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Parenting Style and Adolescent Gender as Moderators of the Association between Parental Restrictions and Adolescents' Risky Driving

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Abstract

Motor vehicle crashes are the leading cause of teenage deaths in the United States, highlighting the need for ways to reduce teenage driver crash rates. Adolescents (n = 176, M age = 16.4 years, 53% female) and their parents (n = 204, 71% mothers) self-reported on parenting style, driving restrictions, and risky driving. Results showed that more parental restrictions were associated with less adolescent risky driving. Three-way interactions were found such that more restrictions were associated with less concurrent risky driving in boys only under conditions of high parental warmth, structure, or autonomy support. Parenting style generally did not moderate the association for girls, although more restrictions were associated with less risky driving one year later for girls only in the context of low autonomy support. Findings are discussed in terms of how parenting may differentially affect risky driving as a form of risk-taking versus risky driving stemming from inexperience.

Keywords: Teenage Risky Driving, Parenting, Parental Restrictions, Self-Determination Theory

Parenting Style and Adolescent Gender as Moderators of the Association between Parental Restrictions and Adolescents' Risky Driving

Motor vehicle crashes are the leading cause of teenage deaths in the United States (Insurance Institute for Highway Safety, 2015). Teenagers generally drive less than most adults, but they have a disproportionately high rate of crashes and crash-related deaths. In 2013, 2,524 teenagers in the United States died from injuries suffered in motor vehicle crashes, accounting for 9 percent of all motor vehicle crash deaths. The fatal crash rate per mile driven for 16-19-year-olds is almost three times the rate for drivers ages 20 years and older; within that group, the fatal crash rate for 16- and 17-year-olds is almost double that of 18- and 19-year-olds (Insurance Institute for Highway Safety, 2015). Non-fatal crash rates and near-crash rates are also higher for teenagers than adults (Lee, Simons-Morton, Klauer, Ouimet, & Dingus, 2011; Simons-Morton et al., 2011). Thus, it is imperative that we implement programs and policies targeting our youngest drivers.

Some have proposed delaying the age of licensure as a way to reduce crash risk (see Simons-Morton, 2007). Indeed, younger novice drivers have higher crash rates than older novice drivers (Mayhew et al., 2003), but delaying the age of licensure would restrict mobility and delay independence for adolescents. Obtaining a driver's license can be seen as an important milestone for many teenagers, and delaying licensure would come at the cost of denying a certain amount of autonomy as well. Furthermore, delaying licensure may merely postpone some crashes and fatalities. Masten, Foss, and Marshall (2011) found that, although fatal crashes involving 16-year-old drivers decreased following policy implementation that resulted in licensing delays, the fatal crash incidence among 18-year-old drivers increased. Thus, delaying

licensure does not seem to be an optimal approach, and other methods of reducing teen crash risk should be explored.

Researchers have long been evaluating practices aimed at making teenagers safer drivers. While driver education and parent-supervised practice training are useful for teaching basic driving skills, they have not been shown to make teenagers safer drivers (Simons-Morton, 2007). Crash rates of teens who have undergone a basic driver education course are no different than teens without this training (Simons-Morton & Ouimet, 2006), and there is some evidence that advanced driving courses may actually increase crash risk in young drivers (Williams & Ferguson, 2004). Similarly, supervised practice driving does not seem to protect against crash risk (McCartt, Shabanova, & Leaf, 2003). While a certain amount of supervised practice may be necessary to acquire basic skills, higher amounts of supervised practice driving do not appear to affect crash rates once teens are licensed (McCartt et al., 2003), nor does requiring a minimum number of supervised driving hours (Ehsani, Raymond, & Shope, 2013). Crash risk is low during supervised practice and increases dramatically when teens start driving independently (Gregersen, Nyberg, & Berg, 2003; Mayhew, Simpson, & Pak, 2003), suggesting that supervised practice and independent driving are very different experiences.

There are several possible reasons why supervised practice is not effective in reducing teen driver risks; parents likely restrict the manifestation of risky behaviors, limit practice driving to relatively safe conditions, and anticipate and warn of hazards (Simons-Morton & Ouimet, 2006). Furthermore, recent research suggests that parents may be focusing on teaching basic vehicle handling skills during supervised driving, while neglecting higher order skills. Goodwin, Foss, Margolis, and Harrell (2014) found that, while supervising their teen driver, parents most often instructed about vehicle handling or operation (e.g., “you need to brake sooner”), while

infrequently providing insights about the higher order skills behind their recommendations (e.g., how to know when to start slowing down). Although comments about vehicle operation declined over the initial four months of supervised practice, as expected, these concrete instructions were not replaced by more frequent discussion of higher order skills. In addition, throughout supervised driving, parents frequently took on some of the driver's responsibility by directing their teen driver and calling attention to possible hazards in the driving environment (Foss et al., 2014). By directing their teens throughout the process of driving, parents may be making supervised driving a safer experience, but the safety benefits are not likely to transfer to when teens begin driving on their own. When parents are essentially co-drivers throughout supervised practice, teens' development of higher order driving abilities may be delayed (Simons-Morton & Ouimet, 2006).

Why do teenagers have elevated crash risks?

Interventions that are effective in making teens safer drivers must develop out of an understanding of what exactly contributes to teens' heightened crash risk. High crash rates among teenage drivers are believed to stem, at least in part, from risky driving behaviors (Williams, 2003; Simons-Morton, 2007; Simons-Morton et al., 2011). Compared to experienced drivers, teens are more likely to drive too fast for conditions and follow too closely (Simons-Morton, Lerner & Singer, 2005). Simons-Morton and colleagues (2011) measured adolescents' and their parents' risky driving via a data acquisition system installed in the participants' vehicles. The authors found that adolescents' rates of elevated g-force events, representative of risky driving maneuvers such as rapid stops and sharp turns, were five times higher than adult rates throughout their first 18 months of driving.

Part of the tendency to engage in risky driving is personality-based. For example, individuals with high levels of sensation seeking are more likely to engage in risky driving behavior (Arnett, Offer, & Fine, 1997; Prato, Toledo, Lotan, & Taubman - Ben-Ari, 2010; Waylen & McKenna, 2008). Adolescents who engage in risky driving generally tend to engage in other risk-taking behaviors as well (Bina et al., 2006; McDonald et al., 2014; Vassallo et al., 2008). Although rates of risky driving are generally stable throughout life (Summala, Rajalin, & Radun, 2014; Vassallo, et al., 2014), some individuals may be prone to personality-based risky driving particularly during adolescence. Due to differing rates of development of executive and socio-emotional neural systems, adolescents are more likely to engage in risk-taking behavior than those in other developmental stages (Lambert, Simons-Morton, Cain, Weisz, & Cox, 2014). Thus, risky driving may be one form of the increased risk-taking behavior commonly seen in adolescence (Taubman-Ben-Ari, 2014).

However, not all adolescents are risky drivers because of a tendency to engage in risk-taking. Vassallo and colleagues (2008) found that most adolescent risky drivers in their study exhibited other problem behaviors as well, but about one third engaged in risky driving only. Thus, another part of risky driving can be considered inexperience-based and may occur in most novice drivers, regardless of other risk-taking behaviors. To some degree, risky driving is a normal part of the learning-to-drive process (Simons-Morton, 2007). Novice drivers may experiment with vehicle speed and risky driving maneuvers as a means of trial and error and as a way to become familiar with the driving process.

The increased risky driving seen in novice drivers translates to increased crash risk. Crash rates decrease as time since licensure increases, highlighting the important role inexperience plays in crash risk (Mayhew et al., 2003). Crash rates (and near-crash rates) are

highest during the initial months of independent driving, decline rapidly throughout the first year, and continue to decline at a slower rate for several years after licensure. This general pattern has been found in studies using self-report (McCartt et al., 2003), official driving records (Mayhew et al., 2003), and naturalistic observation (Lee et al., 2011; Simons-Morton et al., 2011). The rapid decline in crash risk over the first year of independent driving is consistent with an effect of learning, suggesting that learning to drive is like learning any other complex behavior (Simons-Morton, 2007). Proficiency can only be achieved gradually through experience.

These findings lead to quite a dilemma: teenagers need independent driving experience to become competent drivers, but they are at a high risk for crashing while they are obtaining this experience. The general solution to this dilemma is to encourage novice teenagers to drive only under less dangerous driving conditions (Simons-Morton & Ouimet, 2006). Although teenagers have overall crash rates that are higher than those of any other age group, these rates are particularly high in some situations and relatively low in others (Williams, 2003). These varying patterns of risk form the basis for Graduated Driver's Licensing (GDL) systems in the United States and worldwide. GDL is structured so that young novices are able to gain driving experience under conditions of low-risk before they are allowed to drive in higher-risk situations.

Graduated Driver's Licensing

Since the mid-1990s, GDL systems have been enacted across the U.S., although these systems vary widely from state to state (Insurance Institute for Highway Safety, 2015). GDL systems include three stages: (1) an extended learner stage during which driving must be supervised by a licensed adult; (2) an intermediate stage during which teens may drive independently but must abide by certain restrictions, most commonly nighttime and passenger

restrictions; and (3) a full-privileged driver's license (Williams, Tefft, & Grabowski, 2012). GDL programs seem to reduce the youngest drivers' crash risk by about 20-40% (Shope, 2007; Williams, 2007; Williams et al., 2012). The more comprehensive programs are associated with the greatest reduction in crashes among young people (Shope, 2007; Williams et al., 2012).

Nighttime driving and driving with young passengers have been identified as two of the riskiest conditions for novice drivers (Simons-Morton, 2007). These are the core restrictions associated with the intermediate phase of most GDL systems, and both restrictions have been shown to contribute uniquely to crash reductions among novice drivers (Williams, 2007; Williams et al., 2012). Williams (2003) found that late-night driving is associated with crash risk for drivers of all ages, but the risk is especially elevated for teenagers. The nighttime (i.e., 9 p.m. to 5:59 a.m.) fatal crash risk for 16-year-old drivers was found to be about three times higher than the daytime risk. A recent national study found that nighttime GDL restrictions reduced nighttime fatal crash involvements of 16- and 17-year-old drivers by about 10% (Fell, Todd, & Voas, 2011). Williams (2003) suggests that the heightened nighttime risk for teenage drivers may be partly because driving is more difficult in the dark and newly licensed drivers may have less experience driving at night. In addition, fatigue may be more likely, and risky, recreational driving, as well as drinking and driving, is more likely to occur at night (Williams, 2003).

The second restriction targeted by most GDL systems concerns the presence of non-family member passengers when a novice teenager is driving. Teenage drivers' crash risk is elevated when teenage passengers are in the car, and this risk increases as the number of passengers increases (Chen, Baker, Braver, & Li, 2000; Preusser, Ferguson, & Williams, 1998). Crash risk and risky driving behavior is particularly high for both male and female teens when a male teen accompanies the driver (Chen et al., 2000; Simons-Morton et al., 2005). Passenger

restrictions were found to reduce fatal crash involvements of 16- and 17-year-old drivers with teen passengers by about nine percent (Fell et al., 2011). In addition to the increased crash risk for teen drivers when passengers are present, the passengers themselves, who are typically teenagers, are at risk for fatal injury (Williams, 2003).

The elevated crash risk associated with having passengers in the car is unique to younger drivers; drivers aged 30 and older actually have a decreased crash risk when passengers are present (Chen et al., 2000; Preusser et al., 1998). Normative developmental processes may help to explain why passengers are associated with an elevated crash risk for young drivers. Teens' immature cognitive control systems make it more difficult for them to focus attention on driving when distractions are present (Keating, 2007). Foss and Goodwin (2014) found that loud conversation and horseplay were common when multiple peer passengers were present, and these distractions, in turn, were associated with crashes and near-crashes. Distracting conditions caused by passengers were more likely to precede crashes and near-crashes than were performance of secondary tasks, such as using a cell phone, adjusting controls, or eating (Foss & Goodwin, 2014). Although these more typical distracted behaviors that take drivers' eyes off the road are also associated with increased crash risk (Klauer et al., 2014), the increased risk associated with mere passenger presence suggests that cognitive overload is a major concern for novice drivers.

Although GDL systems have reduced crashes among teen drivers, compliance is required for these systems to be effective. Teens violate GDL laws frequently, especially passenger restrictions (Williams, 2007; Williams et al., 2012). A recent study found that 65% of teens in the intermediate licensing phase violated nighttime restrictions and 81% violated passenger restrictions (Brookland, Begg, Langley, & Ameratunga, 2014). Violating these laws is

associated with crash risk: Carpenter and Pressley (2013) reported that about 15% of fatal crashes that involved drivers covered by a nighttime GDL law occurred while violating that law and almost 22% of fatal crashes that involved drivers covered by both nighttime and passenger restrictions violated the passenger restrictions.

The Role of Parents

To prevent teens from driving in these high-risk situations, GDL is dependent on parents to enforce its restrictions (Simons-Morton, 2007). Indeed, children of parents who implemented fewer driving rules exhibited lower compliance with GDL laws (Brookland et al., 2014). Thus, parental enforcement of GDL provisions may be crucial for teen compliance. Moreover, parents may be able to further reduce their teens' crash risk by expanding on weak GDL restrictions. GDL laws vary widely from state to state, and most GDL provisions are not restrictive enough (Williams et al., 2012). Teenagers' fatal crashes most frequently occur from 6 p.m. to midnight, but some nighttime restrictions do not begin until midnight or 1 a.m. (Insurance Institute for Highway Safety, 2015; Williams et al., 2012). Thus, many states' nighttime restrictions do not cover the periods during which teens are at highest risk. In addition, despite the research that even one teen passenger increases crash risk, some states' passenger restrictions allow one, two, or even three passengers to be present (Williams et al., 2012). Finally, parents can impose additional restrictions, such as cell phone bans and restrictions concerned with other distracted behaviors, to further enhance the safety effects of existing GDL laws.

Although most parents impose at least modest limits on their newly licensed teenagers (Hartos, Shattuck, Simons-Morton, & Beck, 2004; McCartt et al., 2003), many of these limits are not clearly understood by teens and there are often no clear consequences for violating these rules (Hartos et al., 2004b). Nevertheless, parent-imposed driving limits are associated with less

risky driving, fewer traffic violations, and fewer crashes among teens (Hartos, Eitel, & Simons-Morton, 2002; McCartt et al., 2003; Simons-Morton, Hartos, Leaf, & Preusser, 2006; Simons-Morton & Ouimet, 2006; Taubman-Ben-Ari & Katz-Ben-Ami, 2012; 2013). Although GDL and parent-enforced restrictions have produced notable crash reductions, teen driver crashes are still occurring at alarming rates (Shope, 2007). Many researchers believe that the answer to this problem still lies with the parents (Simons-Morton, 2007).

In addition to setting restrictions, parents influence their teens' driving in several other notable ways. For example, teens' driving styles, behaviors, and crash involvements generally are similar to those of their parents (Brookland et al., 2014; Bianchi & Summala, 2004; Lahatte & Le Pape, 2008; Miller & Taubman - Ben-Ari, 2010; Prato et al., 2010; Taubman–Ben-Ari, Kaplan, Lotan, & Prato, 2015). However, studies that focus on parental restrictions and modeling behavior are based on a top-down unidirectional approach that fails to recognize adolescent agency (Laird, 2011). Such research assumes that teens must comply with their parents' limits. In reality, teens may resist the restrictions imposed by their parents, particularly if they do not expect these restrictions based on previous patterns of parenting. The style in which parents impose restrictions may have an effect on how teens react to the restrictions (Deci & Ryan, 2000). Teens may choose not to comply with the restrictions when possible or they may reluctantly comply with the rules without internalizing their parents' reasons for these rules. In either case, without internalization, it is possible that the intended safety effects of the restrictions may be lost (Deci & Ryan, 2000; Soenens, Vansteenkiste, & Niemiec, 2009).

Parenting Style

According to Self-Determination Theory (SDT), adolescents are likely to internalize their parents' rules and act in accordance with those rules if three basic psychological needs are

satisfied: the needs for relatedness, competence, and autonomy (Deci, Eghrari, Patrick, & Leone, 1994; Ryan & Deci, 2000; Vansteenkiste, Soenens, Van Petegem, & Duriez, 2014). Fulfillment of each of these needs has been shown to independently predict variability in emotional well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). The need for relatedness involves feeling connected to and valued by important others (Deci & Ryan, 2000). Parental warmth and involvement is thought to promote relatedness. Parents can provide warmth by expressing love, being supportive, spending time with their child, and paying attention to things that are important to their child (Deci & Ryan, 2000).

The need for competence involves feeling effective within one's environment (Ryan & Deci, 2000). Parents facilitate competence by providing structure in their child's life. Parents provide structure by conveying clear and consistent rules and consequences and by maintaining the role of authority (Farkas & Grolnick, 2010). Structure allows children to anticipate how their actions can determine success and failure outcomes. When parental structure is low, children may feel as if they have no control over key outcomes, resulting in low perceived competence (Farkas & Grolnick, 2010). Parental structure does not necessarily concern the extent or number of restrictions imposed; rather it encompasses how clearly and consistently restrictions are imposed.

The last of the three basic psychological needs, autonomy, is considered especially important during the developmental stage of adolescence. Autonomy concerns the need to feel like one's actions reflect personally endorsed values, interests, and needs (Ryan & Deci, 2000). Autonomy involves the experience of authentically initiating or endorsing one's own behaviors, rather than having internal or external motives as the driving force on behavior (Deci & Ryan, 2000). Autonomy support involves the style in which parents impose limits and restrictions,

rather than the degree or quality of structure imposed (Grolnick & Pomerantz, 2009). Autonomy-supportive parenting promotes adolescents' self-endorsed functioning, contrasted with controlled functioning, through which children's actions are determined by certain parental demands (Vasquez, Patall, Fong, Corrigan, & Pine, 2015). Parents can support autonomy by taking their teens' perspectives, supporting their initiations, and helping them solve problems on their own. Autonomy supportive parents openly discuss their rules with their teens, acknowledge disagreements about the rules, and allow their teens choices for how (but not whether) they follow the rules. When parents fail to consider their adolescents' input, adolescents may feel coerced and are less likely to follow or internalize their parents' rules (Vansteenkiste et al., 2014).

Parenting that provides high levels of warmth/involvement, structure, and autonomy support facilitates children's adjustment and well-being, whereas children whose self-determination needs are not fulfilled are more likely to have adjustment problems (Steinberg, 2001). According to SDT, when parents provide warmth, structure, and autonomy support, adolescents feel connected to their parents, understand their parents' rules, and are likely to transform their parents' values into their own (Ryan & Deci, 2000). The style in which parents impose restrictions, rather than the degree of restrictions, has been shown to predict a variety of adolescent outcomes across cultures, including academic functioning, socio-emotional functioning, and antisocial behavior (Farkas & Grolnick, 2010; Soenens et al., 2009; Vansteenkiste et al., 2014; Wang, Pomerantz, & Chen, 2007). When warmth, structure, and autonomy support are adequate, adolescents are able to internalize their parents' restrictions, and these restrictions, in turn, are followed and produce the intended effects (Deci & Ryan, 2000). When parents do not meet their children's needs for warmth, structure, or autonomy support,

adolescents typically react negatively to their parents' restrictions. Psychological reactance is considered an aversive motivational state that occurs when a freedom is threatened (Rains, 2013). Parenting that does not meet self-determination needs is associated with greater reactance in children, and reactance, in turn, is associated with adolescent internalizing and externalizing problems, as well as noncompliance with parental rules (Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015).

Parents who provide warmth, structure, and autonomy support to their children in other domains are likely to be similarly involved in their teens' driving (Laird, 2014). Although no prior study has examined the relationship between adolescent driving and SDT dimensions of parenting specifically, some research suggests that parenting style may play a role in risky driving. Ginsburg, Durbin, García-España, Kalicka, and Winston (2009) found that more parental rules predicted some safe driving behaviors and attitudes in teens, but when rules were accompanied by parental support, the protective benefit was amplified. Teens with authoritative parents (i.e., parents who provided high levels of rules and support) reported less risky driving behavior and half the rate of crashes of teens with uninvolved parents (i.e., who provided few rules and low support). The general family climate also has been shown to contribute to teens' driving behavior. Teens whose parents provide a climate for road safety (i.e., model and commit to safe driving, monitor their teens' driving and set limits, enable open communication, and provide feedback and clear messages regarding driving) are less likely to exhibit risky driving behavior (Taubman-Ben-Ari & Katz-Ben-Ami, 2012; 2013). In addition, mutual support in parent-teen interactions, but not support from either parent or teen alone, predicted a more positive supervised driving experience, emphasizing the importance of reciprocity in parent-teen interactions (Mirman, Curry, Wang, Fisher Thiel, & Durbin, 2014).

The Current Study

The current study aims to examine ways in which parents contribute to adolescents' risky driving. Risky driving is prevalent among adolescents, whereas crashes are a relatively rare occurrence; thus risky driving is used as a more sensitive index of potential crash risk. Children of parents who do not impose many rules are more likely to engage in problem behavior, which may include risky driving (Steinberg, 2001). Several risky driving behaviors exhibited by adolescents (e.g., driving with teenage passengers, nighttime driving, texting while driving) are explicitly limited by parents and/or graduated licensing laws (Hartos et al., 2004b; Williams et al., 2012). Simply by following the rules, children's likelihood of engaging in risky driving behaviors is reduced. Therefore, fewer driving restrictions are expected to be associated with more risky driving behavior. However, implementing driving restrictions is not likely to be the only way that parents affect their adolescents' driving. Parental warmth, structure, and autonomy support are also expected to uniquely contribute to risky driving.

The efficacy of parental restrictions may depend on how these restrictions are communicated. Adolescents whose parents provide support of self-determination needs feel that their parents have more legitimacy in regulating their driving behavior than do adolescents with less supportive parents (Laird, 2014). When parenting meets self-determination needs, children are likely to internalize their parents' rules, comply with the rules, and act in a way that is generally consistent with parents' desire for safe driving. Thus, warmth, structure, and autonomy support are expected to moderate the associations between restrictions and risky driving behavior. More restrictions will be more strongly associated with less risky driving when structure is of high quality and communicated in a warm and autonomy supportive manner. Specific hypotheses are as follows:

Hypothesis 1: More parental driving restrictions are predicted to be associated with less risky driving by adolescents.

Hypothesis 2: More parental warmth, more structure, and more autonomy support are predicted to be associated with less risky driving by adolescents.

Hypothesis 3: Parental warmth, structure, and autonomy support are predicted to moderate associations between driving restrictions and adolescents' risky driving, such that more restrictions are expected to be more strongly associated with less risky driving when parents provide warmth, high quality structure, and autonomy support.

All analyses will be tested concurrently as well as longitudinally to examine whether parental restrictions and parenting style at the time of licensure have a lasting effect on risky driving one year later. In addition, exploratory analyses will examine the role of adolescent gender in these associations. Males engage in more risky driving behaviors than females (Arnett et al., 1997; Bina, Graziano, & Bonino, 2006; McDonald, Sommers, & Fargo, 2014; Prato et al., 2010), are more likely to get a citation in their first year of driving (McCartt et al., 2003), and are more likely to endorse a reckless or angry driving style, whereas females are more likely to endorse a careful driving style (Taubman-Ben-Ari & Katz-Ben-Ami, 2012; 2013). Although some studies have found that male and female novice drivers have similar rates of crashes and near-crashes (e.g., Lee et al., 2011), males are more likely to suffer fatalities due to motor vehicle crashes (Insurance Institute for Highway Safety, 2015). In addition to gender differences in risky driving, male and female adolescents are also parented differently. Compared to male adolescents, females have reported that their parents set more driving limits, monitor their driving more closely, maintain more open driving-related communication, and convey clearer safety messages (Taubman-Ben-Ari & Katz-Ben-Ami, 2012; Taubman-Ben-Ari & Katz-Ben-

Ami, 2013). In addition, male and female adolescents may have different expectations of parents' rules regarding driving. Prior to licensure, adolescent boys expected fewer driving restrictions and viewed restrictions as less legitimate than adolescent girls (Laird, 2014). Taubman-Ben-Ari and Katz-Ben-Ami (2012) found that clearer driving-related messages from parents were associated with fewer reckless driving habits among female adolescents, but not males. Thus, it is possible that parenting differentially affects driving behavior based on gender, but no specific hypotheses were formed based on the sparse research in this area.

Method

Participants

Participants included 204 parents and 176 adolescents, ranging from 15 to 18 years of age (*M* age = 16.4 years, *SD* = .73). Adolescents were diverse in terms of gender (52.9% female) and ethnicity (51.1% white, non-Hispanic, 20.1% African American, 14.4% Hispanic, and 14.4% of other or multiple ethnicities), as reported by their parents. All parents living in the home were invited to participate in the study, but only one parent was required for participation. Two parents participated in 28 families. Most parents self-reported as the mother (71.0%) or father (24.3%), with a few (4.7%) reporting as grandparents, aunts, or step-parents of the adolescent. One hundred fifty-four adolescents completed a follow-up survey at a subsequent time point. Adolescents who participated at the subsequent time point did not differ in age, gender, or ethnicity from those who did not participate.

Procedure

Following IRB approval, adolescent participants were recruited from drivers' training programs in Jefferson Parish, Louisiana between May and October, 2012. The graduated licensing regulations in effect at the time required that all individuals 16 years or younger

(through July 31, 2012) or 17 years or younger (beginning August 1, 2012) must complete a drivers' training program prior to obtaining a learner's permit or intermediate license. Participants were recruited through two drivers' training programs: a privately-owned drivers' training school, as well as a drivers' training program offered by the Jefferson Parish School System. Once adolescents reported that they had obtained an intermediate driver's license, a research assistant scheduled an interview with the adolescent and one or both parents, either in the participants' home or in the Families and Teens laboratory on UNO's campus. Immediately following the interview, participants separately completed a set of questionnaires, and the family received $100 total compensation for the interview and questionnaire completion. All measures included in this study were assessed at this time. Risky driving was additionally assessed one year later; at this time point, families were mailed a final set of questionnaires and received $100 compensation upon return of the completed questionnaires.

Measures

Driving restrictions. Driving restrictions were assessed using 18 items gathered from several sources (e.g., Hartos, Beck, & Simons-Morton, 2004; Sherman, Lapidus, Gelven, & Banco, 2004; Williams, Leaf, Simons-Morton, & Hartos, 2006). Adolescents and their parents reported how often parents limit each driving behavior (see Appendix A for the adolescent-report questionnaire; parents responded to an analogous set of items). Responses were scored on a five-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *usually*, 4 = *always*). Separate scores were computed for adolescents and parents as the mean of the 18 items, αs = .89 and .91, respectively. Scores indexed adolescents' and parents' reports of the frequency with which driving restrictions were imposed, with higher scores indicating restrictions were imposed more often.

Parenting style. Parental warmth/involvement, quality of structure, and autonomy support were assessed using the Parenting as a Social Context Questionnaire (Skinner, Johnson, & Snyder, 2005). Adolescents and parents were asked to rate the veracity of each statement (see Appendix B for the adolescent-report questionnaire and see Appendix C for the parent-report questionnaire). All responses were scored on a four-point scale (0 = *not at all true*, 1 = *not very true*, 2 = *sort of true*, 3 = *very true*).

Warmth/involvement was defined by parents' expression of love and quality time spent with the child. Rejection, viewed as the opposite of warmth/involvement, was defined as parents' disapproval of the child. To measure parental warmth/involvement, adolescents completed four items assessing warmth/involvement and four items assessing rejection. Rejection items were reverse coded before taking the mean of the eight items, α = .84. Parents completed four items assessing warmth and five items assessing rejection. Rejection items were reverse coded before averaging the nine items, α = .74. Scores indexed adolescents' and parents' perceptions of parental warmth/involvement, with higher scores indicating more warmth.

Structure was defined by the clearness and consistency of parents' interactions with their child. Chaos, seen as the opposite of structure, was defined by the child not knowing what to expect from the parents. To measure quality of structure, adolescents completed four items assessing structure and four items assessing chaos. Chaos items were reverse coded before averaging the eight items, α = .81. Parents completed seven items assessing structure and four items assessing chaos, which were reverse coded before averaging the 11 items, α = .75. Scores indexed adolescents' and parents' perceptions of structure, with higher scores reflecting higher quality structure.

Autonomy support was defined by parents' trust in the child and willingness to listen to the child's opinions. Coercion, the opposite of autonomy support, was defined by parents telling the child what to do. To measure autonomy support, adolescents completed four items assessing autonomy support and four items assessing coercion. Coercion items were reverse coded before averaging the eight items, α = .87. Parents completed five items assessing autonomy support and three items assessing coercion, which were reverse coded before averaging the eight items, α = .68. Scores indexed adolescents' and parents' perceptions of autonomy support, with higher scores indicating more autonomy support provided by parents.

A composite parenting style variable combining warmth, structure, and autonomy support also was formed. Adolescent scores were computed as the mean of the 24 items, α = .94. Parent scores were computed as the mean of the 28 items, α = .87. Scores indexed adolescents' and parents' perceptions of parenting style, with higher scores indicating more warmth, structure, and autonomy support provided by parents.

Risky driving. Risky driving was assessed using 36 items based on items used by Hartos, Eitel, and Simons-Morton (2002). Risky driving encompassed various conditions that have been shown to be associated with crash rates in adolescent drivers, including risky driving maneuvers (e.g., speeding, tailgating, risky lane changing), distracted driving (e.g., while texting, while eating), and driving during risky conditions (e.g., at night, with passengers, after using alcohol/drugs). Teens were asked how many times in the last week they performed each risky driving behavior (see Appendix D for the complete list of items). Responses were scored on a five-point scale (0 = *never*, 1 = *1-2 times*, 2 = *3-4 times*, 3 = *5-6 times*, 4 = *7 or more times*). A risky driving score was computed as the mean of the 36 items, αs = .92 and .94 for time 1 and

time 2, respectively. Scores indexed teens' reports of risky driving behaviors, with higher scores indicating more frequent risky driving.

Results

Analyses first tested mean-level differences in all study variables as a function of adolescent gender. Next, analyses tested bivariate associations among variables. Finally, multivariate analyses tested the primary hypotheses that parental warmth, structure, and autonomy support moderate the association between driving restrictions and adolescents' risky driving. Regression equations were computed to test these hypotheses both cross-sectionally and longitudinally. Adolescents' and parents' reports of parenting behaviors typically show only modest correlations (Tein, Roosa, & Michaels, 1994); thus, adolescent- and parent-reports of the predictor variables were analyzed separately. Two parents participated in some, but not all families, which violates the assumption of independence of observations. To address this, analyses were conducted using MPLUS 7.3 (Muthén & Muthén, 2015). All analyses using parents' reports were conducted using the "type = complex" data specification to provide more accurate estimates of the standard errors in the nested data set. For all analyses, gender was coded such that girls = 0 and boys = 1; all other variables were continuous.

Descriptive Statistics and Bivariate Correlations

Table 1 presents the means and standard deviations of all study variables for girls, boys, and the entire sample, as well as results testing for mean-level differences between girls and boys. Significant gender differences emerged for adolescent-reported driving restrictions, with girls reporting more restrictions than boys, and for adolescent-reported risky driving at time 1, but not time 2, with boys reporting more risky driving than girls. There were no significant gender

Table 1.

Means and Standard Deviations as a Function of Adolescent Gender

	Girls	Boys	Overall	*p*
Adolescent-Reported Restrictions	2.19 (.85)	1.89 (.70)	2.04 (.79)	.024
Parent-Reported Restrictions	2.52 (.86)	2.34 (.82)	2.44 (.84)	.158
Adolescent-Reported Warmth	2.62 (.46)	2.54 (.49)	2.58 (.48)	.215
Parent-Reported Warmth	2.32 (.47)	2.25 (.44)	2.28 (.46)	.320
Adolescent-Reported Structure	2.08 (.55)	2.09 (.59)	2.08 (.57)	.868
Parent-Reported Structure	2.52 (.35)	2.47 (.36)	2.50 (.35)	.381
Adolescent-Reported Autonomy Support	2.09 (.63)	2.00 (.60)	2.05 (.62)	.278
Parent-Reported Autonomy Support	2.41 (.42)	2.38 (.39)	2.40 (.41)	.718
T1 Adolescent-Reported Risky Driving	.44 (.32)	.62 (.50)	.53 (.42)	.007
T2 Adolescent-Reported Risky Driving	.71 (.52)	.81 (.59)	.76 (.55)	.356

Note: T1= Time 1; T2 = Time 2.

differences in adolescents' reports of warmth, structure, and autonomy support, nor in parents' reports of any variable.

Table 2 presents the bivariate associations among all study variables. Values in the table are standardized covariance estimates reported using the full nested data set with corrected standard errors. As predicted by Hypothesis 1, using all adolescent reports, more driving restrictions were associated with less risky driving at time 1 (r = -.40, p < .001) and time 2 (r = -.29, p < .001). Cross-informant analyses also supported Hypothesis 1, such that more parent-reported driving restrictions were associated with less adolescent-reported risky driving at time 1 (r = -.17, p = 008) and time 2 (r = -.18, p = .015). In contrast to Hypothesis 2, none of the parenting style variables were associated with adolescent risky driving at either time point.

Adolescent and parent reports of the same construct generally showed modest correlations (rs = .38 to .49, all ps <. .001). The three parenting style variables were intercorrelated both within informant (rs = .71 to .75 for adolescent reports and .61 to .68 for parent reports, all ps < .001) and across informants (rs = .32 to .43, all ps < .001). Adolescent-

Table 2.

Correlations among Variables

	1	2	3	4	5	6	7	8	9	10
1. AR Restrictions										
2. PR Restrictions	.48***									
3. AR Warmth	-.06	-.11								
4. PR Warmth	-.01	-.17*	.38***							
5. AR Structure	-.10	-.19**	.75***	.40***						
6. PR Structure	.05	.02	.32***	.61***	.38***					
7. AR Autonomy Support	-.14	-.22**	.71***	.38***	.72***	.33***				
8. PR Autonomy Support	-.04	-.17*	.39***	.64***	.43***	.68***	.49***			
9. T1 AR Risky Driving	-.40***	-.17**	-.07	.03	-.06	.03	.01	.06		
10. T2 AR Risky Driving	-.29***	-.18*	.04	-.02	.02	.03	-.06	-.01	.50***	
11. Male Gender	-.22*	-.13	-.12	-.10	.02	-.08	-.10	-.04	.29**	.10

Note: *$p < .05$, **$p < .01$, ***$p < .001$. AR = Adolescent-Reported; PR = Parent-Reported; T1= Time 1; T2 = Time 2.

reported driving restrictions were not associated with any of the parenting style variables, but more parent-reported restrictions were associated with less parent-reported warmth (r = -.17, p = .017), adolescent-reported structure (r = -.19, p = .006), adolescent-reported autonomy support (r = -.22, p = .001), and parent-reported autonomy support (r = -.17, p = .018). More risky driving at time 1 was linked with more risky driving at time 2 (r = .50, $p < .001$).

Multivariate Associations

Multiple regression was used to determine if the association between driving restrictions and risky driving was moderated by any of the parenting style variables or gender (Hypothesis 3). All interaction terms were computed from centered variables. Initially, two-way interactions (e.g., restrictions x warmth) were tested individually, followed by a test of the three-way interactions (e.g., restrictions x gender x warmth). The pattern of significance generally remained consistent across the two-way and the three-way interaction models; therefore, only the three-way interaction models are reported. The parenting style variables (i.e., warmth, structure, and autonomy support) were intercorrelated; thus a separate analysis was conducted for each of them. These models were first tested using the adolescents' reports of all variables; the analyses

were then repeated with the parents' reports of restrictions, warmth, structure, and autonomy support. In each analysis, seven variables (i.e., gender, restrictions, parenting style, gender x restrictions, gender x parenting style, restrictions x parenting style, gender x restrictions x parenting style) were entered simultaneously to predict time 1 risky driving. For each of the longitudinal analyses, these seven variables in addition to time 1 risky driving were entered simultaneously to predict time 2 risky driving. A total of twelve regression analyses were computed.

Adolescent-Report. Table 3 summarizes results from the regression analyses using adolescent reports. Across the three cross-sectional models, the only significant predictor of time 1 risky driving was driving restrictions. More driving restrictions were associated with less risky driving. Gender was a marginally significant predictor in each case with boys reporting more risky driving than girls. The model using warmth as the parenting style predictor accounted for 18.9% of the variance in risky driving at time 1. The model using structure accounted for 19.3% of the variance in risky driving, and the model using autonomy support accounted for 18.4%.

When predicting risky driving longitudinally, the only significant predictor of time 2 risky driving in each of the three models was time 1 risky driving. More risky driving at time 1 was associated with more risky driving at time 2. The model using warmth accounted for 27.7% of the variance in time 2 risky driving. The model using structure accounted for 27.2% of the variance, and the model using autonomy support accounted for 26.4%.

Table 3.

Adolescent Risky Driving Regressed on Gender and Adolescent-Reported Parenting

	T1 Risky Driving					T2 Risky Driving				
	R^2	B	SE	β	p	R^2	B	SE	β	p
				Warmth						
	.189					.277				
T1 Risky Driving		-	-	-	-		.49	.07	.64	.000
Gender		.14	.07	.12	.054		.01	.07	.01	.916
Restrictions		-.30	.09	-.16	.001		-.13	.10	-.09	.183
Warmth		.05	.11	.05	.643		.07	.11	.08	.544
Gender x Restrictions		-.10	.09	-.08	.296		.09	.09	.10	.317
Gender x Warmth		-.14	.10	-.18	.170		.06	.11	.09	.603
Restrictions x Warmth		-.09	.11	-.11	.409		.07	.11	.10	.549
Gender x Restrictions x Warmth		.07	.10	.13	.488		-.03	.11	-.07	.769
				Structure						
	.193					.272				
T1 Risky Driving		-	-	-	-		.47	.07	.61	.000
Gender		.13	.07	.11	.066		.01	.07	.01	.921
Restrictions		-.32	.09	-.17	.001		-.14	.10	-.10	.159
Structure		-.07	.12	-.05	.581		.09	.12	.09	.474
Gender x Restrictions		-.09	.09	-.08	.311		.09	.09	.09	.367
Gender x Structure		-.03	.11	-.03	.788		-.01	.12	-.01	.945
Restrictions x Structure		-.02	.11	-.02	.866		-.06	.11	-.07	.631
Gender x Restrictions x Structure		.08	.10	.11	.421		.12	.11	.22	.241
				Autonomy Support						
	.184					.264				
T1 Risky Driving		-	-	-	-		.47	.07	.61	.000
Gender		.13	.07	.11	.076		-.00	.08	-.00	.975
Restrictions		-.30	.09	-.16	.001		-.14	.10	-.10	.152
Autonomy Support		-.01	.10	-.01	.922		-.01	.10	-.01	.917
Gender x Restrictions		-.10	.09	-.09	.261		.08	.10	.08	.427
Gender x Autonomy Support		-.03	.10	-.03	.777		-.05	.10	-.06	.643
Restrictions x Autonomy Support		-.08	.10	-.08	.389		.02	.10	.03	.828
Gender x Restrictions x Autonomy Support		.01	.10	.02	.893		-.03	.10	-.06	.740

Note: T1= Time 1; T2 = Time 2.

Parent-Report. Table 4 summarizes results from the regression analyses using parent-reported predictor variables. In each of the three cross-sectional models, boys reported more risky driving than girls, and more driving restrictions were associated with less risky driving. The three-way interaction terms in each of the models were marginally significant. When gender, restrictions, warmth, and their interactions were entered as predictors, the model accounted for 14.1% of the variance in adolescent-reported risky driving at time 1. Gender and

Table 4.

Adolescent Risky Driving Regressed on Gender and Parent-Reported Parenting

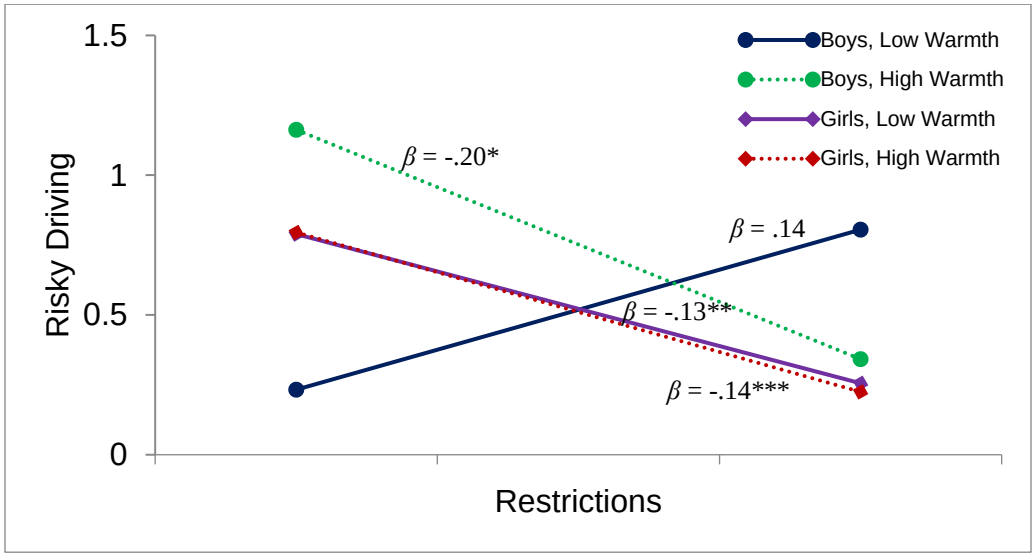
	T1 Risky Driving					T2 Risky Driving				
	R^2	B	SE	β	p	R^2	B	SE	β	p
				Warmth						
	.141					.279				
T1 Risky Driving		-	-	-	-		.47	.10	.62	.000
Gender		.19	.07	.17	.011		.00	.07	.00	.996
Restrictions		-.27	.07	-.14	.000		-.13	.08	-.09	.123
Warmth		-.02	.07	-.02	.781		.05	.10	.06	.651
Gender x Restrictions		.14	.09	.11	.127		.05	.08	.06	.523
Gender x Warmth		.08	.13	.11	.540		-.12	.09	-.22	.205
Restrictions x Warmth		-.01	.06	-.01	.880		-.07	.07	-.10	.294
Gender x Restrictions x Warmth		-.23	.12	-.37	.075		.02	.09	.05	.800
				Structure						
	.117					.273				
T1 Risky Driving		-	-	-	-		.49	.10	.64	.000
Gender		.23	.08	.20	.007		-.02	.07	-.02	.836
Restrictions		-.26	.07	-.14	.000		-.16	.10	-.11	.131
Structure		.00	.08	.01	.956		-.02	.11	-.03	.883
Gender x Restrictions		.15	.11	.12	.171		.09	.09	.10	.322
Gender x Structure		.03	.09	.05	.746		.02	.09	.03	.877
Restrictions x Structure		-.02	.06	-.03	.767		.02	.09	.03	.861
Gender x Restrictions x Structure		-.15	.08	-.32	.067		.07	.09	.20	.445
				Autonomy Support						
	.131					.293				
T1 Risky Driving		-	-	-	-		.47	.10	.62	.000
Gender		.19	.07	.17	.014		-.03	.08	-.03	.739
Restrictions		-.25	.07	-.13	.000		-.18	.10	-.12	.071
Autonomy Support		.07	.07	.07	.304		-.08	.13	-.11	.547
Gender x Restrictions		.17	.10	.13	.097		.10	.10	.11	.311
Gender x Autonomy Support		-.06	.09	-.10	.535		.04	.11	.08	.728
Restrictions x Autonomy Support		.01	.06	.01	.877		.19	.10	.33	.065
Gender x Restrictions x Autonomy Support		-.20	.12	-.41	.083		-.15	.10	-.44	.133

Note: T1= Time 1; T2 = Time 2.

restrictions were each significant predictors of time 1 risky driving; the gender x restrictions x warmth interaction term was marginally significant. Post hoc probing of the interaction was used to determine the predictive value of restrictions for girls and boys separately at 1 standard deviation (SD) above and below the mean level of warmth. Results are depicted in Figure 1 and indicate that more restrictions were linked with less risky driving by girls at both low (β = -.13, SE = .05, p = .008) and high (β = -.14, SE = .04, p < .001) levels of warmth. Regions of

Figure 1.

Restrictions x Gender x Warmth Predicting Concurrent Risky Driving



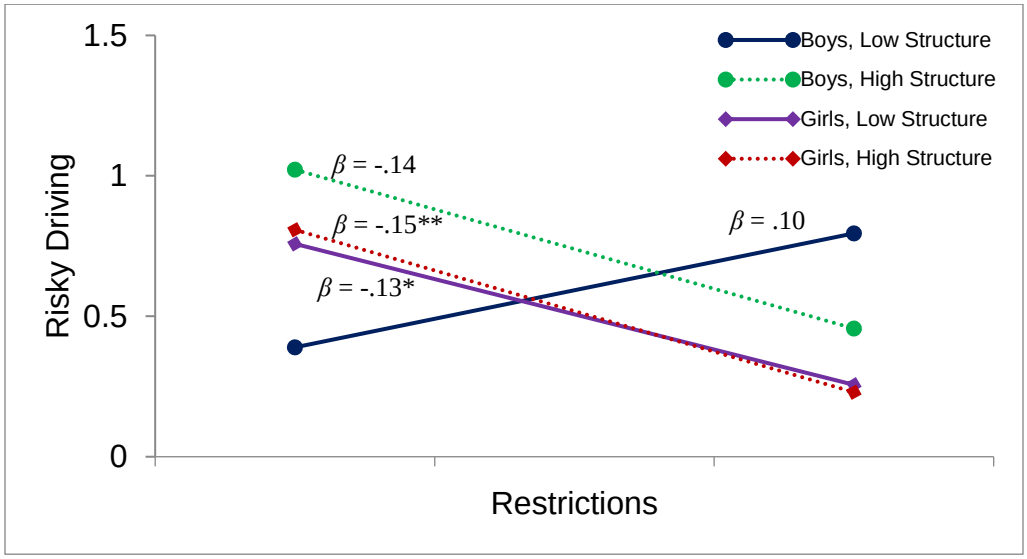
Note: *$p < .05$, **$p < .01$, ***$p < .001$.

significance showed that more restrictions were associated with less risky driving by girls at levels of parent-reported warmth 1.66 SDs below the mean and higher. For boys, more restrictions were linked with less risky driving when parents reported high warmth (β = -.20, SE = .09, p = .017) but not when parents reported low levels of warmth (β = .14, SE = .13, p = .267). More restrictions were significantly associated with less risky driving by boys only at levels of warmth .49 SDs above the mean and higher.

When gender, restrictions, structure, and their interactions were entered as predictors, the model accounted for 11.7% of the variance in time 1 risky driving. Gender and restrictions were each significant predictors, and the gender x restrictions x structure interaction term was marginally significant. Post hoc probing examined the association between restrictions and risky driving for girls and boys at 1 SD above and below the mean level of structure. The results are depicted in Figure 2 and indicate that more restrictions were associated with less risky driving by girls at both low (β = -.13, SE = .05, p = .011) and high (β = -.15, SE = .04, p = .001) levels of

Figure 2.

Restrictions x Gender x Structure Predicting Concurrent Risky Driving.



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

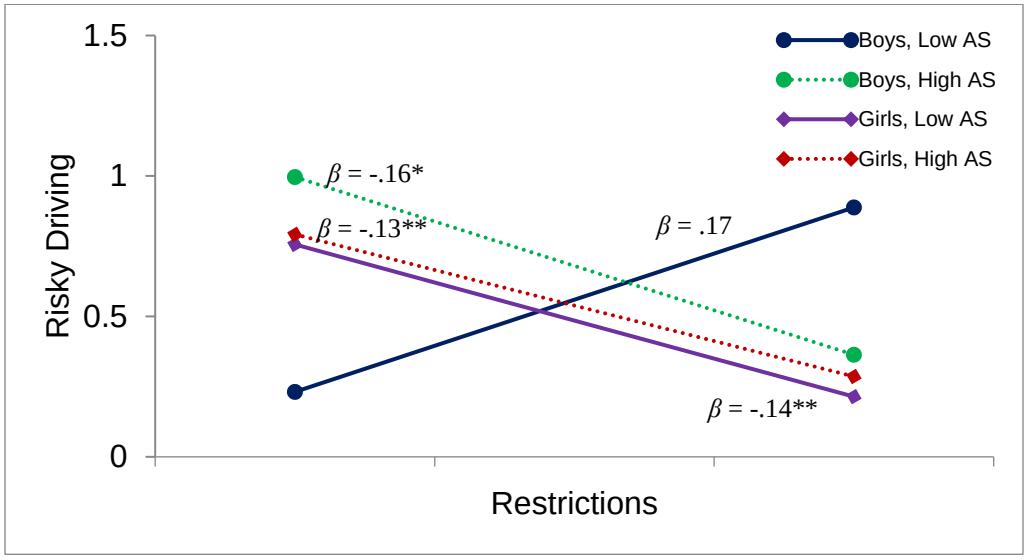
structure. Restrictions were not associated with risky driving by boys at either low (β = .10, SE = .11, p = .345) or high (β = -.14, SE = .08, p = .062) levels of structure, defined at 1 SD from the mean. However, when these associations were examined at 2 SDs above and below the mean, gender differences emerged. More restrictions were linked with less risky driving at very high levels of structure for both girls (β = -.16, SE = .07, p = .024) and boys (β = -.26, SE = .10, p = .012), but restrictions were not linked with risky driving at very low levels of structure for either girls (β = -.12, SE = .08, p = .131) or boys (β = .22, SE = .15, p = .137). Regions of significance showed that more restrictions were associated with less risky driving by girls at levels of structure 1.46 SDs below the mean and higher and that more restrictions were associated with less risky driving by boys at levels of structure 1.09 SDs above the mean and higher.

When autonomy support was entered as the parenting style variable, the model accounted for 13.1% of the variance. Gender and restrictions were significant predictors; the gender x

restrictions interaction term and the gender x restrictions x autonomy support interaction term were each marginally significant. Only the three-way interaction was decomposed because the gender x restrictions interaction is included within the gender x restrictions x autonomy support interaction. Results from post hoc probing at 1 SD above and below the mean level of autonomy support are depicted in Figure 3. For girls, more restrictions were linked with less risky driving at both low (β = -.14, SE = .05, p = .003) and high (β = -.13, SE = .04, p = .002) levels of autonomy support. Regions of significance showed that more restrictions were associated with less risky driving by girls at levels of autonomy support 2.13 SDs below the mean and higher. For boys, more restrictions were linked with less risky driving at high levels of autonomy support (β = -.16, SE = .07, p = .022) but not at low levels of autonomy support (β = .17, SE = .15, p = .275). More restrictions were associated with less risky driving by boys at levels of autonomy support .72 SDs above the mean and higher.

Figure 3.

Restrictions x Gender x Autonomy Support Predicting Concurrent Risky Driving.



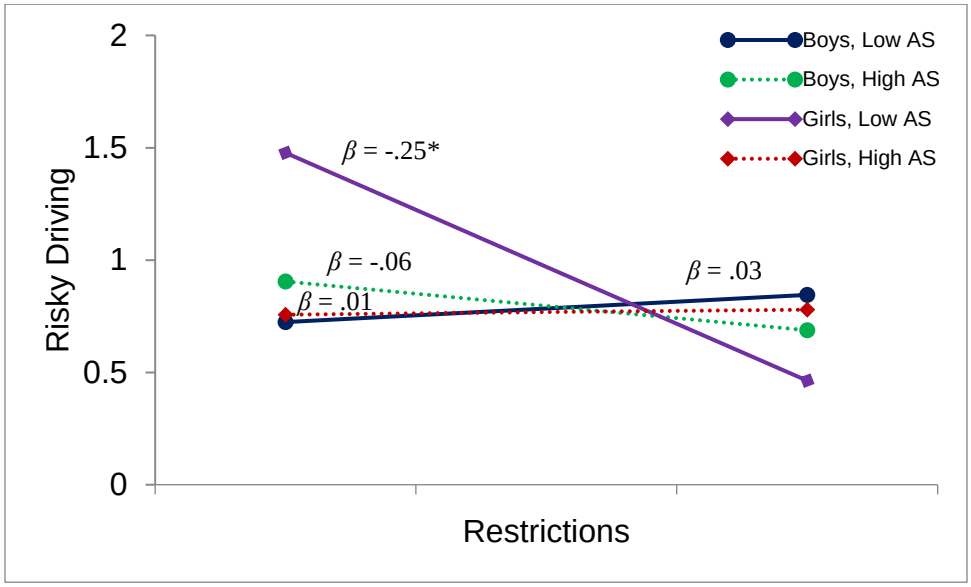
Note: *p < .05, **p < .01, ***p < .001.

The patterns of results were highly similar across models testing warmth, structure, and autonomy support. Therefore, exploratory regression equations were computed to test the robustness of these results. First, all variables were entered simultaneously to determine whether the effects were unique or redundant across the three parenting style components. In this model, none of the interaction terms were significantly associated with risky driving (*p*s = .209 to .457). The second set of robustness analyses tested the composite parenting variable that combined warmth, structure, and autonomy support. The gender x restrictions x parenting composite interaction term was marginally significant (β = -.46, SE = .25, p = .071), which is consistent with the primary findings.

Across the three parent-reported longitudinal models, time 1 risky driving was the only significant predictor of time 2 risky driving. More risky driving at time 1 was associated with more risky driving at time 2. The model using warmth accounted for 27.9% of the variance in time 2 risky driving, the model using structure accounted for 27.3%, and the model using autonomy support accounted for 29.3%. In the model using autonomy support, restrictions and the restrictions x autonomy support interaction term were each marginally significant. However, this interaction term was only significant when gender was included in the model. Because gender was coded as girls = 0 and boys = 1, the restrictions x autonomy support term actually represents an interaction effect for girls but not boys. Thus, the three-way interaction term was decomposed for interpretation. As shown in Figure 4, post hoc probing at 1 SD above and below the mean level of autonomy support indicated that more restrictions were linked with less time 2 risky driving by girls at low levels of autonomy support (β = -.25, SE = .13, p = .049) but not at high levels of autonomy support (β = .01, SE = .05, p = .923). Regions of significance showed that more restrictions were associated with less risky driving by girls at levels of autonomy

Figure 4.

Restrictions x Gender x Autonomy Support Predicting Risky Driving at Time 2.



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

support .81 SDs below the mean and lower. For boys, restrictions were not associated with risky driving at either low ($\beta = .03$, SE = .15, $p = .837$) or high ($\beta = -.06$, SE = .10, $p = .565$) levels of autonomy support.

Discussion

The purpose of this study was to examine how different aspects of parenting influence adolescents' risky driving behavior. Specifically, parental driving restrictions, warmth, structure, and autonomy support were measured shortly after adolescents obtained their driver's license, and analyses tested the relations between these variables and adolescents' self-reported risky driving concurrently and one year later. Results show that more driving restrictions were associated with less risky driving, but parental warmth, structure, and autonomy support showed no relationship with risky driving. There was some support for the notion that restrictions, parenting style, and gender may interact in predicting adolescents' risky driving, although the

findings were modest and showed mixed support for the primary hypothesis. The results are discussed more thoroughly below.

The amount of driving restrictions that parents impose on their newly licensed teenagers was shown to be a robust predictor of risky driving. Bivariate correlations showed that more adolescent-reported and parent-reported restrictions shortly after licensure were each associated with less risky driving, concurrently as well as several months later. In addition, restrictions were the strongest individual predictors of concurrent risky driving in each of the regression models. These results replicate findings from other research (e.g., Hartos et al., 2002; Taubman-Ben-Ari & Katz-Ben-Ami, 2012; 2013), suggesting the presence of a strong link between restrictions and risky driving.

While parents may be able to reduce their adolescents' risky driving by setting rules, parenting style seems to have less of an impact, at least directly. Warmth, structure, and autonomy support were not significantly associated with risky driving at either time point in any of the bivariate or multivariate analyses. These constructs were hypothesized to be associated with risky driving because prior research has shown that they are related to other risky and problem behavior in adolescents (Williams, Cox, Hedberg, & Deci, 2000). However, it is possible that risky driving is not analogous to other risky behaviors displayed by adolescents. Part of risky driving likely stems from a tendency to engage in risk-taking behaviors (Bina et al., 2006), but another part of risky driving may simply reflect a lack of skill in inexperienced drivers (McKnight & McKnight, 2003; Simons-Morton, 2007; Williams, 2003). Warmth, structure, and autonomy support would not be expected to influence skill level in novice drivers. Thus, if risky driving in this sample is more reflective of inexperience rather than personality, it makes sense that warmth, structure, and autonomy support would not be related.

Although parenting style was not directly related to risky driving, partial support was found for the hypothesis that associations between more restrictions and less risky driving would be stronger under conditions of high warmth, structure, and autonomy support. Three-way interactions between parent-reported restrictions, parenting style, and adolescents' gender were marginally significant predictors of concurrent risky driving. Findings were similar for warmth, structure, and autonomy support, hereafter collectively referred to as "supportive parenting." More restrictions were associated with less risky driving for girls mostly regardless of parenting style, although statistical significance was lost at very low levels of supportive parenting. For boys whose parents reported high levels of supportive parenting, the association was similar to that of girls. However, for boys whose parents reported low levels of supportive parenting, there was no association between restrictions and risky driving. This interaction was not replicated with adolescent-report or in any of the longitudinal analyses. Only one longitudinal model showed marginally significant results indicative of moderation. Further examination of the parent-reported restrictions x autonomy support x gender interaction term revealed an interesting pattern: contrary to predictions, more restrictions were associated with less risky driving one year later only for girls whose parents reported *low* levels of autonomy support. There were no longitudinal associations between restrictions and risky driving for boys or for girls whose parents reported high levels of autonomy support.

One possible explanation for the discrepant findings for boys and girls has to do with the distinction between personality-based risky driving and inexperience-based risky driving. Boys engaged in more risky driving at time 1 than girls, and boys also showed a greater range of risky driving engagement, whereas girls' risky driving was unvaryingly low. Thus, it is possible that boys' risky driving shortly after licensure stemmed from both personality-based risky driving as

well as inexperience-based risky driving, whereas girls' risky driving was mostly of the inexperience type. Indeed, compared to girls, boys have reported that they have less intention to obey driving rules (Desrichard, Roché, & Bègue, 2007), indicating that boys' risky driving may be more likely to be personality-based than girls' risky driving. In addition, boys' risky driving has been shown to be more strongly associated with other risk-taking behaviors than girls' risky driving (Bina et al., 2006). Based on SDT predictions, it stands to reason that supportive parenting would moderate the association between restrictions and risky driving for boys, but not girls, if boys' risky driving is more personality-based. Future research should distinguish between personality-based risky driving and inexperience-based risky driving and aim to determine how the two may be differentially affected by parenting. Given the strong associations between self-determination parenting and other adolescent problem behaviors (McDonald et al., 2014; Vassallo et al., 2008), the possible usefulness of incorporating Self-Determination Theory in efforts to reduce personality-based risky driving in adolescents is worth further study.

The finding that more restrictions were associated with less risky driving in girls only in the context of low autonomy support seems to suggest a possible benefit of autonomy *suppression* over time in regards to girls' risky driving. Although autonomy-suppressive parenting is generally associated with maladaptive child outcomes (Vasquez et al., 2015), children may differ in how they cope with autonomy-suppressive parenting (Soenens, Vansteenkiste, & Van Petegem, 2015). For instance, some children may react to parents' autonomy suppression with direct defiance of parents' rules; this may help to explain the current finding of a lack of relationship between restrictions and boys' risky driving in the context of unsupportive parenting. Compared to girls, boys exhibit greater reactance in response to parental

restrictions (Kakihara, Tilton-Weaver, Kerr, & Stattin, 2010), and some recent research suggests that relations between parenting and problem behavior may be stronger for boys than girls (Rueth, Otterpohl, & Wild, 2016). Other children may respond to parents' autonomy suppression by submitting to their parents' requests because they feel pressured to do so. In the context of driving, autonomy suppression may result in fewer opportunities to drive and thus fewer opportunities to engage in risky driving. Thus, the association between more restrictions and less risky driving in girls one year later, only in the context of low autonomy support, may possibly reflect that these girls are not afforded many opportunities for risky driving. Indeed, in this sample, girls reported more driving restrictions than boys, and more parent-reported restrictions were associated with less autonomy support reported by both parents and adolescents. Since autonomy suppressive parents of girls imposed the heaviest driving restrictions at the time of licensure, it is possible that this group of girls experienced greater persistence of restrictions one year later, which may account for reduced risky driving. Future research should explore this possibility further.

Finally, it is important to note that, with the exception of the one longitudinal model including autonomy support, findings were similar for each measure of parenting style, as well as the composite parenting construct. Exploratory analyses of robustness suggested that no one aspect of parenting had more of an effect on risky driving than any other. Parent-reported warmth, structure, and autonomy support were highly intercorrelated in this study. Although warmth, structure, and autonomy support are viewed as distinct ways of supporting self-determination (Deci & Ryan, 2000), participants in this sample seemed to be rating the quality of parenting more generally, rather than distinguishing between the three constructs.

Limitations

This study has several limitations. First, adolescents' and parents' reports of each construct showed only modest correlations, and the study's major finding that restrictions, parenting style, and adolescent gender interact to predict adolescents' risky driving was only found using parent-report of restrictions and parenting style. Although discrepancies between parents' and adolescents' perspectives are common (Tein et al., 1994), the findings would be stronger if they were replicated with adolescent-report. However, it is worth noting that the significant findings resulted from cross-informant analyses, reducing the possibility that shared method variance inflated the estimates. Adolescents' risky driving was only measured via self-report, since parents likely would not be able to accurately report on their children's risky driving. Although parents and adolescents each may provide valuable reports of parenting behaviors, parents' reports of their own parenting may be more relevant in terms of applying this research to parenting interventions. The current findings suggest that how parents perceive their own parenting is associated with how adolescents perceive their own risky driving. Since the informants are reporting on their own behavior, it seems to add more credence to the notion that general parenting interventions that help parents meet their children's self-determination needs may also help to reduce adolescent engagement in risky driving behaviors, at least for boys. However, the current research is correlational, and thus causal statements cannot be made based on the findings.

Although a strength of this study is the inclusion of both parents. 71% of participating parents were the mother, indicating that fathers' perspectives were underrepresented in this study. Future studies on parenting of novice drivers would benefit from a greater sampling of fathers' reports. Another limitation has to do with the constructs used to measure driving restrictions and risky driving. Several driving behaviors (e.g., phone use while driving, nighttime driving) were

assessed both as a possible restricted behavior and as a risky driving behavior. Thus, the association between driving restrictions and risky driving may be somewhat inflated due to the overlap in items. That is, to some degree the association between restrictions and risky driving reflects the extent to which adolescents are following their parents' rules. Nevertheless, parents likely would not know whether their children are obeying these types of driving rules or not, and thus obeying would likely reflect internalization of the rules, consistent with SDT predictions. Furthermore, engaging in these types of risky driving behaviors is associated with crash risk and thus relevant for study regardless of whether the parents impose rules around these behaviors.

Finally, it is important to note that all constructs assessed in this study were based on self-report. Replicating these results with more objective measures would strengthen the findings. This is especially true for the construct of risky driving; official records of traffic violations, as well as data acquisition systems installed in participants' vehicles such as those used by Simons-Morton et al. (2011), would complement self-report data to provide a more thorough assessment of risky driving. In addition, mean levels of risky driving were rather low in this study, and thus the restricted range of risky driving behaviors could have influenced the results. It is not known whether this sample truly did not engage in much risky driving or if ratings were influenced by participants' social desirability or inability to accurately report on their own driving behaviors. Future research should examine the effects of parenting on adolescents with high levels of engagement in risky driving.

Conclusion

Teenage risky driving is an important target of public health policies aimed at reducing teenage driver crash rates. The results of this study suggest that more parent-imposed driving restrictions are a robust predictor of less risky driving by adolescents shortly after licensure.

Though inexperience and risk-taking tendencies likely both contribute to risky driving, inexperience may play a more prominent role in adolescence (McKnight & McKnight, 2003), emphasizing the importance of parental restrictions limiting novice drivers to relatively safe driving conditions. Although modest, the results of this study suggest that, for boys, the effectiveness of parental driving restrictions may be enhanced if parents are also warm, structured, or autonomy supportive. Compared to girls, boys have higher rates of risky driving and higher crash rates (Arnett et al., 1997; Bina et al., 2006; Insurance Institute for Highway Safety, 2015; McDonald et al., 2014), and thus reducing adolescent boys' risky driving is particularly essential. More risky driving is associated with higher crash rates in adolescent drivers (Williams, 2003), and therefore reducing adolescent risky driving is an important goal for policy makers and parents alike.

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Appendix A

How often do your parents…?

1. Limit you to driving only in local areas (in your part of town)
2. Limit you to driving only with a parent/adult in the car
3. Limit you to driving only to parent approved destinations
4. Prohibit you from driving on high speed roads
5. Try to stop you from texting while driving
6. Try to make you wear your seatbelt
7. Stop you from driving in bad weather
8. Try to stop you from talking on the phone while driving
9. Limit your driving to daylight hours
10. Prohibit you from driving with other teenagers in the car
11. Limit you to driving close to home
12. Not let you go for a drive without a specific destination
13. Have a curfew for you (require you to be home by a certain time)
14. Prohibit you from driving after 11 PM
15. Require you to get their permission before you can take the car
16. Not let you drive if your grades and behavior are unacceptable
17. Limit you to only having 1 friend in the car at a time
18. Limit you to driving only on certain roads

Appendix B

Please tell us how true each of the following statements are.

Warmth/Involvement

1. My parents let me know they love me.
2. My parents enjoy being with me.
3. My parents are always glad to see me.
4. My parents think I'm special.

Rejection

5. Sometimes I wonder if my parents like me.
6. My parents think I'm always in the way.
7. My parents make me feel like I'm not wanted.
8. Nothing I do is good enough for my parents.

Structure

9. When I want to do something, my parents show me how.
10. When I want to understand how something works, my parents explain it to me.
11. If I ever have a problem, my parents help me to figure out what to do about it.
12. My parents explain the reasons for our family rules.

Chaos

13. When my parents make a promise, I don't know if they will keep it.
14. When my parents say they will do something, sometimes they don't really do it.
15. My parents keep changing the rules on me.
16. My parents get mad at me with no warning.

Autonomy Support

17. My parents trust me.

18. My parents accept me for myself.

19. My parents let me do the things I think are important.

20. My parents try to understand my point of view.

Coercion

21. My parents are always telling me what to do.

22. My parents boss me.

23. My parents think there is only one right way to do things--their way.

24. My parents say “no” to everything.

Appendix C

How true is each of the following statements?

Warmth/Involvement

1. I do special things with my daughter/son.
2. I set aside time to talk to my daughter/son about what is important to her/him.
3. I know a lot about what goes on with my daughter/son.
4. I really know how my daughter/son feels about things.

Rejection

5. Sometimes my daughter/son is hard to like.
6. At times the demands that my daughter/son makes feels like a burden.
7. Sometimes I feel like I can't be there for my daughter/son when she/he needs me.
8. My daughter/son needs more than I have time to give her/him.
9. I don't understand my daughter/son very well.

Structure

10. When my daughter/son wants to do something, I show her/him how.
11. When I tell my daughter/son I'll do something, I do it.
12. When my daughter/son wants to understand how something works, I explain it to her/him.
13. I expect my daughter/son to follow our family rules.
14. If my daughter/son has a problem, I help her/him figure out what to do about it.
15. I make it clear what will happen if my daughter/son does not follow our rules.
16. I make it clear to my daughter/son what I expect from her/him.

Chaos

17. I change the rules a lot at home.
18. I get mad at my daughter/son with no warning.
19. My daughter/son doesn't seem to know what I expect from her/him.
20. I let my daughter/son get away with things I really shouldn't allow.

Autonomy Support

21. I encourage my daughter/son to express her/his opinions even when I don't agree with them.
22. I trust my daughter/son.
23. I expect my daughter/son to say what she/he really thinks.
24. I encourage my daughter/son to stay true to herself/himself.
25. I encourage my daughter/son to express her/his feelings even when they're hard to hear.

Coercion

26. To get my daughter/son to do something I have to yell at her/him.
27. I sometimes feel that I have to push my daughter/son to do things.
28. I can't afford to let my daughter/son decide too many things on her/his own.

Appendix D

Please answer these questions by thinking about how you drove in the last week. How many times in the last week did you…?

1. Eat while driving
2. Pull out into traffic without waiting for a large space between cars
3. Cut in front of a car to turn
4. Drive 20 or more miles per hour over the speed limit
5. Make an illegal U-turn
6. Drive after drinking alcohol
7. Drive while you were very tired
8. Drive 10-19 miles per hour over the speed limit
9. Drive through a stop sign without stopping completely
10. Drive after using marijuana
11. Drive after using other illegal drugs
12. Pass two or three vehicles at a time on a road with two-way traffic
13. Drive without wearing a safety belt
14. Drive in a way to show off to other people
15. Pass a car in a no-passing zone
16. Race another car if even only for a short distance
17. Change lanes without enough room between cars
18. Play the radio so loud that you would not be able to hear car horns or sirens
19. Tailgate or follow someone too closely
20. Switch lanes to weave through slower traffic

21. Change lanes without signaling

22. Drive through an intersection when the light was red or just turning red

23. Horse around with passengers while driving

24. Talk on a cell phone while driving

25. Text while driving

26. Drive 1-9 miles per hour over the speed limit

27. Drive between 11 PM and 6 AM

28. Drive after dark on the weekend

29. Drive on unfamiliar roads

30. Drive while passengers used drugs or alcohol

31. Drive on Interstates (e.g., I-10)

32. Drive in bad weather

33. Drive after dark during the week

34. Drive between 9 PM and 11 PM

35. Drive with one teen friend in the car

36. Drive with several teen friends in the car

Vita

The author was born in Luling, Louisiana. She obtained her Bachelor of Science degree in Psychology from Spring Hill College in 2012. She joined the University of New Orleans Applied Developmental Psychology graduate program in 2014 and is a member of Dr. Robert Laird's Families and Teens research lab.