenbacher, Deffenbacher et al., 2003) was used to assess the frequency of respondents' crash-related experiences, aggression, and risky behavior on the road over the past three months. Participants reported the frequency (0 to 5+ where 5+ was treated as a 5 in analyses) of the following: (a) six accident-related outcomes (i.e., had a major accident, had a minor accident, had a "close call" but were not actually in an accident, had a moving violation, lost concentration while driving, had a minor loss of control of the vehicle); (b) three-month frequencies of 13 driving-related aggressive behavior items (e.g., had a verbal argument with the driver of another vehicle, honked your horn in anger); and (c) three-month frequencies of 15 items assessing risky behavior (e.g., been drunk and driven, driven 20+ miles over the speed limit). Previous studies have shown that the three-month reports of crash-related outcomes do not form a reliable scale (αs = .41 to .45) (Deffenbacher, Deffenbacher et al., 2001; Deffenbacher, Lynch, Filetti, Dahlen & Oetting, 2003). Therefore, each item was analyzed individually. Reported alpha reliabilities for the three-month reports of aggression range from .85 to .89 (current α = .85) and from .83 to .86 for the three-month report of risky behavior (current α = .86) (Deffenbacher, Deffenbacher et al., 2001; Deffenbacher, Lynch et al., 2003). High anger drivers report more aggression, risky behavior and some increase in crash-related outcomes than their low anger counterparts (Deffenbacher et al., 2000; Deffenbacher, Lynch et al., 2003).

Trait Anger Scale. Participants completed the 10-item Trait Anger Scale (TAS) (Spielberger, 1988) in order to assess general characteristics of anger that might contribute to elevated risk while driving. Respondents answered 4-point Likert-type ratings (1 = almost never, 4 = almost always) that reflect how he or she typically reacts

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with anger. Past research indicates that α reliabilities for the TAS range from .81 to .91 (current α = .85) (Spielberger, 1988); test-retest reliabilities range from .70 to .77 over two weeks (Jacobs, Latham & Brown, 1988) and .75 for two months (Morris, Deffenbacher, Lynch & Oetting, 1996). The TAS correlates positively with other measures of anger, aggression, and hostility and is more highly correlated with these variables than with other cognitive, emotional, behavioral or personality variables (Deffenbacher, Oetting, Thwaites et al., 1996; Deffenbacher, Oetting, Lynch et al., 1996; Spielberger, 1988).

Anger Expression Inventory. Spielberger's (1988) 24-item Anger Expression Inventory (AX) was completed to gauge ways of expressing anger generally. The three 8-item scales (αs = .73 to .81) are rated on Likert-like scales (1 = almost never, 4 = almost always) and measure a participant's tendency to express anger by suppressing it and holding grudges (Anger-In), by outwardly expressing anger in negative ways (Anger-Out), and by controlling anger and calming down (Anger-Control). Current α reliability was .75 on the Anger-In subscale, .76 on the Anger-Out subscale, and .83 on the Anger-Control subscale. Correlations between these forms of anger expression and measures of anger, personality functioning and physiological variables indicate good construct validity (Deffenbacher, 1992; Deffenbacher, Oetting, Thwaites et al., 1996; Spielberger, 1988).

Scales of Peer and Parental Influence on Driving Anger. Participants completed the 85-item Scales of Peer and Parental Influence on Driving Anger (SPPI). The SPPI (Appendix A) was developed for this study in order to assess perceived peer aggressive behaviors while driving, peer encouragement of aggressive behavior while driving, peer

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discouragement of aggressive behavior while driving, perceived parental aggressive behavior while driving, parental encouragement of aggressive behavior while driving, parental discouragement of aggressive behavior while driving, and parental monitoring of driving behavior. Development and psychometric properties of the SPPI are described at the beginning of the Results section with the final outcome summarized here.

For the three scales concerning peers, participants were instructed to think of those peers or friends with whom they rode and drove most from ages 16 to 18. They were then asked to rate each item on five-point Likert-type scales (1 = never or almost never, 5 = always or almost always). The Peer Modeling scale (α = .93) contains 14 items like "yell at other drivers" and "not let others pass" under the following stem: "When you rode with your friends and they were angry or getting back at other drivers, how often did they..." The Peer Encouragement scale (α = .93) is composed of 12 items like "get back at drivers" and "flash your lights in anger" under the following stem: "When you drove with your friends and you were angry or getting back at other drivers, how often did your friends encourage you to..." The Peer Discouragement scale (α = .96) contains 12 items like "seeking revenge or retaliation on other drivers" and "honking your horn in anger" under the following stem: "When you drove with your friends and you were angry or getting back at other drivers, how often did your friends try to keep you from..."

The Parental Modeling scale (α = .93), Parental Encouragement scale (α = .85), and Parental Discouragement scale (α = .99) were identical to their respective peer scales with the word "parents" substituted for "peers" in each stem. In answering these items,

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participants were instructed to consider the parent(s), stepparent(s) or other adult guardian(s) with whom they drove and rode most from ages 16 to 18.

The seventh SPPI scale, Parental Monitoring (α = .87), is composed of six items such as "Did your parents know with whom you rode or drove?" and "Did your parents know if you did things like yell or swear at other drivers?"

Procedure

A brief description of the study as a project on driving and anger as well as on interactions with parents and peers in the students' first two or three years of driving was posted on the introductory psychology website. It stated that the one-credit study would take approximately 45 minutes to complete. A similar description of the study was offered to students in an announcement made by course instructors during a class lecture. Interested students were able to sign up for the study through the course website.

Participants met for the study in groups of 55-60 in a classroom accommodating approximately 100 people. A research assistant explained the study, answered questions, and passed out two informed consent documents to each participant (Appendix B). The participants signed the informed consent form, returned one copy, and kept the remainder for their own records. The students then completed a packet of instruments printed in the following order: demographic information, DAS, DAX, Driving Survey, TAS, AX, and SPPI. Questionnaire packets were free of personal identifiers in order to ensure confidentiality and anonymity. Following completion of the questionnaire packet, participants were given a debriefing form (Appendix B). Participation took 30 to 45 minutes.

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CHAPTER 3

RESULTS

Scale Development

Item analyses were conducted on SPPI items broken down into the seven rationally derived scales. For each scale, items were correlated with the total score for the scale (not including that item). A correlation of .40 was determined as the minimum for inclusion in the final scale. Also, items were removed if doing so would greatly increase a scale's α reliability.

Results for the Peer Modeling scale are listed in Table 1. All correlations were greater than .40 except for one item, "When you rode with your friends and they were angry or getting back at other drivers, how often did they throw things at other drivers?" The item was dropped. Cronbach's α for the final 14-item Peer Modeling scale was .93. For the Peer Encouragement scale (α = .93) (Table 2), all item to total correlations were greater than .40. For the Peer Discouragement scale (α = .96) (Table 3), all item to total correlations were greater than .40. For the Parental Modeling Scale (Table 4), the correlation for one item, "When you rode with your parents and they were angry or getting back at other drivers, how often did they throw things at other drivers?" was much below the other items composing the scale and was near (r = .41) the established cut-off. For these reasons, and because the item was removed from the comparable Peer Modeling scale, the item was removed from the final scale (α = .93). For the Parental

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Encouragement scale (Table 5), the correlation for one item, "When you drove with your parents and you were angry or getting back at other drivers, how often did your parents encourage you to not let other drivers take advantage of you?" was less than .40 and was removed ($\alpha = .85$). For the Parental Discouragement scale (Table 6), no item was dropped ($\alpha = .99$). For the Parental Monitoring scale (Table 7), the correlation for one item, "How much did your parents monitor with whom you rode or drove?" was low ($r = .22$), and the item was dropped. A second item, "Did your parents know with whom you rode or drove?" was kept because removal would not greatly increase the estimated α. Cronbach's α for the 6-item Parental Monitoring scale was .87. A summary of the total number of items and Cronbach's α for each scale is listed in Table 8. Of the original 85 developed items, 81 items remained in the final seven scales, and α reliabilities of the scales ranged from .85 to .99.

A one-way MANOVA on the seven SPPI scales revealed a significant multivariate effect for gender, $F(7, 319) = 3.69$, $\eta^2 = 0.075$, $p < .01$. Univariate ANOVAs on each SPPI scale were conducted as follow-up tests to the MANOVA (Table 9). Using a Bonferroni correction, each ANOVA was tested at the .007 level. Men and women did not differ on levels of reported Peer Encouragement, Peer Discouragement, Parental Encouragement, Parental Discouragement, and Parental Monitoring. Men reported significantly higher scores on Peer Modeling and Parental Modeling. These gender effects were small.

Correlations (Table 10) explored the relatedness of scales of the SPPI. A degree of correlation was expected between these rationally derived and theoretically related scales. Peer Modeling correlated positively with Peer Encouragement, Parental

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Modeling, Parental Encouragement, and Parental Discouragement but not with Peer Discouragement. Peer Encouragement correlated positively with Parental Modeling, Parental Encouragement, and Parental Discouragement but not with Peer Discouragement. Peer Discouragement correlated positively with Parental Discouragement and Parental Encouragement. Parental Modeling correlated positively with Parental Encouragement but not with Parental Discouragement. Parental Encouragement did not correlate with Parental Discouragement. Parental Monitoring did not correlate with any scale.

When found, significant correlations between scales of the SPPI were small to medium and accounted for 1% to 46% of the variance. Peer and Parental Encouragement and Discouragement were unrelated and Parental Monitoring was uncorrelated with all other scales. The pattern of correlation suggested that measures assessed related but separate constructs. Measures, therefore, were not further reduced.

Relations of SPPI Scales to Driving-Related Measures

Correlations explored the relation between perceived peer behaviors behind the wheel and peer encouragement and discouragement of participants' driving anger and aggression with each of the following: total score and the six scales of the DAS, five forms of expressing anger while driving derived from the DAX , three-month reports of aggression and risky behavior behind the wheel, as well as three-month reports of three accident-related behaviors, and lifetime reports of moving violations, minor accidents, and major accidents (Table 11). Peer modeling and encouragement correlated very similarly with driving-related variables. They correlated positively with total driving anger, four types of driving anger, overall aggressive anger expression, verbal, physical

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and vehicular forms of anger expression, aggression, and risky behavior, losses of concentration, losses of vehicular control, and close calls and negatively with adaptive/constructive anger expression. Correlations with peer discouragement were generally fewer and smaller. Peer discouragement correlated positively with total driving anger, two of the DAS scales, overall aggressive and verbal and physical forms of aggressive anger expression, but not vehicular anger expression. No peer variable correlated with accidents or tickets. Across the domain of peer influence, the relationships were small to moderate and accounted for 1% to 19% of the variance.

Correlations explored the relationship between perceived parental behaviors behind the wheel, parental encouragement and discouragement of participants' driving anger and aggression, and parental monitoring of driving with participant measures of driving anger and aggression (Table 12). Parental Modeling correlated positively with two forms of driving anger, overall aggressive anger expression, three forms of aggressive (verbal, personal physical, and vehicular) anger expression, and aggressive and risky behavior. Parental Encouragement correlated positively with total driving anger and two forms of driving anger, overall aggressive anger expression, three forms of aggressive (verbal, personal physical and vehicular) anger expression, and aggressive behavior. Parental Discouragement correlated positively with total driving anger and five forms of driving anger, overall aggressive anger expression and two forms of aggressive (verbal and vehicular but not physical) anger expression, and aggressive and risky behavior. Parental Monitoring correlated negatively with total driving anger, two forms of driving anger, and risky behavior. Parental Monitoring correlated positively with adaptive and constructive anger expression. No variable was related to loss of

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concentration and only Parental Monitoring was correlated (negatively) with minor loss of control and close calls. No parental variable correlated with accidents or tickets. Generally, within the domain of parental influence, relationships were small and accounted for 1% to 13% of the variance.

Relations of General Anger Measures to SPPI Scales and Driving Measures

Correlations explored the relations between participants' general trait anger, three forms of general anger expression, and the seven SPPI scales (Table 13). Trait anger and Anger-Out correlated positively and Anger-Control correlated negatively with Peer and Parental Modeling as well as Peer and Parental Encouragement. Anger-In correlated positively with Peer Modeling and Peer Encouragement and negatively with Parental Monitoring. Anger-Control correlated positively with Parental Monitoring. No general anger or anger expression variable correlated with peer or parental discouragement. Relationships were small and accounted for 1% to 15% of the variance.

Correlations explored the relationships between general trait anger, three forms of general anger expression, and driving-related measures (Table 14). Trait anger correlated positively with total driving anger, five forms of driving anger, overall aggressive anger expression as well as the three forms of aggressive expression (verbal, personal physical, and vehicular), aggressive and risky behavior, losses of concentration, losses of control, and close calls. Trait anger correlated negatively with adaptive and constructive anger expression. Suppression of general anger (Anger-In) correlated positively with overall aggressive roadway anger expression, two forms of aggressive expression (verbal and vehicular), and losses of concentration, but correlated negatively with tickets for moving violations. Outward expression of general anger correlated positively with total driving

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anger, four forms of driving anger, overall aggressive anger expression, three forms of aggressive expression (verbal, personal physical, and vehicular), aggressive and risky behavior, losses of concentration, losses of control, close calls, and tickets for moving violations. Outward expression of general anger was negatively correlated with one form of driving anger (Illegal Driving) and adaptive and constructive driving anger expression. Controlled expression of general anger correlated negatively with total driving anger, four forms of driving anger, overall aggressive anger expression, three forms of aggressive expression (verbal, personal physical, and vehicular), aggressive and risky behavior, and correlated positively with adaptive/constructive expression of roadway anger. Relationships between general anger measures and driving measures generally were small to moderate and accounted for 1% to 41% of the variance.

Prediction of Driving Measures by Gender and Peer and Parental Influence

Data so far have been at the individual bivariate correlational level. In this section, sets of variables were combined in regression models to increase the complexity of understanding of emotional and behavioral variables. First these models explored relationships at the level of peers, parents, and the individuals (i.e., trait anger and general anger expression). Subsequent models included combinations of peer, parental, and individual variables to gain more complex understanding of phenomena. In all cases, participant gender was entered on Step 1 to remove the influence of this demographic variable and to allow a clearer understanding of the contributions of the variables included in the model. Variables of interest (e.g., Peer Modeling, Peer Encouragement, and Peer Discouragement) were added on Step 2. Centered interaction variables combining gender and the variables of interest were added on Step 3. A significant term

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on the first step would suggest that gender played a significant role in the prediction of the driving-related measures. A significant term on the second step suggested that the variables of interest added to the prediction of the driving measures above and beyond the role of gender. A significant term on the third step suggested that the relationships between driving measures and the variables of interest varied as a function of some kind of combination of gender and that set. A pattern of nonsignificant interactions on the third step across variables suggested that relationships could generally be best understood at the level of main effects. Models included five of the most general and least redundant driving measures (i.e., total driving anger, adaptive/constructive expression of anger, aggressive anger expression, aggressive behavior, and risky behavior).

Results for peer variables are summarized in Table 15. Gender was a significant predictor of adaptive/constructive expression, aggressive expression, aggressive and risky behavior and was not a significant predictor of total driving anger. The peer influence measures added a significant amount of variance above and beyond gender to the prediction of total driving anger, aggressive expression, and aggressive and risky behavior. Interactions between gender and peer influence variables did not contribute above and beyond the main effects of gender and peer influence.

Parallel analyses for parental influence measures (Table 16) showed the same pattern for gender. Parental measures but not the interactions added a significant amount of variance in all models.

A third set of hierarchical regression analyses were run to predict driving measures from gender, both peer and parental influence measures, and their interactions (Table 17). Once again, gender was a significant predictor of adaptive/constructive

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expression, aggressive expression, aggressive and risky behavior and was not a significant predictor of total driving anger. The peer and parental influence measures accounted for a significant amount of variance to all five models, and interactions were not significant.

No significant interactions were shown in the fifteen regression analyses predicting driving measures from gender, peer, and parental influence measures. Therefore, in examining the individual weights of gender and peer or parental influence measures in the prediction of driving measures, results of the regressions are summarized through Step 2.

All five models for peer variables (Table 18) were significant and accounted for 5% to 25% of the variance in the criterion measures. Peer Modeling and Peer Encouragement were significant predictors of total driving anger; participants who reported higher levels of peer modeling of angry driving behaviors and increased encouragement of aggressive behaviors reported a higher level of driving anger. Only gender was a significant predictor of adaptive/constructive expression, due to females reporting more use of adaptive and constructive anger expression. Gender, Peer Modeling, Peer Encouragement, and Peer Discouragement significantly predicted aggressive expression. Men and those who experienced greater peer modeling, encouragement, and discouragement reported a higher level of aggressive anger expression behind the wheel. Gender, Peer Modeling and Peer Encouragement predicted aggressive and risky behavior. Men and those who experienced greater peer modeling and encouragement reported increased risky and aggressive behaviors while driving.

Models including parental influence measures (Table 19) were significant and

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accounted for 9% to 21% of the variance. Parental Encouragement, Discouragement, and Monitoring predicted total driving anger. Participants who experienced greater parental encouragement, more parental discouragement, and less parental monitoring reported higher driving anger. Adaptive and constructive expression of driving anger was predicted by gender and Parental Monitoring. Women and those who experienced greater parental monitoring reported higher use of adaptive and constructive anger expression behind the wheel. Aggressive expression was predicted by all five variables; men and those who experienced higher parental modeling, encouragement, and discouragement and lower parental monitoring reported greater aggressive expression of anger behind the wheel. Gender, Parental Modeling, Encouragement, and Discouragement predicted aggressive behavior. Males and those who experienced greater modeling, encouragement and discouragement from parents reported more aggressive behaviors when driving. Risky Behavior was predicted by gender, Parental Discouragement, and Monitoring. Men and those who experienced greater parental discouragement and lower parental monitoring reported more risky behaviors.

When peer and parental measures were entered together (Table 20), models were significant and accounted for 11% to 31% of the variance. Driving anger was predicted by Parental Encouragement, Parental Discouragement, and Parental Monitoring; participants who experienced increased encouragement and discouragement and less monitoring by their parents reported more driving anger. Adaptive/constructive expression of anger was predicted by gender and Parental Monitoring. Women and those who had higher parental monitoring reported greater use of adaptive/constructive aggressive expression. Aggressive expression of anger was predicted by gender, Parental

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Modeling, Parental Monitoring, Peer Modeling, and Peer Encouragement. Increased aggressive expression was reported by men and those who experienced higher modeling by both parents and peers, higher encouragement from peers, and lower parental monitoring. Gender, Parental Modeling, Peer Modeling, and Peer Encouragement predicted aggressive behavior; higher aggressive behavior was reported by men and those who experienced higher modeling from parents and peers as well as greater encouragement by peers. Risky behavior was predicted by gender, Parental Monitoring, Peer Modeling, and Peer Encouragement. Men and those who experienced lower parental monitoring and higher peer modeling and encouragement reported more risky behaviors when driving themselves.

Prediction of Driving Measures from Gender, General Anger, and Peer and Parental Influence

Previous studies and current data have demonstrated that general trait anger and anger expression are significant predictors of driving-related anger, anger expression, and risky, aggressive, and accident-related behavior. Therefore, for the peer and parental influence measures to be considered important constructs for further study and implementation into prevention efforts, they should add significantly to models above and beyond the role of general anger and its expression. To address this issues, regression models were repeated with general anger measures entered on Step 2. That is, gender entered on Step 1, trait and general anger expression on Step 2, sets of measures of interest on Step 3, and the interactions of gender and other measures on Step 4.

Results for models including peer measures (Table 21) showed gender was a significant predictor of adaptive/constructive expression, aggressive expression,

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aggressive and risky behavior. General anger measures added significant variance to all models. Peer measures added significant variance beyond gender and general anger measures to the prediction of total driving anger, aggressive expression, and aggressive behavior. The set of interactions were not significant. Parallel analyses including parent measures (Table 22) showed the same contributions for gender and general anger variables and showed that parent measures but not interactions contributed. Analyses including peer and parent measures (Table 23) also demonstrated significant contributions for peer and parent variables, but not for interactions.

As in the previous hierarchical regressions, none of the interaction terms proved significant. Therefore, in examining the individual weights of variables, results are presented through Step 3, first for models for peer measures, next parent variables and finally for peer and parent measures in the same model.

All five models including peer variables (Table 24) were significant and accounted for 20% to 50% of the variance. Trait anger was the sole significant predictor of total driving anger; participants who experienced higher levels of trait anger reported greater driving anger. Gender, suppression of anger, and controlled anger expression were significant predictors of adaptive/constructive expression. Women and individuals reporting greater use of anger suppression and control reported more use of adaptive and constructive expression of driving anger. Gender, trait anger, outward aggressive expression, peer modeling, encouragement, and discouragement significantly predicted aggressive anger expression. Men and individuals higher in trait anger, externalized expression of general anger, and those experiencing greater peer modeling, encouragement, and discouragement of driving anger/aggression reported increased

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aggressive expression of anger behind the wheel. It appears that controlled expression of general anger positively contributed to aggressive anger expression behind the wheel. However, this contradicts both theory and findings from the correlation analyses, suggesting controlled anger expression acted as a suppressor variable. Gender, trait anger, outward expression of anger, and peer modeling predicted aggressive behavior. Controlled expression of general anger was a suppressor variable. Men and those participants who experienced greater trait anger, greater externalized general anger expression, and greater peer modeling of driving anger/aggression reported more aggressive behaviors while driving. Gender, trait anger, and outward expression of anger were significant predictors of risky behavior. Controlled expression of general anger was a suppressor variable. Men and those experiencing a higher level of trait anger and more externalized general anger reported more risky behaviors behind the wheel.

All five models including parent variables (Table 25) were significant and accounted for 24% to 51% of the variance. Trait anger, Parental Discouragement, and Parental Monitoring were significant predictors of driving anger. Individuals experiencing a higher level of general anger, greater parental discouragement of angry/aggressive driving behavior, and a lower level of parental monitoring reported more driving anger. Gender, suppression of anger, controlled anger expression, and Parental Monitoring were significant predictors of adaptive/constructive expression. Women and participants experiencing greater use of general anger suppression, higher control of anger, and increased parental monitoring reported greater use of adaptive/constructive expression of anger behind the wheel. Gender, trait anger, inward aggressive expression, outward aggressive expression, parental modeling and

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discouragement significantly predicted aggressive expression. Controlled expression of anger was a suppressor. Men and those who experience greater general anger, externalized aggressive expression, suppression of general anger, modeling of driving anger/aggression by parents, and discouragement of driving anger/aggression by parents reported increased aggressive expression of anger behind the wheel. Gender, trait anger, outward expression of anger, and parental discouragement predicted aggressive behavior. Controlled expression of anger was a suppressor. Greater aggressive behavior behind the wheel was reported by men and those who experienced more trait anger, externalized aggressive expression of general anger, and parental discouragement of anger/aggression while driving. Gender, trait anger, outward expression of anger, and parental monitoring were significant predictors of risky behavior. Controlled expression of general anger was a suppressor. Men and those who experienced greater externalized expression of general anger and had lower levels of parental monitoring reported more risky behaviors behind the wheel.

Models including peer and parent measures (Table 26) were significant and accounted for 25% to 51% of the variance. Driving anger was predicted by trait anger, Parental Discouragement, and Parental Monitoring. Participants who reported more driving anger experienced higher general anger, greater parental discouragement and lower parental monitoring. Adaptive/constructive expression of anger was predicted by gender, inward expression of anger, controlled expression of anger, and Parental Monitoring. Women and those more likely to engage in suppression and control of general anger and well as those experiencing greater parental monitoring reported higher use of adaptive and constructive forms of anger expression. Aggressive expression of

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anger was predicted by gender, trait anger, outward expression of anger, and Parental Modeling. Men and those experiencing higher general anger, external expression of general anger, and parental modeling of angry/aggressive driving reported more use of aggressive forms of anger expression while driving. Gender, trait anger, outward general anger expression, and Peer Modeling predicted aggressive behavior. Controlled expression of general anger was a suppressor. Men and those experiencing greater general anger, external expression of general anger, and peer modeling of anger/aggressive driving reported more aggressive behaviors. Risky behavior was predicted by gender, trait anger, outward expression of anger, and Parental Monitoring. Controlled expression of anger was a suppressor. Men and those experiencing greater general anger, higher external expression of general anger, and less parental monitoring of driving behavior reported more risky behaviors behind the wheel.

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Table 1

Corrected Item to Total Correlation for the Peer Modeling Scale

When you rode with your friends and they were angry or getting back at other drivers, how often did they...	*Corrected Item/ Total r*
1. Get really angry when driving?	.66
2. Lose control of their anger while driving?	.64
3. Cut other drivers off in anger?	.69
4. Honk their horn in anger?	.69
5. Flash their lights in anger?	.54
6. Tailgate or drive up close to other drivers in anger?	.73
7. Not let other drivers pass?	.70
8. Not let other drivers change into their lane?	.74
9. Box other drivers in?	.63
10. Give other drivers the finger?	.67
11. Make angry gestures at other drivers (other than giving the finger)?	.70
12. Make angry faces at other drivers?	.69
13. Yell at other drivers?	.73
14. Swear at other drivers?	.73
15. Throw things at other drivers?	.38

Note. Item 15 was removed from final scale due to low item to total scale correlation.

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Table 2

Corrected Item to Total Correlation for the Peer Encouragement Scale

When you drove with your friends and you were angry or getting back at other drivers, how often did your friends encourage you to...	*Corrected Item/ Total r*
1. Be really angry at other drivers?	.72
2. Get back at other drivers?	.78
3. Give other drivers the finger or make other gestures?	.72
4. Swear or yell at other drivers?	.75
5. Not let other drivers take advantage of you?	.64
6. Drive aggressively?	.68
7. Cut other drivers off in anger?	.68
8. Not let other drivers cut in?	.73
9. Flash your lights in anger?	.59
10. Honk your horn in anger?	.61
11. Tailgate or drive up close to other drivers in anger?	.73
12. Not let other drivers pass?	.74

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Table 3

Corrected Item to Total Correlation for the Peer Discouragement Scale

When you drove with your friends and you were angry or getting back at other drivers, how often did your friends try to keep you from...	*Corrected Item/ Total r*
1. Getting really angry at other drivers?	.74
2. Seeking revenge or retaliation on other drivers?	.77
3. Giving other drivers the finger or make other gestures?	.82
4. Swearing or yelling at other drivers?	.80
5. Not letting other drivers take advantage of you?	.77
6. Driving aggressively?	.81
7. Cutting other drivers off in anger?	.86
8. Not letting other drivers cut in?	.85
9. Flashing your lights in anger?	.83
10. Honking your horn in anger?	.78
11. Tailgating or driving up close to other drivers in anger?	.82
12. Not letting other drivers pass?	.84

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Table 4

Corrected Item to Total Correlation for the Parental Modeling Scale

When you rode with your parents and they were angry or getting back at other drivers, how often did they...	*Corrected Item/ Total r*
1. Get really angry when driving?	.69
2. Lose control of their anger while driving?	.72
3. Cut other drivers off in anger?	.72
4. Honk their horn in anger?	.59
5. Flash their lights in anger?	.55
6. Tailgate or drive up close to other drivers in anger?	.72
7. Not let other drivers pass?	.74
8. Not let other drivers change into their lane?	.72
9. Box other drivers in?	.60
10. Give other drivers the finger?	.62
11. Make angry gestures at other drivers (other than giving the finger)?	.63
12. Make angry faces at other drivers?	.67
13. Yell at other drivers?	.74
14. Swear at other drivers?	.70
15. Throw things at other drivers?	.41

Note. Item 15 was removed from final scale due to low item to total scale correlation.

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Table 5

Corrected Item to Total Correlation for the Parental Encouragement Scale

When you drove with your parents and you were angry or getting back at other drivers, how often did your parents encourage you to...	*Corrected Item/ Total r*
1. Be really angry at other drivers?	.54
2. Get back at other drivers?	.63
3. Give other drivers the finger or make other gestures?	.61
4. Swear or yell at other drivers?	.57
5. Not let other drivers take advantage of you?	.36
6. Drive aggressively?	.49
7. Cut other drivers off in anger?	.67
8. Not let other drivers cut in?	.53
9. Flash your lights in anger?	.58
10. Honk your horn in anger?	.46
11. Tailgate or drive up close to other drivers in anger?	.59
12. Not let other drivers pass?	.52

Note. Item 5 was removed from final scale due to low item to total scale correlation.

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Table 6

Corrected Item to Total Correlation for the Parental Discouragement Scale

When you drove with your parents and you were angry or getting back at other drivers, how often did your parents try to keep you from...	*Corrected Item/ Total r*
1. Getting really angry at other drivers?	.91
2. Seeking revenge or retaliation on other drivers?	.93
3. Giving other drivers the finger or make other gestures?	.93
4. Swearing or yelling at other drivers?	.92
5. Not letting other drivers take advantage of you?	.82
6. Driving aggressively?	.89
7. Cutting other drivers off in anger?	.95
8. Not letting other drivers cut in?	.94
9. Flashing your lights in anger?	.92
10. Honking your horn in anger?	.88
11. Tailgating or driving up close to other drivers in anger?	.94
12. Not letting other drivers pass?	.95

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Table 7

Corrected Item to Total Correlation for the Parental Monitoring Scale

Item	*Corrected Item / Total r*
1. How much did your parents monitor with whom you rode or drove?	.22
2. Did your parents know with whom you rode or drove?	.43
3. Did your parents know how aggressively your friends drove?	.61
4. Did your parents know how aggressively you drove?	.69
5. Did your parents know if you did things like yell or swear at other drivers?	.75
6. Did your parents know if you did things like honk your horn or flash your lights in anger?	.76
7. Did your parents know if you did things like cut another driver off or tailgated in anger?	.75

Note. Item 1 was removed from final scale due to low item to total scale correlation.

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Table 8

Final Number of Items and Alpha Reliabilities of the SPPI Scales

Scale	*Number of Items*	*α*
Peer Modeling	14	.93
Peer Encouragement	12	.93
Peer Discouragement	12	.96
Parental Modeling	14	.93
Parental Encouragement	11	.85
Parental Discouragement	12	.99
Parental Monitoring	6	.87

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Table 9

Gender Differences in the Scales of the SPPI

Scale	*Gender*				*Univariate Gender F(1,325)*	*Gender Effect Size (η^2)*
	Men		*Women*			
	M	*SD*	*M*	*SD*		
PeM	34.97	12.29	31.34	11.11	7.65*	.023
PeE	23.91	10.32	21.95	8.86	3.31	.010
PeD	24.90	12.42	22.98	11.29	2.07	.006
PaM	24.99	11.78	21.27	7.87	12.09*	.036
PaE	13.44	4.58	12.44	2.87	5.90	.018
PaD	39.20	17.85	37.13	19.16	0.96	.003
PMon	14.84	6.04	16.59	6.21	6.27	.019

*$p < .007$

Note. Each ANOVA was tested at the level of $p < .007$ to account for a Bonferroni correction. PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement, PaM = Peer Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring.

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Table 10

Correlations between Scales of the SPPI

Scale	*2*	*3*	*4*	*5*	*6*	*7*
1. Peer Modeling	.68**	.09	.30**	.15**	.26**	.02
2. Peer Encouragement	--	.07	.21**	.24**	.25**	-.01
3. Peer Discouragement		--	.10	.12*	.46**	.09
4. Parental Modeling			--	.43**	-.07	.01
5. Parental Encouragement				--	-.07	.03
6. Parental Discouragement					--	.08
7. Parental Monitoring						--

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

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Table 11

Correlation between Participants' Driving Measures and Peer Influence Scales of the SPPI

Measure	*PeM*	*PeE*	*PeD*
Total Score DAS	.27**	.28**	.11*
Hostile Gestures	.07	.09	.01
Illegal Driving	.00	.02	.02
Police Presence	.24**	.20**	.04
Slow Driving	.26**	.28**	.19**
Discourtesy	.25**	.24**	.06
Traffic Obstructions	.26**	.30**	.12*
Aggressive Expression	.44**	.41**	.17**
Verbal Aggressive Expression	.39**	.36**	.18**
Personal Physical Aggressive Expression	.34**	.31**	.13*
Use of Vehicle to Express Anger	.34**	.33**	.11
Adaptive/Constructive Expression	-.14**	-.11*	.05
Aggressive Behavior	.42**	.38**	.08
Risky Behavior	.34**	.31**	.04
Loss of Concentration	.11	.12*	-.06
Minor Loss of Control	.17**	.15**	.02
Close Calls	.12*	.15**	.05

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Moving Violations	.06	.03	-.03
Minor Accidents	.03	-.01	-.06
Major Accidents	.02	.00	.05

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

Note. DAS = Driving Anger Scale, PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement.

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Table 12

Correlation between Participants' Driving Measures and Parental Influence Scales of the SPPI

Measure	*PaM*	*PaE*	*PaD*	*PMon*
Total Score DAS	.08	.14**	.25**	-.12*
Hostile Gestures	-.05	.07	.17**	-.09
Illegal Driving	-.10	.08	.05	.03
Police Presence	.10	.15**	.14**	-.13*
Slow Driving	.14**	.06	.24**	-.10
Discourtesy	.14**	.09	.18**	-.11*
Traffic Obstructions	.03	.16**	.25**	-.08
Aggressive Expression	.36**	.25**	.19**	-.10
Verbal Aggressive Expression	.28**	.14**	.18**	-.10
Personal Physical Aggressive Expression	.28**	.29**	.09	-.03
Use of Vehicle to Express Anger	.33**	.24**	.16**	-.09
Adaptive/Constructive Expression	-.11	-.07	-.04	.23**
Aggressive Behavior	.28**	.23**	.14**	-.07
Risky Behavior	.14**	.10	.12*	-.15**
Loss of Concentration	-.02	-.01	.03	-.10
Minor Loss of Control	-.02	-.05	.07	-.11*
Close Calls	.02	-.03	.03	-.11*

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Moving Violations	.05	.00	-.01	-.05
Minor Accidents	.00	.09	-.07	.00
Major Accidents	.06	.05	-.06	-.06

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

Note. DAS = Driving Anger Scale, PaM = Parental Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring.

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Table 13

Correlation between SPPI Scales and General Anger Measures

Scale	*TAS*	*Anger-In*	*Anger-Out*	*Anger-Control*
PeM	.39**	.19**	.29**	-.15**
PeE	.35**	.17**	.27**	-.13*
PeD	.07	.02	.09	.00
PaM	.33**	.00	.31**	-.17**
PaE	.23**	.08	.18**	-.17**
PaD	.10	.09	.10	.04
PMon	-.08	-.11**	-.04	.12*

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

Note. PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement, PaM = Parental Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring, TAS = Trait Anger Scale.

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Table 14

Correlation between Driving Measures and General Anger Measures

Measure	*TAS*	*Anger-In*	*Anger-Out*	*Anger-Ctl*
Total Score DAS	.41**	.10	.28**	-.23**
Hostile Gestures	.19**	.09	.06	-.06
Illegal Driving	-.06	.09	-.13*	-.05
Police Presence	.31**	-.01	.26**	-.21**
Slow Driving	.45**	.05	.36**	-.20**
Discourtesy	.39**	.10	.28**	-.19**
Traffic Obstructions	.35**	.09	.24**	-.24**
Aggressive Expression	.64**	.18**	.55**	-.27**
Verbal Aggressive Expression	.51**	.17**	.48**	-.22**
Personal Physical Aggressive Expression	.44**	.07	.41**	-.14*
Use of Vehicle to Express Anger	.59**	.17**	.45**	-.28**
Adaptive/Constructive Expression	-.32**	.07	-.32**	.42**
Aggressive Behavior	.58**	.03	.55**	-.23**
Risky Behavior	.44**	.10	.40**	-.13*
Loss of Concentration	.14**	.11*	.12*	-.05
Minor Loss of Control	.20**	.10	.19**	-.06
Close Calls	.24**	.09	.18**	-.05
Moving Violations	.10	-.16*	.12*	-.02

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Minor Accidents	.09	-.04	.03	-.04
Major Accidents	.09	.06	.05	-.09

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

Note. DAS = Driving Anger Scale, TAS = Trait Anger Scale, Anger-Ctl = Anger-Control.

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Table 15

Regression Models Predicting Driving Measures: Gender (Step 1), Peer Influence Measures (Step 2), and Their Interactions (Step 3)

	Step 1		*Step 2*		*Step 3*	
Measure	*F(1, 327)*	R^2	*F(4, 324)*	ΔR^2	*F(7,321)*	ΔR^2
DAS	0.23	.00	11.87*	.10	1.20	.01
A/C	10.60*	.03	2.16	.02	0.24	.00
AE	12.90**	.04	30.20**	.21	0.14	.00
AB	10.06*	.03	24.28**	.18	0.36	.00
RB	14.50**	.04	12.77**	.10	0.56	.00

*$p < .01$, **$p < .001$

Note. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 16

Regression Models Predicting Driving Measures: Gender (Step 1), Parental Influence Measures (Step 2), and Their Interactions (Step 3)

	Step 1		*Step 2*		*Step 3*	
Measure	*F(1, 325)*	R^2	*F(5, 321)*	ΔR^2	*F(9,317)*	ΔR^2
DAS	0.22	.00	9.67*	.11	1.83	.02
A/C	10.69*	.03	5.08*	.06	0.34	.00
AE	12.18*	.04	18.00*	.18	0.23	.00
AB	9.87*	.03	9.71*	.11	2.11	.02
RB	13.87*	.04	4.09*	.05	1.77	.02

*$p < .01$

Note. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 17

Regression Models Predicting Driving Measures: Gender (Step 1), Peer and Parental Influence Measures (Step 2), and Their Interactions (Step 3)

	Step 1		*Step 2*		*Step 3*	
Measure	*F(1, 325)*	R^2	*F(8, 318)*	ΔR^2	*F(15,311)*	ΔR^2
DAS	0.22	.00	8.08**	.15	1.85	.03
A/C	10.69*	.03	3.65*	.07	0.28	.01
AE	12.18*	.04	18.03**	.27	0.41	.01
AB	9.87*	.03	12.47**	.21	1.51	.03
RB	13.87**	.04	6.44**	.12	1.26	.02

*$p < .01$, **$p < .001$

Note. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 18

Regression Models Predicting Driving Measures from Gender and Peer Influence Measures

Criterion	*Predictors*	R^2
DAS	Gender (-.03), PeM (.15*), PeE (.18*), PeD (.09)	.10***
A/C	Gender (.18**), PeM (-.10), PeE (-.03), PeD (.07)	.05**
AE	Gender (-.20***), PeM (.27***), PeE (.21**), PeD (.13*)	.25***
AB	Gender (-.17**), PeM (.28***), PeE (.18**), PeD (.04)	.21***
RB	Gender (-.21***), PeM (.19**), PeE (.16*), PeD (.00)	.14***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered the model. Gender was entered in Step 1; the remaining variables were entered in Step 2. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with $F(4, 324)$. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement.

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Table 19

Regression Models Predicting Driving Measures from Gender and Parental Influence Measures

Criterion	*Predictors*	R^2
DAS	G (-.03), PaM (.04), PaE (.15*), PaD (.27***), PMon (-.15**)	.11***
A/C	G (.18**), PaM (-.08), PaE (-.04), PaD (-.06), PMon (.23***)	.09***
AE	G (-.19**), PaM (.30***), PaE (.14*), PaD (.22***), PMon (-.11*)	.21***
AB	G (-.17**), PaM (.21***), PaE (.14*), PaD (.17**), PMon (-.07)	.13***
RB	G (-.20***), PaM (.10), PaE (.06), PaD (.14*), PMon (-.14*)	.09***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered the model. Gender was entered in Step 1; the remaining variables were entered in Step 2. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with $F(5, 321)$. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, G = Gender, PaM = Parental Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring.

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Table 20

Regression Models Predicting Driving Measures from Gender and Both Peer and Parental Influence Measures

Criterion	*Predictors*	R^2
DAS	G (-.03), PaM (-.01), PaE (.12*), PaD (.21**), PMon (-.14**), PeM (.14), PeE (.11), PeD (-.01)	.15***
A/C	G (.18**), PaM (-.06), PaE (-.04), PaD (-.07), PMon (.22***), PeM (-.09), PeE (-.01), PeD (.08)	.11***
AE	G (-.19**), PaM (.22***), PaE (.08), PaD (.08), PMon (-.11*), PeM (.21***), PeE (.17**), PeD (.08)	.31***
AB	G (-.17**), PaM (.12*), PaE (.10), PaD (.06), PMon (-.07), PeM (.25***), PeE (.14*), PeD (.00)	.24***
RB	G (-.20***), PaM (.03), PaE (.03), PaD (.06), PMon (-.14*), PeM (.18*), PeE (.14*), PeD (-.02)	.16***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered into the model. Gender was entered in Step 1; the remaining variables were entered in Step 2. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with $F(8, 318)$. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, G = Gender, PaM = Parental Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring, PeM =

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Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement.

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Table 21

Regression Models Predicting Driving Measures: Gender (Step 1), General Anger Measures (Step 2), Peer Influence Measures (Step 3), and Their Interactions (Step 4)

	Step 1		*Step 2*		*Step 3*		*Step 4*	
	F(1,327)	R^2	*F(5,323)*	ΔR^2	*F(8,320)*	ΔR^2	*F(15,313)*	ΔR^2
DAS	0.23	.00	16.43***	.17	4.07**	.03	0.75	.01
A/C	10.60**	.03	21.36***	.20	0.83	.01	0.73	.01
AE	12.90***	.04	61.72***	.42	10.22***	.05	0.91	.01
AB	10.06**	.03	49.81***	.37	8.66***	.05	0.27	.00
RB	14.50***	.04	21.88***	.20	3.50*	.02	0.42	.01

*$p < .05$, **$p < .01$, ***$p < .001$

Note. DAS = Driving Anger Scale, AE = Aggressive Expression, A/C = Adaptive/Constructive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 22

Regression Models Predicting Driving Measures: Gender (Step 1), General Anger Measures (Step 2), Parental Influence Measures (Step 3), and Their Interactions (Step 4)

	Step 1		*Step 2*		*Step 3*		*Step 4*	
	F(1,325)	R^2	*F(5,321)*	ΔR^2	*F(9,317)*	ΔR^2	*F(17,309)*	ΔR^2
DAS	0.22	.00	16.47**	.17	6.70**	.07	1.52	.03
A/C	10.69*	.03	21.05**	.20	3.66*	.03	0.80	.02
AE	12.18*	.04	60.39**	.41	6.13**	.04	1.15	.02
AB	9.87*	.03	49.58**	.37	2.28	.02	1.06	.02
RB	13.87**	.04	21.26**	.20	1.88	.02	0.77	.02

*$p < .01$, **$p < .001$

Note. DAS = Driving Anger Scale, AE = Aggressive Expression, A/C = Adaptive/Constructive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 23

Regression Models Predicting Driving Measures: Gender (Step 1), General Anger Measures (Step 2), Peer and Parental Influence Measures (Step 3), and Their Interactions (Step 4)

	Step 1		*Step 2*		*Step 3*		*Step 4*	
	F(1,326)	R^2	*F(5,321)*	ΔR^2	*F(12,314)*	ΔR^2	*F(23,303)*	ΔR^2
DAS	0.22	.00	16.47***	.17	4.57***	.08	1.61	.04
A/C	10.69**	.03	21.05***	.20	2.55*	.04	0.75	.02
AE	12.18**	.04	60.39***	.41	6.03***	.07	1.09	.02
AB	9.87**	.03	49.58***	.37	4.37***	.05	0.98	.02
RB	13.87***	.04	21.26***	.20	2.66*	.04	0.79	.02

*$p < .05$, **$p < .01$, ***$p < .001$

Note. DAS = Driving Anger Scale, AE = Aggressive Expression, A/C = Adaptive/Constructive Expression, AB = Aggressive Behavior, RB = Risky Behavior.

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Table 24

Regression Models Predicting Driving Measures from Gender, General Anger Measures, and Peer Influence Measures

Criterion	*Predictors*	R^2
DAS	G (-.03), T (.39***), AI (.03), AO (-.01), AC (-.04), PeM (.06), PeE (.13), PeD (.08)	.20***
A/C	G (.18**), T (-.14), AI (.11*), AO (-.02), AC (.35***), PeM (-.04), PeE (.00), PeD (.07)	.24***
AE	G (-.20***), T (.49***), AI (.09), AO (.25***), AC (.10*), PeM (.12*), PeE (.11*), PeD (.10*)	.50***
AB	G (-.17**), T (.44***), AI (-.05), AO (.31***), AC (.15**), PeM (.16**), PeE (.10), PeD (.01)	.46***
RB	G (-.21**), T (.33***), AI (.04), AO (.23**), AC (.15**), PeM (.09), PeE (.10), PeD (-.02)	.27***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered the model. Gender was entered in Step 1; trait anger and anger expression were entered in Step 2; the remaining variables were entered in Step 3. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with F (8, 320). DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, G = Gender, T = Trait

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Anger Scale, AI = Anger-In, AO = Anger-Out, AC = Anger-Control, PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement.

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Table 25

Regression Models Predicting Driving Measures from Gender, General Anger Measures, and Parental Influence Measures

Criterion	*Predictors*	R^2
DAS	G (-.03), T (.39***), AI (.02), AO (-.02), AC (-.05), PaM (-.06), PaE (.09), PaD (.23***), PMon (-.11*)	.24***
A/C	G (.18**), T (-.14), AI (.10*), AO (-.02), AC (.34***), PaM (.02), PaE (.02), PaD (-.05), PMon (.18***)	.27***
AE	G (-.19**), T (.49***), AI (.09*), AO (.25***), AC (.10), PaM (.14**), PaE (.07), PaD (.13**), PMon (-.07)	.49***
AB	G (-.17**), T (.44***), AI (-.05), AO (.31***), AC (.15**), PaM (.04), PaE (.09), PaD (.09*), PMon (-.05)	.42***
RB	G (-.20***), T (.33***), AI (.04), AO (.23**), AC (.14*), PaM (-.03), PaE (.02), PaD (.07), PMon (-.12*)	.51***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered the model. Gender was entered in Step 1, trait anger and anger expression were entered in Step 2, and the remaining variables were entered in Step 3. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with $F(9, 317)$. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, G = Gender, T = Trait Anger Scale, AI = Anger-In, AO = Anger-Out, AC = Anger-Control, PaM = Parental

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Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring.

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Table 26

Regression Models Predicting Driving Measures from Gender, General Anger Measures, and Both Peer and Parental Influence Measures

Criterion	*Predictors*	R^2
DAS	G (-.03), T (.39***), AI (.02), AO (-.02), AC (-.05), PeM (.07), PeE (.07), PeD (-.01), PaM (-.08), PaE (.08), PaD (.21**), PMon (-.11*)	.25***
A/C	G (.18**), T (-.14), AI (.10*), AO (-.02), AC (.34***), PeM (-.05), PeE (.02), PeD (.09), PaM (.02), PaE (.00), PaD (-.08), PMon (.18***)	.27***
AE	G (-.19**), T (.49***), AI (.09), AO (.25***), AC (.10), PeM (.10), PeE (.10), PeD (.08), PaM (.11*), PaE (.04), PaD (.05), PMon (-.07)	.51***
AB	G (-.17**), T (.44***), AI (-.05), AO (.31***), AC (.15**), PeM (.17**), PeE (.07), PeD (-.01), PaM (-.01), PaE (.08), PaD (.04), PMon (-.06)	.45***
RB	G (-.20***), T (.33***), AI (.04), AO (.23**), AC (.14*), PeM (.11), PeE (.08), PeD (-.02), PaM (-.06), PaE (.01), PaD (.03), PMon (-.12*)	.28***

*$p < .05$, **$p < .01$, ***$p < .001$

Note. The number in parentheses is the standardized beta (β) weight for that variable at the point in which it entered the model. Gender was entered in Step 1, trait anger and anger expression were entered in Step 2, and the remaining variables were entered in Step

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3. Asterisks following β weights indicate significant predictors. Asterisks following β weights indicate significant predictors. Asterisks following R^2 values indicate the significance of the overall regression model with $F(12, 314)$. DAS = Driving Anger Scale, A/C = Adaptive/Constructive Expression, AE = Aggressive Expression, AB = Aggressive Behavior, RB = Risky Behavior, G = Gender, T = Trait Anger Scale, AI = Anger-In, AO = Anger-Out, AC = Anger-Control, PeM = Peer Modeling, PeE = Peer Encouragement, PeD = Peer Discouragement, PaM = Parental Modeling, PaE = Parental Encouragement, PaD = Parental Discouragement, PMon = Parental Monitoring.

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CHAPTER 4

DISCUSSION

Potential Limitations

A potential limitation of the sample is the age of the participants. The study utilized college students who had a median age of 18. It is likely that the majority of these participants have been driving for only two to three years. Perhaps parents and peers are most associated with an individual at the time of driver's instruction with the relation diminishing over time. If this were true, sampling high school students at around age 16 when they are first learning to drive would provide a more accurate picture of the relationship between individuals, parents, and peers on driving-related measures. However, it is likely that the young age of the participants and their related short tenure as drivers make them a highly appropriate group for a study addressing the development of driving anger and aggression. Other studies addressing the development of aggressive and risky driving behaviors have sampled drivers of similar age and driving tenure. Results of this study can thus be readily compared to the existing literature.

It is noteworthy that the study involved a group of college students who were largely white, educated, and middle class. These participants were solicited solely through an introductory psychology course at a Western state university and thus may be representative of only one subset of the general population. Due to the limited nature of

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the participants' demographics, caution should be used in extending these results to other populations. However, these demographics still apply to a large, meaningful group.

Another potential limitation of the study is the use of self-report measures. Information reported by individuals in the study may not provide the most accurate picture of driving anger, expression, and behaviors. Perhaps most significant was that this study relied on reports of participants' perceptions of peer and parental behaviors, encouragements, and discouragements. One previous study (Michaels et al., 1983) showed that children's perceptions of their parents' behaviors were better predictors than parents' own self-reports. However, it is important that the results of this study be considered within the context of perceptions of behavior and not as objective evidence of documented behaviors. Two previous studies exploring the relationship between parents' and their offspring's driving behaviors have utilized official state driving records (Carlson & Klein, 1970; Ferguson et al., 2001). This could have led to more reliable information, and yet might have introduced inaccuracies due to ignoring the frequency of minor accidents that go unreported to the state's Department of Transportation. Additionally, self-report methods are the most appropriate means to examine an individual's own emotions, emotional expression, and difficult to observe risky, aggressive, and crash-related behaviors.

Caution has been taken in presenting the results of this study to highlight them as correlational and exploratory in nature rather than causal. We cannot conclude that the factors studied relate to each other in a cause and effect manner. The present study is an important first step in exploring a previously unresearched area of practical interest and provided information for future studies that could follow stricter controls.

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Despite these possible limitations, the sample provides a strong overall picture of the relationship of driving-related anger, anger expression, and aggressive, risky, and accident-related behavior to an individual's gender, general anger, anger expression and peer and parental influences. A breadth of previously validated instruments assessing driving-related anger, anger expression, and behaviors as well as general trait anger and anger expression were coupled with a newly developed and highly reliable set of scales assessing peer and parental influence. A large, gender balanced sample was collected ensuring acceptable power for analyses.

Scale Development

The present study developed reliable measures of peer (modeling, encouragement, and discouragement) and parent influence (modeling, encouragement, discouragement, and monitoring) (αs = .85 to .99). Scales showed small to moderate intercorrelations while others were unrelated. The absence of correlation and the small to moderate degree of relationships suggest that scales of the SPPI assessed related but separate constructs. Only two gender differences were found; men reported higher scores on Peer and Parental Modeling. In summary, the SPPI appeared to reliably measure peer and parental variables that could be related to participants' driving anger, anger expression, aggression, and risky behaviors.

Several interesting patterns of correlation arose when looking more closely at the SPPI scales. Perceptions of peer behavior (modeling) and encouragement of behavior were highly correlated. Likewise, parental modeling and parental encouragement were highly correlated. How might this play out? Perhaps parents and peers provide modeling and encouragement of behavior simultaneously during angry exchanges on the road.

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Parents and peers are also more likely to sanction behaviors in others that are most similar to their own. Perhaps the relationship lies in perception. Encouragement of angry driving by peers or parents could lead participants to perceive that their reinforcers are likely to display those behaviors while driving themselves. Displays of angry driving by parents and/or peers could lead an individual to believe that parents and peers would also sanction those behaviors in others. Reported parental discouragement of angry driving behaviors was positively related to peer modeling and encouragement of those same behaviors. Behind the wheel, as in other areas of potential risk, teenage peers may reinforce behaviors that parents seek to punish or prohibit.

At the same time, results showed a high degree of positive correlation between paired peer and parental influence measures (modeling, encouragement, and discouragement). Participants reported a significant degree of relatedness between the actions of their parents and peers with respect to influence of roadway anger, aggression, and risky behaviors. This could be due to parental influence in selection of likeminded peers or selection by individuals of peers that are most similar to themselves and to their families. Research on the development of friendships in children shows that interpersonal patterns learned within families are mirrored in friendship interactions (Park & Waters, 1989; Youngblade & Belsky, 1992).

There were no significant relationships between peer modeling and encouragement with peer discouragement nor parental modeling and encouragement with parental discouragement. It appears that parents and peers exert the greatest influence through modeling and reinforcement rather than punishment of driving behaviors. On the

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other hand, participants may just be less likely to attend to and remember sanctions against angry, aggressive, and/or risky driving behaviors by their parents and peers.

The lack of correlation between parental monitoring and all other variables is a striking finding. This independence is an important consideration for the regression analyses discussed below as results found cannot be due to shared variance with other constructs.

Moderate correlations were found for participants' trait anger, suppression of anger (Anger-In), controlled expression of anger (Anger-Control), and outward negative expression of anger (Anger-Out) with the scales of the SPPI. The pattern of correlation was especially strong between the general anger measures and Peer Modeling, Parental Modeling, Peer Encouragement and Parental Encouragement while Peer Discouragement and Parental Discouragement were not related to the general anger measures. These findings support the social learning theory for general anger and aggression and parallel other studies of peer modeling of anger and aggression (Cohen, 1971; Dishion et al., 1994; Werner, 2001). Alternatively, the findings could indicate that individuals high on general anger and anger expression seek out peers who behave in a like manner and reinforce those behaviors. This conclusion would support previous studies showing that aggressive individuals are more likely to seek out other aggressive peers as friends (Mariano & Harton, 2005). It is likely that both processes are at work as shown in a longitudinal study of adolescent smoking (Akers & Lee, 1996).

Gender

Gender was added in the first step of regression analyses predicting driving anger, adaptive/constructive anger expression, aggressive anger expression, aggression, and

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risky behavior. Gender contributed a significant, but small amount of variance to the prediction of adaptive/constructive anger expression, aggressive expression, aggressive and risky behavior but did not contribute to prediction of driving anger. Women reported increased use of positive, constructive anger expression, whereas men reported increased aggressive expression, aggression, and risky behaviors. Past studies have shown a similarly significant though small effect of gender. Females report greater adaptive and constructive expression of roadway anger (Deffenbacher, Lynch, et al., 2002; Deffenbacher, White & Lynch, 2004). Men frequently report greater aggression and risky roadway behavior (Deffenbacher et al., 2000; Deffenbacher, Lynch, et al., 2002; Deffenbacher et al., 2004; Miller et al., 2002; Parker et al, 2002; Shinar & Compton, 2004).

Peer Influence

Scales of the SPPI correlated with measures of driving anger, driving anger expression, aggressive and risky behavior, and accident related events as well as general anger and general anger expression. The scales assessing peer influence generally showed small to moderate correlations with participants' driving anger measures. A pattern of larger correlations was shown between peer modeling, peer encouragement, and participants' reports of behavioral expression of anger, aggression, and risky behaviors while smaller correlations were shown with driving anger. These findings likely reflect the larger relations peers have for behaviors than for emotions. Results also demonstrated that peers have larger potential association over day-to-day roadway occurrences and behaviors. No relationship was shown between the peer influence variables and more infrequent driving-related events (e.g., moving violations and

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accidents). These are not behaviors that are easily influenced by modeling or reinforcement, but low frequency events of determined multiple factors. Perhaps the low baserate occurrence of accidents and tickets prevented adequate analysis of these relationships. Fewer significant relationships were shown between discouragement of angry, aggressive, and risky behaviors by peers and an individual's driving-related measures. One would expect to find significant, negative relationships between discouragement and behavior. Instead, the few significant correlations were positive. Greater discouragement of behaviors was related to greater occurrence of those behaviors. A high frequency of aggression and risky behaviors likely leads to increased opportunities for discouragement from peers. Given this pattern, it is possible that discouragement may not be addressing its intended goal of reducing roadway anger and aggression and may actually backfire and encourage the behavior. However, further study of these constructs is warranted before conclusions can be reached.

Correlations between peer influence measures and participants' general anger and anger expression were roughly the same magnitude as the parallel driving measures (e.g., driving anger/general anger, aggressive expression/Anger-Out, adaptive/constructive expression/Anger-Control). This could be due to an overlap between driving-specific influence measures and more global peer influence on anger and anger expression. This would be expected given the previously shown ties between driving anger and general anger (Blanchard et al., 2000; Deffenbacher et al., 2006; Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000). Conversely, this could be a reflection of a give-and-take process whereby individuals higher in general anger and anger expression select peers that provide more modeling and encouragement of risky and aggressive behaviors behind

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the wheel. Alternatively, individuals higher in general anger and anger expression might perceive others (such as peers) to be engaging in modeling and encouragement of risky and aggressive behaviors more often. Those events (consistent with an "angrier" worldview) may be more salient to individuals high in general anger.

To further explore the association of peers, gender and peer influence variables were regressed on total driving anger, constructive anger expression, aggressive anger expression, aggression, and risky behavior. The contribution of gender to these models was previously discussed. With the exception of use of adaptive/constructive expression (predicted solely by female gender), variables of peer influence contributed significantly to the prediction of the criterion variables. Peer modeling and encouragement were significant predictors of driving anger, aggressive expression, aggression, and risky behavior. Past research has substantiated two processes guiding these findings: peers influence each other through mutual modeling and reinforcement of behaviors while there is also evidence that adolescents select likeminded peers (Ackerman, 2006). Those participants experiencing greater peer influence reported greater driving anger, aggression, and risky behavior. The significance of both modeling and encouragement in the models is evidence that each contributes to the understanding of roadway anger and anger expression as related but different sources of variance. Peer discouragement was a significant predictor of aggressive expression. As in the correlations, the relationship was positive; individuals experiencing greater discouragement engaged in greater aggressive expression of anger. Otherwise, peer discouragement was not shown to be an important variable in the prediction of driving anger and aggression.

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Overall, the results support the hypothesis that peers serve as models and reinforcers of driving anger and aggression. Likewise, the findings strengthen past studies showing that peers serve as models for risky and aggressive driving behaviors (Beck & Bargman, 1993; Clark, 1976; Clark & Prolisko, 1979; Gulliver & Begg, 2004; McKay & Coben, 2002; Møller, 2004; Mookherjee & Hogan, 1980).

Parental Influence

The scales assessing parental influence generally showed small to moderate correlations with participants' driving anger measures. Parental modeling and encouragement showed the greatest correlations with participants' behavioral expression of anger and aggression. Relatively smaller and fewer relationships were shown between parental modeling and encouragement and participants' driving anger. Therefore, it seems that parental association through possible modeling and encouragement is greater for behavior than for emotions. One would expect a negative relationship between driving anger and parental discouragement if it was fulfilling the intended purpose of reducing anger and aggression. However, significant positive relationships were shown between parental discouragement and forms of driving anger, aggression, and risky behavior. Those individuals likely provide more opportunities for discouragement by their parents. Alternatively, perhaps increased discouragement of certain behaviors by parents could actually encourage their offspring to engage in them. As noted for the peer influence findings, it appears that parents' modeling, encouragement, and discouragement were more highly related to day-to-day roadway experience and were less related to more infrequent roadway events (e.g., moving violations and accidents).

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Parental monitoring was shown to be an important correlate to participants' driving anger and risky behaviors. Monitoring was related to increased positive and constructive expression of anger and decreased driving anger, risky behavior, and accident-related events (i.e., minor loss of vehicular control and close calls). The findings parallel a past research study that found significant relationships between parents' and offspring's driving-related anger, anger expression, angry thoughts, as well as aggressive and risky behaviors behind the wheel (Deffenbacher et al., 2006). The findings are also in line with studies highlighting the importance of parental monitoring of roadway behaviors (Beck et al., 2002; Beck, Raleigh, et al., 2001; Beck, Shattuck, et al., 2001; Hartos et al., 2000, 2002; Preusser et al., 1985; Shope et al., 2001).

Correlations between parental influence measures and participants' general anger and anger expression were shown to be of roughly the same magnitude as the parallel driving measures (e.g., driving anger/general anger, aggressive expression/Anger-Out, adaptive/constructive expression/Anger-Control). This could be due to an overlap between driving-specific influence measures and more global parental influence on anger and anger expression. This would be expected given the previously shown ties between driving anger and general anger. Alternatively, individuals higher in general anger and anger expression might perceive others (such as parents) to be engaging in modeling and encouragement of risky and aggressive behaviors more often. Those events (consistent with an "angrier" worldview) may be more salient to individuals high in general anger.

To further explore the impact of parents, gender and parental influence variables were regressed on driving anger, constructive anger expression, aggressive anger expression, aggression, and risky behavior. The contribution of gender to these models

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was previously discussed. Increased parental modeling and encouragement were significant predictors of increased aggressive expression and aggressive behavior. Increased parental encouragement predicted greater driving anger. These results parallel the findings of peer influence. Like in the peer analyses, modeling and encouragement independently contributed significant variance. Parents appear to provide direct influence through modeling and encouragement of problematic behaviors behind the wheel. However, another pattern emerged regarding parental influence. Higher rates of parental discouragement and lower rates of parental monitoring, either alone or in concert, predicted increased anger and problematic anger expression behind the wheel. Increased parental monitoring predicted increased use of positive, constructive expression of driving anger. Thus, it seems that parents may influence participants in two ways. They may serve as a source of modeling and encouragement of problematic behaviors (like peers) yet they may also reduce problematic behaviors in their children by monitoring behaviors behind the wheel.

Combined Peer and Parental Influence

No other study to date has explored the relative associations of peers and parents to driving anger and risky and aggressive roadway behavior. It is likely that both factors contribute and possibly in different ways. The contribution of gender to these models was previously discussed. Peer and parental measures contributed to the prediction of the criterion variables beyond the influence of gender in all five models. Driving anger was predicted solely by parental influence measures. Increased parental encouragement, discouragement, and decreased parental monitoring predicted increased driving anger. Emotions, such as anger experienced while driving, may be less likely to be directly

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modeled or encouraged by peers. This finding parallels past findings of the influence of parents on anger development (Crockenberg, 1985; Lemerise & Dodge, 1993; Lewis & Sarni, 1985).

Lower levels of parental monitoring predicted increased driving anger, aggressive anger expression, and risky behaviors. Aggressive anger expression, aggressive behavior, and risky behavior were predicted by peer modeling, peer encouragement, and parental modeling. These findings are consistent with previous analyses and indicate that overt behavior and reinforcement from both parents and peers are significant sources of variance in the prediction of roadway risk and aggression. Strengthening previous findings, discouragement of behavior, whether from peers or parents, was not associated with the driving-related measures and explained little to no variance in the models. However, parental monitoring was a consistently important predictor in these models. Increased parental monitoring correlated positively with increased use of adaptive and constructive anger expression.

Relationships with General Anger

Moderate correlations were found between participants' driving anger measures and their reported general anger and anger expression. General anger and externalized expression of general anger were strongly correlated with driving anger, aggressive anger expression, aggression, and risky behaviors. They were negatively related to adaptive and constructive expression of driving anger. Those who are high in general anger and outward expression of general anger were also most likely to engage in driving anger and externalized expression of anger. Fewer significant relationships were shown between suppression of general anger and driving-related measures. Negative correlations were

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found between controlled expression of general anger and driving-related measures. Again, these results would be in line with the hypothesis of overlap between the constructs of general anger and driving anger. Those individuals who are better able to control their anger are less likely to express it negatively while driving. These findings parallel past research demonstrating significant relationships between driving anger measures and general anger (Deffenbacher et al., 2006; Deffenbacher, Deffenbacher, et al., 2003). It is interesting to note that the level of association between an individual's driving-related measures and general anger measures was an order of magnitude above the correlation between an individual's driving anger measures and the influence of parents and peers.

When general anger measures were entered into regression models prior to peer or parent measures, they contributed significant variance beyond the contribution of gender to the prediction of all five driving variables. Except for adaptive/constructive expression, controlled expression of anger was a suppressor variable. Not surprisingly, parallels were shown between participants' general anger expression and driving-related anger and behaviors. Trait anger contributed to the prediction of driving anger. Trait anger and outward expression of general anger predicted aggressive anger expression, aggression, and risky behavior. Suppression of general anger contributed variance to the prediction of use of adaptive and constructive anger expression. Those higher in trait anger and more likely to externalize in general situations also did so behind the wheel. These findings support the relationship between general anger and expression to roadway anger and expression and are in line with previous findings demonstrating a significant

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relationship between general aggression and roadway aggression (Lajunen & Parker, 2001).

The inclusion of an individual's general anger and anger expression in the models pulled variance away from the peer influence variables. Once variance was accounted for by the general anger measures, peer influence did not contribute to the prediction of driving anger, adaptive/constructive anger expression, or risky behavior. All three peer influence variables contributed to the prediction of aggressive expression beyond the contribution of gender and general anger variables while peer modeling contributed to aggressive behavior. These results strengthen the previously discussed role of peers as direct models and reinforcers of roadway aggression. Overt aggression behind the wheel is likely the easiest, most provocative and obvious behavior open to influence through modeling and reinforcement.

The inclusion of an individual's general anger and anger expression in the models pulled variance away from the parental influence variables. However, as a group, parental influence variables contributed to all models beyond gender and general anger variables. On an individual level, at least one parental influence variable contributed to the prediction of each criterion. Increased parental discouragement and decreased parental monitoring predicted increased driving anger. Increased parental monitoring related to increased use of adaptive, constructive anger expression. Increased parental discouragement predicted increased aggressive anger expression (along with increased parental modeling) and aggressive behavior. Decreased parental monitoring predicted increased risky behavior. Parental monitoring was the most consistent predictor.

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Reduced monitoring predicted increased risky and aggressive behavior, while the presence of monitoring was associated with positive, constructive expression of anger.

The final analyses combined all variables of interest to explore the most complex set of predictors (i.e., an individual's general anger and expression, peer, and parental influence measures). The inclusion of an individual's general anger and anger expression in the models reduced the contributions of peer and parental influence variables. However, once variance was accounted for by the general anger measures, at least one influence variable contributed to the prediction of each criterion. Increased driving anger was predicted by increased parental discouragement and decreased parental monitoring. Increased parental monitoring predicted increased use of adaptive, constructive expression of anger. Parental modeling predicted aggressive expression of anger while driving. Peer modeling predicted aggressive behavior. Decreased parental monitoring predicted increased risky roadway behavior. Overall, results demonstrated that external influence of parents and peers generally decreased when an individual's own trait anger and aggression was included. Parental monitoring was the most consistent factor in the prediction of participants' driving anger and anger expression while modeling by parents and peers also contributed. The significance of parental monitoring parallels past findings on driving aggression and risky behaviors (Beck et al., 2002; Beck, Raleigh, et al., 2001; Beck, Shattuck et al., 2002; Hartos et al., 2000, 2002; Preusser et al., 1985; Shope et al., 2001). The findings are in line with the importance of parental monitoring on other issues of development such as school achievement and performance (Hoover-Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995). More generally, these findings are in line with research showing the positive outcome of an authoritative

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parenting style in which children are raised with warmth, supervision, and fairness (e.g., Baumrind, 1973; Dornbusch, Ritter, Liederman, Roberts & Fraleigh, 1987; Lamborn, Mounts, Steinberg & Dornbusch, 1991; Steinberg, Elmen & Mounts, 1989).

It might appear from these findings that internal factors (namely trait anger and anger expression) contribute to driving anger and aggression to a larger extent than the external influence of peers and parents. However, two caveats should be kept in mind. First, individual general anger and anger expression were entered into models first to provide the most stringent test of peer and parent variables. They, therefore, had a greater chance of accounting for shared variance. Second, trait anger and aggression may develop heavily through influence of parents and peers (e.g., Crockenberg, 1985; Dishion et al., 1994; Eron et al., 1991; Lemerise & Dodge, 1993; Malatesta et al., 1989; Malatesta-Magai, 1991; Neapolitan, 1981; Owens & Straus, 1975; Radke-Yarrow & Kochanska, 1990; Strassberg et al., 1994). The variance accounted for by trait anger may have artificially lowered the contribution of peer and parent influence in those models. In models not including general anger measures, modeling and encouragement of peers and parents predicted driving anger, aggression, and risky behaviors. Discouragement by peers and parents was largely ineffective.

Implications and Future Directions

The results of this study could be practically applied to decrease the development of driving anger and aggression. Since it has been shown that perceived peer behavior is associated with an individual's behavior, why not utilize peers as a positive source of influence? In past studies, peer helping and education programs have been recommended to decrease behaviors such as eating disorders and drug abuse (Norem-Hebeisen &

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Hedin, 1983; Watts & Ellis, 1992). Programs have been developed to increase education and reduce problematic behavior in areas such as health and sex, alcohol, tobacco and drug use, acquaintance rape, and youth violence. Programs demonstrated increased education and reduced risky behaviors for participants (Brigham et al., 2003; Green & Documet, 2005). Others provided participants with an increased knowledge base and changed attitudes regarding risky behaviors (Borgia, Schifano & Marinacci, 2005; Ergene, Çok, Tümer, & Ünal, 2005). These programs have proven beneficial to both participants and peer leaders (Pearlman, Camberg & Wallace, 2002).

Parents are often interested in programs that can reduce harm and/or provide growth for their children. Parents could be educated about the role they play as monitors of their children's driving as well as the role they and their children's peers play as models and reinforcers of behavior. An obvious vehicle for this education would be as a component of adolescents' driver's education training. The intervention could be a one-time informational meeting with written materials provided to parents. Parents could be guided in ways to increase fair yet firm monitoring and supervision of adolescents' driving behaviors, driving companions, and use of vehicles. Past research on adolescent drug use has shown that parental education efforts decrease adolescent use and promotes sobriety (Smith, Sells & Rodman, 2006). Parental interventions may be most effective when included in a multi-component program (Ollendick, 2005). Driver's education is one such multi-component program.

When parents and families are unable or unwilling to provide structure for driving, the burden often falls on society. Legislative changes are ongoing in many states to provide greater monitoring and supervision of adolescents' driving. The results of this

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study provide general support for the development of those measures. Future research should follow the outcomes across time to better understand the impact of these laws.

Another implication of the present study was to strengthen our understanding of the importance of individual factors in the development and expression of driving anger. Interventions aimed at changing an individual's intensity of driving anger and modes of anger expression may be more effective than changes aimed at external factors such as peer and parental influence. A study of college students' attitudes about sexual assault showed that lectures to individuals from experts proved a more effective vehicle for change than peer education interventions (Wyandt, 2001). Within the realm of driving anger, individual interventions have proven effective at reducing driving anger and aggression. Deffenbacher and colleagues have demonstrated a decline in driving anger, aggressive expression, and risky behavior among participants enrolled in eight weekly group sessions focused on cognitive therapy and relaxation interventions (Deffenbacher et al., 2000; Deffenbacher, Filetti, Lynch, Dahlen & Oetting, 2002; Deffenbacher, Richards & Kogan, 2001; Richards, Deffenbacher, Filetti, Lynch & Kogan, 2001).

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APPENDIX A

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Scales of Peer and Parental Influence on Driving Anger (SPPI)

Directions: Please mark your response by filling in the appropriate bubble to the right. For purposes of the next set of questions, the word "friends" means the peers or friends you rode with and drove with most when you were in a vehicle without your parents from ages 16 to 18.

	When you rode with your friends and THEY were angry or getting back at other drivers, how often did THEY...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Get really angry when driving?	O	O	O	O	O
2.	Lose control of their anger while driving?	O	O	O	O	O
3.	Cut other drivers off in anger?	O	O	O	O	O
4.	Honk their horn in anger?	O	O	O	O	O
5.	Flash their lights in anger?	O	O	O	O	O
6.	Tailgate or drive up close to other drivers in anger?	O	O	O	O	O
7.	Not let other drivers pass?	O	O	O	O	O
8.	Not let other drivers change into their lane?	O	O	O	O	O
9.	Box other drivers in?	O	O	O	O	O
10.	Give other drivers the finger?	O	O	O	O	O
11.	Make angry gestures at other drivers (other than giving the finger)?	O	O	O	O	O
12.	Make angry faces at other drivers?	O	O	O	O	O
13.	Yell at other drivers?	O	O	O	O	O
14.	Swear at other drivers?	O	O	O	O	O
15.	Throw things at other drivers?	O	O	O	O	O

	When you drove with your friends and YOU were angry or getting back at other drivers, how often did your friends encourage you to...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Be really angry at other drivers?	O	O	O	O	O
2.	Get back at other drivers?	O	O	O	O	O
3.	Give other drivers the finger or make other gestures?	O	O	O	O	O
4.	Swear or yell at other drivers?	O	O	O	O	O
5.	Not let other drivers take advantage of you?	O	O	O	O	O
6.	Drive aggressively?	O	O	O	O	O
7.	Cut other drivers off in anger?	O	O	O	O	O
8.	Not let other drivers cut in?	O	O	O	O	O
9.	Flash your lights in anger?	O	O	O	O	O
10.	Honk your horn in anger?	O	O	O	O	O
11.	Tailgate or drive up close to other drivers in anger?	O	O	O	O	O
12.	Not let other drivers pass?	O	O	O	O	O

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	When you drove with your friends and <u>YOU were angry or getting back at other drivers</u>, how often did your friends try to <u>keep you from</u>...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Getting really angry at other drivers?	O	O	O	O	O
2.	Seeking revenge or retaliation on other drivers?	O	O	O	O	O
3.	Giving other drivers the finger or make other gestures?	O	O	O	O	O
4.	Swearing or yelling at other drivers?	O	O	O	O	O
5.	Not letting other drivers take advantage of you?	O	O	O	O	O
6.	Driving aggressively?	O	O	O	O	O
7.	Cutting other drivers off in anger?	O	O	O	O	O
8.	Not letting other drivers cut in?	O	O	O	O	O
9.	Flashing your lights in anger?	O	O	O	O	O
10.	Honking your horn in anger?	O	O	O	O	O
11.	Tailgating or driving up close to other drivers in anger?	O	O	O	O	O
12.	Not letting other drivers pass?	O	O	O	O	O

For purposes of the next set of questions, consider the word "parents" to mean the parent(s), stepparent(s) or other adult guardian you rode with and drove with <u>most</u> from ages 16 to 18.

	When you rode with your parents and <u>THEY were angry or getting back at other drivers</u>, how often did <u>THEY</u>...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Get really angry when driving?	O	O	O	O	O
2.	Lose control of their anger while driving?	O	O	O	O	O
3.	Cut other drivers off?	O	O	O	O	O
4.	Honk their horn in anger?	O	O	O	O	O
5.	Flash their lights in anger?	O	O	O	O	O
6.	Tailgate or drove up close to other drivers in anger?	O	O	O	O	O
7.	Not let other drivers pass?	O	O	O	O	O
8.	Not let other drivers change into their lane?	O	O	O	O	O
9.	Box other drivers in?	O	O	O	O	O
10.	Give other drivers the finger?	O	O	O	O	O
11.	Make angry gestures at other drivers (other than giving the finger)?	O	O	O	O	O
12.	Make angry faces at other drivers?	O	O	O	O	O
13.	Yell at other drivers?	O	O	O	O	O
14.	Swear at other drivers?	O	O	O	O	O
15.	Throw things at other drivers?	O	O	O	O	O

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	When you drove with your parents and <u>YOU were angry or getting back at other drivers</u>, how often did your parents <u>encourage YOU to</u>...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Be really angry at other drivers?	O	O	O	O	O
2.	Get back at other drivers?	O	O	O	O	O
3.	Give other drivers the finger or make other gestures?	O	O	O	O	O
4.	Swear or yell at other drivers?	O	O	O	O	O
5.	Not let other drivers take advantage of you?	O	O	O	O	O
6.	Drive aggressively?	O	O	O	O	O
7.	Cut other drivers off in anger?	O	O	O	O	O
8.	Not let other drivers cut in?	O	O	O	O	O
9.	Flash your lights in anger?	O	O	O	O	O
10.	Honk your horn in anger?	O	O	O	O	O
11.	Tailgate or drive up close to other drivers in anger?	O	O	O	O	O
12.	Not let other drivers pass?	O	O	O	O	O

	When you drove with your parents and <u>YOU were angry or getting back at other drivers</u>, how often did your parents try to <u>keep YOU from</u>...	**Never or Almost Never**	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	Getting really angry at other drivers?	O	O	O	O	O
2.	Seeking revenge or retaliation on other drivers?	O	O	O	O	O
3.	Giving other drivers the finger or making other gestures?	O	O	O	O	O
4.	Swearing or yelling at other drivers?	O	O	O	O	O
5.	Not letting other drivers take advantage of you?	O	O	O	O	O
6.	Driving aggressively?	O	O	O	O	O
7.	Cutting other drivers off in anger?	O	O	O	O	O
8.	Not letting other drivers cut in?	O	O	O	O	O
9.	Flashing your lights in anger?	O	O	O	O	O
10.	Honking your horn in anger?	O	O	O	O	O
11.	Tailgating or driving up close to other drivers in anger?	O	O	O	O	O
12.	Not letting other drivers pass?	O	O	O	O	O

		Never or Almost Never	**A little**	**Some**	**Quite Often**	**Always or Almost Always**
1.	How much did your parents monitor with whom you rode or drove?	O	O	O	O	O
2.	Did your parents know with whom you rode or drove?	O	O	O	O	O

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		Never or Almost Never	A little	Some	Quite Often	Always or Almost Always
3.	Did your parents know how aggressively your friends drove?	O	O	O	O	O
4.	Did your parents know how aggressively you drove?	O	O	O	O	O
5.	Did your parents know if you did things like yell or swear at other drivers?	O	O	O	O	O
6.	Did your parents know if you did things like honk your horn or flash your lights in anger?	O	O	O	O	O
7.	Did your parents know if you did things like cut another driver off or tailgated in anger?	O	O	O	O	O

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APPENDIX B

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Consent to Participate in a Research Study
Colorado State University

TITLE OF RESEARCH: Peers, Parents, Emotions, and Driving

PRINCIPAL INVESTIGATOR: *Jerry L. Deffenbacher, Ph.D. (970-491-6871)*
jd6871@lamar.colostate.edu

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH? We are interested in how young adults develop their emotional reactions while driving.

WHAT PROCEDURES/METHODS WILL BE USED? This study involves completing short questionnaires about emotional expression while driving and your interactions with your parents and peers in the first two or three years of your driving. For your participation, you will receive one research credit for PY 100.

WHO IS DOING THE RESEARCH? Jerry L. Deffenbacher, Professor in the Department of Psychology

WHAT IS THE PURPOSE OF THIS RESEARCH? This research addresses the relationship of emotional expression while driving and interactions with parents and peers.

WHERE IS THE RESEARCH GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? Questionnaires will be completed in classrooms in the Clark Building and will take about 45 minutes.

WHAT WILL I BE ASKED TO DO? You will be asked to complete a series of questionnaires about your emotional expression, particularly anger expression, and your interactions with your parents and peers when you were first driving.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS RESEARCH? If you are under the age of 18, contact Dr. Jerry L. Deffenbacher and arrangements will be made for your parents to review the project and provide their consent for you to be involved, if they give their permission to participate.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS? Risks are minimal. Questionnaires are your reports of anger and anger expression and of your interactions with peers and parents, are voluntary, and may be terminated at any time. On some of the questionnaires, we may be asking you to admit to aggressive anger expression. We do not want our research to put you at risk. In fact, our research depends on honest, truthful responses. We protect you by the way the questionnaires are completed and materials are turned in. Do not put your name anywhere on the questionnaires so that they are anonymous. We think these procedures protect you and minimize risk so that it should not be a problem to respond openly and truthfully. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

WILL I BENEFIT FROM TAKING PART IN THIS RESEARCH? There are no known benefits to you.

DO I HAVE TO TAKE PART IN THE RESEARCH? No. Your participation is completely voluntary.

WHAT WILL IT COST ME TO PARTICIPATE? There are no known costs to participating, except for the time you take completing the questionnaires.

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WHO WILL SEE THE INFORMATION THAT I GIVE? This study is anonymous. Since your name or other personally identifying information are not on the questionnaire, this means that no one, not even members of the research team, will know that the information you give comes from you. Your information will be kept in locked, secure areas and will be seen only by research staff. We will keep private all research records that identify you, to the extent allowed by law. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep you name and other identifying information private.

CAN MY TAKING PART IN THE RESEARCH END EARLY? Your participation in this research is voluntary. If you decide to participate in this study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY? You will one research credit for PY 100.

WHAT HAPPENS IF I AM INJURED BECAUSE OF THE RESEARCH? The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS? Ask the research assistant. He/she will answer your questions to the best of his/her ability. If you have additional questions, contact the investigator, Dr. Jerry L. Deffenbacher at 970-491-6871 or jld6871@lamar.colosstate.edu. If you have any questions about your rights as a volunteer in this research, contact Celia Walker, Director of Regulatory Compliance, at 970-491-1553. We will give you a copy of this consent form to take with you.

WHAT ELSE DO I NEED TO KNOW? Hopefully, we have answered all of your questions, but if you have any questions, ask the research assistant or contact Dr. Jerry L. Deffenbacher.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing two pages.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

_____ _____

Name of person providing information to participant Date

_____

Signature of Research Staff

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Debriefing Statement

Car crashes are a leading cause of death for people aged 15-24 in the U.S., and psychological factors such as anger and anger expression are potential contributors. This study involved completing questionnaires about feelings and behaviors, especially when driving. Responses will be correlated so that the relationships can be understood and so that potential risk factors for risky and aggressive driving and accidents can be identified. We are also exploring how the behavior of parents and peers when you were first driving correlates with your driving.

We truly appreciate your involvement in this research. If you have any questions, please feel free to contact Dr. Jerry L. Deffenbacher, Department of Psychology (970-491-6871 or jld6871@lamar.colostate.edu).

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