THE EFFECTS OF VIDEO GAME EXPOSURE, UNMITIGATED AGENCY, AND MORAL

DISENGAGEMENT ON RISKY DRIVING BEHAVIOR

IN ADOLESCENTS AND YOUNG ADULTS

by

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ABSTRACT

An online survey was administered to 301 Introductory Psychology students assessing

unmitigated agency, moral disengagement, exposure to video games, and driving behavior. Both

video game categories and driving behavior were disaggregated into subcategories. Regression

analyses revealed that unmitigated agency significantly predicted all categories of risky driving

behavior (H1), and mediation analyses found that moral disengagement partially explained all

relations between unmitigated agency and type of risky driving behavior (H2). Regression

analyses also revealed that type of video game exposure significantly predicted most categories

of risky driving behavior (H3). For all instances in which there was a significant relation between

video game category and type of risky driving behavior, mediation analyses indicated that moral

disengagement either partially or fully explained those relations (H4).

DEDICATION

  This thesis is dedicated to everyone who helped me and guided me through the trials and tribulations of creating this manuscript. In particular, I would like to thank my husband John Sipperley, without whose support I would not have even had the courage to apply to graduate school. And, I would like to thank my father, Dr. Robert M. Sutton, who always instilled in me a desire to pursue a doctorate. Thank you both for believing in me when I could not, and for supporting me when I lacked the strength to do so myself. You both raise me up to more than I can be.

LIST OF ABBREVIATIONS AND SYMBOLS

α Cronbach's alpha index of internal consistency

β Regression Coefficient

M   Mean

p   Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value

R^2 Variance explained by the regression model

SD   Standard Deviation

t   Computed value of *t* test

Z   Computed value of a *Z*-score for a Sobel test

$<$ Less than

$=$ Equal to

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

        According to the National Highway Transportation Safety Administration, motor vehicle

crashes are the leading cause of death for 15 to 20 year olds accounting for 35% of all teen

deaths (NHTSA, 2009a). This group makes up just 9% of the total United States population and

only 6% of all licensed drivers, yet 19% of all traffic fatalities in 2007 could be attributed to

them (NTHSA, 2009b). This age group also has three times as many fatal crashes compared to

all other drivers combined (NHTSA, 2006) which is a rate that is more than double that for

drivers who are 35 years and older (NTHSA, 2008a).

        International statistics indicate that young men are the most risky drivers in virtually

every country (Blockley and Hartley, 1995; Doherty, Andrey, and MacGregor, 1998). In 2008,

the fatal crash rate per 100,000 was three times higher for male drivers than for female drivers,

and male drivers accounted for 71% of all traffic fatalities (NHTSA, 2008b). Adolescent males

appear to be the most vulnerable population of drivers. Between 1997 and 2007, the number of

young male drivers between the ages of 15 and 20 involved in fatal automobile crashes

decreased only 3% while there was a decrease in the number of female teen drivers involved in

fatal crashes of 13% during the same ten year period (NHTSA, 2007). Is this dangerous behavior

in male adolescent drivers due to differences in sex, that is to say "the binary categories of 'male'

or 'female'," or to differences in gender which is "the beliefs that people hold about the

categories of men and women," (Archer and Lloyd, 2002, p. 17)?

1

Sex or Gender

Research suggests that the answer appears to fall in the domain of gender rather than sex differences. While a great deal of research points to the differences in risky driving between male and female drivers, there is evidence that risky driving might be the product of gender, not sex. Krahe and Fenske (2002) found that men who endorse the "macho" personality constellation of masculinity as measured by Mosher and Sirkin's Hyper-masculinity Inventory (1984) also report more aggressive driving behavior. It has also been found that drivers who report high levels of masculinity coupled with low levels of femininity also report the highest number of accidents and aggressive violations, while high levels of femininity appear to buffer the effects of masculinity on accidents and aggressive violations (Ozkan and Lajunen, 2005). Furthermore, when masculinity was activated by priming via masculine words being broadcast from the car radio, participants in a simulator study increased their driving speed significantly from the beginning of the simulation to the end as compared to priming with feminine or neutral words (Mast, Sieverding, Esslen, Graber, and Jancke, 2008). Finally, previous research studies conducted by the author found no differences between the sexes in self-reports of risky driving, but differences were found for gender (Sutton, 2008a; Sutton 2008b). Drivers who scored high in negative masculinity (unmitigated agency), reported significantly more risky driving, but those who scored high in positive masculinity (agency), positive femininity (communion), and negative femininity (unmitigated communion), did not.

Agency and Communion are broad constructs of gender that were first proposed by Bakan (1966). Agency is a focus on self and separation (Helgson & Fritz, 1999). It includes socially instrumental traits such as dominance, achievement, independence, competence, and self-confidence, and it has been associated with high self-esteem and low levels of distress. Thus,

agency is viewed as a positive masculine trait. Agency may also be linked to certain aspects of evolution. Humans were hunter-gatherer nomads during the time in which they were exposed to their environment of evolutionary adaptedness (EEA), the environment that produces a species' evolved tendencies, (Cosmides, Tooby, & Barkow, 1992; Tooby & Cosmides, 1990). As men competed against each other for partners with whom to procreate, and women found most attractive those men who could provide for their progeny, men evolved dispositions that favored competition, violence, and risk-taking, all skills that would make them excellent hunters, and thus, providers (Eagly & Wood, 1999). As a result, as society slowly evolved following the Neolithic Revolution and into the Industrial Age, men began to adopt social roles with greater power and status but less care-giving, including employment in predominantly male-dominated careers (which are agentic, in nature, and high-paying), and engaging in more assertive, independent behaviors (Wood & Eagly, 2000).

In contrast, communion is a focus on others and connectedness (Helgeson & Fritz, 1999). It includes expressive traits such as caring, kindness, gentleness, understanding, warmth, and helpfulness. Communion is associated with providing more support to others while perceiving that more reciprocal support is available. Thus, communion is viewed as a positive feminine trait. Communion may also be a function of evolution. During human EEA, women became highly invested in the long-term care of their progeny because of the protracted human developmental period, so they evolved a proclivity to nurture, a quality which was attractive to men who were seeking reproductive partners who were most likely to ensure the long-term health and survival of their progeny (Eagly & Wood, 1999). Thus, with the evolution of society, women began to adopt social roles with more care-giving but less power and status, including domestic roles and employment in predominantly female-dominated careers (which are

nurturing, by nature, but low-paying), yielding behaviors that are more communal and interpersonally facilitative (Wood & Eagly, 2000).

According to Bakan (1966), the healthy individual demonstrates a balance between agency and communion, more commonly referred to as androgyny. However, when agency exists in the absence of communion, or vice versa, agency and communion are said to be taken to the maladaptive and socially undesirable extremes of unmitigated agency (agency that is not mitigated by communion) and unmitigated communion (communion that is not mitigated by agency) (Helegson & Fritz, 2000). Unmitigated Agency is a focus on self to the exclusion of others, coupled with a negative view of others, and includes traits such as arrogance, hostility, cynicism, greed, egotism, and putting one's own interests ahead of others' (Helegson & Fritz, 1999). Thus, unmitigated agency is viewed as a negative masculine trait. However, unmitigated agency is not merely high agency coupled with low communion or a greater degree of agency; it is a separate construct. A person who scored high in agency but low in communion would be self-confident and independent but would not be emotional or aware of others' feelings. These characteristics are not equivalent to the traits of greediness, hostility and arrogance associated with unmitigated agency. Additionally, agency and unmitigated agency are correlated with different traits in the Big Five construct of personality (Helegson & Fritz, 2000). Agency is positively correlated with extroversion and conscientiousness and negatively correlated with neuroticism, while unmitigated agency is associated with neuroticism but negatively correlated to conscientiousness and extroversion. Unmitigated agency is also associated with Type A Personality, while agency is not (Helegson, 1990).

Unmitigated communion is a focus on others to the exclusion of self and includes traits such as being overly nurturing, intrusive, easily exploitable, and unable to say no (Helegson &

Fritz, 1999). Thus, unmitigated communion is viewed as a negative feminine trait. Again, unmitigated communion is not merely a combination of high communion and low agency. A person who scores high on communion but low on agency would be emotional, passive, helpful, kind and aware of others' feelings but would not be independent, competitive, or self-confident. However, this is not the same as putting others' needs ahead of one's own or becoming overly involved in others' problems. In the Big Five construct, communion is positively associated with extroversion and conscientiousness (Helegson & Fritz, 1998). Although communion is positively correlated with agreeableness, the correlation between unmitigated communion and agreeableness is modest, at best, and accounted for by the overlap between communion and unmitigated communion (Helegson & Fritz, 2000).

Another feature of unmitigated agency and unmitigated communion that distinguishes them from agency and communion is their associations with negative relationship and health problems. In relationships, people who are high in unmitigated communion have problems because they are perceived to be intrusive into other people's private affairs. People who are high in unmitigated agency have problems in relationships because they are perceived to be cruel and uncaring. Unmitigated agency is also associated with undesirable externalizing behaviors that include academic misconduct and fighting (Spence, Helmreich, & Holahan, 1979).

Agency is associated with desirable health behaviors including increased physical activity and healthier eating habits, and following an illness, people who score high in communion are the most likely to seek help (Danoff-Burg, Mosher, & Grant, 2006). However, high levels of unmitigated communion are associated with undesirable health behaviors such as smoking and drinking (McCreary, Newcomb, & Sadava, 2006). Unmitigated agency is also related to such adverse health behaviors as risky sex, drug use, alcohol over-consumption, alcohol abuse, and

most relevant to the current study, risky driving (McCreary, et al., 2006). In fact, according to one study, individuals who scored high on unmitigated agency frequently reported driving in excess of the speed limit by 20 miles, or more (Danoff-Burg, et al., 2006). This relation is important for young drivers because according to the NHTSA, 16-year-old drivers have a higher rate of crashes in which excessive speed is a factor (NHTSA, 2006).

Of course, the ideal is for someone to exhibit the characteristics of both genders, to be androgynous. Traditionally, androgynous individuals are believed to be more adept at a wide variety of tasks regardless of the sex with which that task is associated (Bem, 1975). It has been reported that androgynous individuals are more socially skillful (Campbell, Steffan, & Langmeyer, 1981), have greater friendship competency, higher global self-worth, and are more scholastically capable (Rose & Montemayer, 1994). However, because androgynous people are more sensitive to both masculine and feminine cues, they may also be more prone to respond with more negative masculine and feminine traits as well as more positive ones. Thus, a distinction may also be made between individuals who are positively androgynous, exhibiting both high agency and high communion, and those who are negatively androgynous, exhibiting both high unmitigated agency and high unmitigated communion. People who are high in positive androgyny demonstrate greater levels of functioning on measures of psychological health and well-being followed, in order, by those who exhibit high agency, high communion, high unmitigated agency, high unmitigated communion, and high negative androgyny (Woodhill & Samuels, 2003). Therefore, it is not global androgyny but positive androgyny that predicts the potential to live the more complete life first envisioned by Bem (1975).

For purposes of this study, gender differences rather than sex differences in risky driving behavior were examined. Because previous studies conducted by the author utilizing this same

6

population base, have shown no differences in risky driving based on sex, differences were expected based on gender (Sutton, 2008a; Sutton 2008b). Unmitigated agency is the only gender construct that has been linked with risky driving across several studies; thus, this is the gender relation that was examined (McCreary, Newcomb, & Sadava, 2006; Sutton 2008a; Sutton 2008b).

Video Games

There are, of course, environmental influences on adolescent risk-taking in driving. One important influence may be exposure to risky or aggressive driving through video games. Since Bandura's earliest studies, research has demonstrated that children will imitate aggressive behavior that has been modeled for them, both within the presence of that model (Bandura & Huston, 1961) and in a new setting in which the model is absent (Bandura, Ross, & Ross, 1961). Moreover, there is evidence that viewing aggressive acts on film increases aggression immediately following exposure (Comstock, 1980; Geen 1983; Geen & Thomas, 1986) and that this aggression can be directed towards a surrogate object (Bandura, Ross, & Ross, 1961; Bandura, Ross, & Ross, 1963a: Bandura, Ross, & Ross, 1963b) or even towards peers (Bjorkqvist, 1985; Josephson, 1987). Additionally, a longitudinal study over a fifteen year period (1977-1992) revealed that exposure to television violence in childhood predicts aggressive behavior in adulthood even when socioeconomic status, intelligence, and parenting are controlled for (Huesmann, Moise-Titus, Podolski, & Eron, 2003). Manifestations of aggression differ across the sexes. Parental report of violent media exposure is associated with physical aggression in male children in a school setting and with relational aggression in female children (Ostrov, Gentile, & Crick, 2006). Risk-taking behaviors in adolescents such as drinking, drunk

driving, vandalism, trespassing, truancy, drug use, and reckless driving have also been linked to violent television viewing (Krcmar & Greene, 2000).

With the advent of video game play as a readily accessible form of entertainment, research has begun to focus on the effects of this relatively new form of media. Of course, there are positive aspects to playing video games. People who play video games that utilize action demonstrate improvement in their visual abilities, which may translate into increased awareness of their surroundings, as well as possible improvements in certain forms of visual impairment and even enhanced military training (Green & Bavelier, 2003). Laparoscopic surgeons who played video games for three or more hours per day in the past were 27% faster and had 37% fewer errors than their colleagues who did not play games, while those who were currently playing video games were 24% faster and had 32% fewer errors (Rosser, Gentile, & Crick, 2007). Video game play can also improve cognition and problem-solving skills. "Expert players performed better than novice players on problem representation, efficiency of strategies, and meta cognition" (Zhang, Shen, Luo, Su, & Wang, 2009, p. 772).

Additionally, there are both social and prosocial aspects to video game play. Sixty five percent of teens play games while someone is in the room with them, and 76% play with someone else at least some of the time (Pew Internet & American Life Project, 2008). While playing with others, 76% of teens report helping others in the course of the game, 85% report witnessing other players being helpful or generous during the game, and of those teens who have witnessed others exhibiting behaviors that they labeled "mean," "overly aggressive," "hateful," "sexist," or "racist," nearly three-fourths have also witnessed another player asking the aggressor to cease (Pew Internet & American Life Project, 2008). Furthermore, video game play has been linked to civic and political outcomes in adolescent game players. Sixty five percent of game

players search online for political information, as opposed to 60% of non-players; 64% of players have raised money for charity, as opposed to 55% of non-players; and 26% of players have tried to persuade others to vote in elections, as opposed to 19% of non-players (Pew Internet & American Life Project, 2008).

However, there are also negative consequences of exposure to violence in video games for children and teens. Although the research at this point appears somewhat mixed (Southwell & Doyle, 2004), results of a meta-analysis indicate that violent video games do increase aggressive behavior in both children and adolescents (Anderson & Bushman, 2001). And, the effects of video game play may be much more pronounced for adolescents than adults, especially for males. Video game play is a ubiquitous occurrence in American teenage life with 97% of all adolescents between 12 and 17 reporting that they play some kind of video game (Pew Internet & American Life Institute, 2008). While female online game players who are over 18 years of age outnumber adolescent male players who are under 17 years (Williams, Consalvo, Caplan, & Yee, 2009), online adolescent game players between 12 and 17 years are still slightly more likely to be male than female (Pew Internet & American Life Institute, 2008). Ninety-nine percent of all adolescent males polled by the Pew Institute and American Life Institute (2008) have reported playing console, online or cell phone games while 94% of adolescent females claimed to have played such games. Adolescent male game players are likely to sacrifice their school work to play and to cite violence as their favorite aspect of a game (Griffiths, Davies, & Chappell, 2004). In one survey (Olsen, et.al, 2007), half of the respondents aged 12 to 14 years played a game rated M (for mature audiences aged 17 or older) on a regular basis; of those respondents, 67.9% were boys. Additionally, one third of the male respondents reported playing games nearly every day, and one in eight reported playing more than 15 hours per week. There is fMRI evidence that

9

playing games with elevated virtual violence results in activation of neural pathways that are commonly triggered for aggressive cognition and behavior and that neural pathways stimulated during highly immersive virtual environmental experiences are parallel to those activated during real experiences (Weber, Ritterfield, & Mathiak, 2006).

Furthermore, there is some evidence that video game playing affects adolescents' driving habits. Today's video games continually strive to provide highly realistic and authentic experiences that differ as little as possible from reality, a concept referred to as "presence" in which players are immersed in an interactive episode to such a degree that they begin to feel that they are actually engaging in the experience; they report a feeling of actually being there (Lee, 2004). In seeking to achieve "presence," graphics in new video gaming systems such as Play Station 3 and X-Box 360 have improved dramatically. Video games such as *Grand Theft Auto* and *Need for Speed* feature street races, car chases, running over pedestrians, crashes, and eluding the police in an extremely realistic fashion, in some cases as part of the game's objective or for the acquisition of rewards. In-depth interviews with young male drivers who participate in illegal street races reveal that "racing" video games play an important role in their driving-related socialization of street racing behavior (Kubitzki, 2004). Additionally, the Pew Internet and American Life Project has found that the most popular category of video games played by teens are "racing" games, which include circuit racing games such as *NASCAR* and *Gran Turismo* and street racing games like *Need for Speed* and *Burnout*, with 74% of teens reporting having played these games (2008).

Teens who report more physical aggression are more likely to play "racing" video games, which is associated with more favorable attitudes towards driving as a form of excitement and fun. This preferential affect, in turn, positively predicts intention to engage in this type of driving

10

in the future (Beullens, Roe, & Van den Bulck, 2008). This connection between aggression and

risky driving warrants an examination of the effect of violent video game exposure and risky

driving behavior.

However, frequent play of "racing" games is positively associated with competitive

driving and car crashes and negatively associated with cautious driving (Fischer, Kubitzki, Guter

& Frey, 2007). Players of these games also report greater accessibility to favorable cognitions

and affect towards risky driving and are more likely to take greater risks in computer simulations

of traffic situations. (Fischer, et al., 2007). Thus, the investigation of a connection between

driving games which lack an aggressive or violent component and actual risky driving behavior

is also in order. In fact these two studies imply that non-violent racing games may have a greater

impact than violent games, racing or otherwise.

Moral Disengagement

Of course, playing violent video games cannot possibly account for risky adolescent

driving alone. There are countless teens playing such games whose behavior has not manifested

as aggression or risk-taking. Perhaps Bandura's theory of moral disengagement (1986) can be

instrumental in clarifying this relationship. Across a series of studies, Bandura has outlined the

process by which individuals accept, permit, and even defend what would otherwise be

unacceptable behaviors by means of moral disengagement (Bandura, 1986, 1991, 1999, 2001,

2002a). Essentially, through the process of moral disengagement, people are able to make

excuses for inflicting harm or suffering onto others while maintaining a clear conscience

(Grussendor, McAlister, Sandstrom, Udd, & Morrison, 2002). As stated by Bandura, "It (moral

disengagement) may focus on agency of action so that perpetrators can minimize their role in

causing harm by diffusion and displacement of responsibility. It may involve minimizing or

distorting the harm that flows from detrimental actions; and the disengagement may include dehumanizing and blaming victims of the maltreatment," (Bandura, 2002b, p. 102). This action occurs in an attempt to justify one's reprehensible actions to avoid self-recrimination by representing behavior as morally justifiable and both personally and socially acceptable (Bandura, 1991).

Moral disengagement has been linked to criminal behavior in children and adolescents. Bandura, Barbaranelli, Caprara, and Pastorelli (1996) found that it was related to delinquent behavior in a sample of 10 to 15 year olds both directly and through reduced feelings of guilt, lowered prosocial behavior and heightened propensity to aggression; similar results were found for aggressive behavior. Another study found that youthful offenders aged 16 to 21 utilize moral disengagement to a higher degree than the general population and that it exerts an influence on delinquent behavior above and beyond the social characteristics of youthful offenders (Kiriakidis, 2008).

Sex differences have also been noted in moral disengagement. It has been found that males are more likely to morally disengage than females (Bandura, et.al., 1996; McAlister, Bandura, Morrison, & Gussendorf, 2003), and that males are more likely to produce aggressive thoughts while disengaging (Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001.) Thus, any connection of moral disengagement to unmitigated agency warrants closer scrutiny. It has been suggested that one should be able to correlate moral disengagement, as measured by Bandura's Moral Disengagement Scale, with exposure to or enjoyment of certain types of media (Raney, 2004). Amount of violent media exposure has been demonstrated to be related to levels of aggression (Anderson & Bushman, 2001; Anderson, Carnagey, & Eubanks, 2003; Anderson & Dill, 2000; Colwell & Payne, 2000; Dill & Dill, 1998; Huesmann & Miller, 1994; Huesmann,

et.al., 2003; Rubin, West, & Mitchell, 2001; Took & Weiss, 1994), and the more one is exposed to violent media the more it is enjoyed and, thus, sought out (Richmond & Wilson, 2008).

However, moral concerns about the violence that a player encounters can undermine enjoyment of playing violent video games, suggesting that cognitive moral reasoning, in the form of moral disengagement, is involved in the processing of game content (Klimmit, Schmid, Nosper, Hartmann, & Vorderer, 2006). Yet, players of violent video games do not appear to experience any moral concern for the violence that they inflict on others in video games, and some players even express a heightened level of enjoyment when simulating the killing of people over animals with simulated real weapons (as opposed to using something like snowballs). Not surprisingly, a connection has been found between interpretations of greater violence in video games and higher scores on Bandura's Moral Disengagement Scale (Chory-Assad, Taylor, & Lewis, 2008).

Richmond and Wilson (2008) examined the possibility that the relationships between frequent exposure to violent media (music, movies, and video games), enjoyment of violent media, and increased levels of aggression are mediated by moral disengagement. It was found that moral disengagement partially mediated the relationship between frequent exposure to and enjoyment of violent media, and it fully mediated the relationship between frequent exposure to violent media and increased levels of aggression. Enjoying violent media led to more exposure to it. As the frequency of exposure increased, a greater degree of moral disengagement was activated. This process also resulted in an increase in levels of aggression.

There are certain aspects of risky driving that include aggression, particularly those that involve engaging in acts of revenge against other drivers in response to perceived slights. Other driving behaviors such as driving while intoxicated or tired, engaging in distracting activities

13

such as talking on the cell phone or texting while driving, and even speeding also put others at risk. But, despite the apparent hazard that these behaviors present, they seem to occur frequently. Drivers who exhibit these behaviors might be engaged in some form of cognitive distortion, or moral disengagement, which would occur in order to facilitate what is known to be dangerous behavior, both to self and others. People who play violent video games, especially male players, are also more likely to morally disengage, as well as become more aggressive (Chory-Assad, Taylor, & Lewis, 2008). Therefore, the relation of violent video game play on risky driving in adolescent male drivers should be examined as a function of moral disengagement.

The purpose of this study is to examine the relations of unmitigated agency and video game exposure to risky driving behavior. The effect of moral disengagement on these relations will also be examined. It is expected that risky driving behavior is a function of both unmitigated agency and violent video game exposure but that these effects are mediated by moral disengagement.

Hypotheses

Both unmitigated agency and video game exposure will be examined as predictors of risky driving behavior. It is expected that unmitigated agency will predict risky driving (H1) and that moral disengagement will mediate this relation (H2) (Figure 1). It is also anticipated that violent video game exposure will predict risky driving behavior (H3), but that moral disengagement will also mediate this relation (H4) (Figure 2). In order to thoroughly investigate these associations both risky driving behavior and video games exposure will be disaggregated. In addition to a total composite score for risky driving, subcategories will be examined including aggressive violations, ordinary violations and mistakes. Video game exposure will be broken down according to video game categories including all violent video games, all driving video games, street racing games, circuit racing games and violent/driving games.

Methods

Participants

Three hundred and one licensed drivers (162 female and 139 male) from the University

of Alabama Psychology Subject Pool completed an online survey consisting of several scales.

The vast majority of students in the sample population (86.4%) ranged in age from 17 to 22

years, which falls within the age group of most interest (late adolescent and young adult).

Consent was obtained before participants began the online survey and debriefing was

provided after the survey was completed. If participants had any questions or concerns, they had

the ability to contact the researcher via e-mail. The surveys took approximately an hour to

complete, and participants received one credit towards their Psychology 101 participation

requirement.

Measures

Unmitigated agency. The first scale that was administered was the extended version of

the Personal Attributes Questionnaire (EPAQ) (see Appendix A) developed by Spence,

Helmreich, & Holahan (1979). This scale contains subscales that measure agency, unmitigated

agency, and communion. There is a subscale in the EPAQ for unmitigated communion, but its

validity has been questioned. Thus, a scale for unmitigated communion developed by Fritz &

Helgeson (1998) has been commonly substituted, as is the case, here. All together, there were 32

items in which participants are asked to rate how accurately each of the statements describes

them on a scale ranging from "1 = not at all like me" to "5 = very much like me." The 32 items

are then divided into four subscales to obtain a score for agency, unmitigated agency, communion, and unmitigated communion by averaging all scores in that category. Higher scores indicate a greater degree of that particular trait. The EPAQ has a demonstrated history of high test-retest validity and Cronbach's α of .7 to .8. In this case, Cronbach's α for the subscales is as follows: agency subscale α = .793, communion subscale α = .79, unmitigated agency α = .79. There is also high test-retest validity for the Fritz & Helgeson Unmitigated Communion Scale with Cronbach's α of .7 to .8. In this case, unmitigated communion α = .77. Based upon previous research in which unmitigated agency was the only predictor of risky driving behavior (McCreary, Newcomb, & Sadava, 2006; Sutton, 2008a; Sutton 2008b), the only gender trait examined in this study was unmitigated agency.

  Violent video game exposure. The next scale that was administered was a revised version of the Video Game Violence Scale that was originally devised by Anderson and Dill (2000). In the original scale, participants listed their five favorite video games and rated the violence of the content and graphics as well as how often they played the game in the same manner as the following description. However, in an effort to be as inclusive of all types of video games as possible, the original scale was adapted to include several video gaming categories. In the measure created for this study (Appendix B), video games were divided into fourteen categories, seven violent and seven non-violent, with the names of specific video games provided in each category as examples. Violent categories included first-person shooter (in which players shoot others in the game, and their viewpoint is from the sightline of the weapon), third-person shooter (in which players shoot others in the game, and their viewpoint is from behind the shooter, so that they can see their own character), street racing (in which players must engage in illegal and dangerous moves to win street races and then evade the police), horror (in which players

encounter supernatural beings or situations, usually involving the "undead"), fighting (in which players engage in hand-to hand combat), combat (in which players simulate war), and violence/driving (in which players must drive to and from checkpoints in an aggressive fashion to be able to engage in violent acts such as assassination or drug dealing, all the while evading the police). There was an additional driving category relevant to this study that was labeled as non-violent, circuit racing (in which players race other vehicles on a closed track while following preset rules and trying to avoid collisions to win a race). Participants were asked to rate how violent they thought the content (the plot, objective, goal) of each category was on a scale ranging from "1 = little or no violent content" to "7 = extremely violent content." They were also asked to rate the violence of graphics (what they see and hear) from "1 = little or no violent graphics" to "7 = extremely violent graphics." Participants were also asked to rate how often they play each game category on a scale ranging from "1 = rarely" to "4 = occasionally" to "7 = often." To calculate a score of violent video game exposure using the method devised by Anderson and Dill, the violent content ratings and violent graphics ratings are added; then the sum is multiplied by the frequency of play score. Higher scores indicate greater video game violence exposure. A composite score for overall violent game exposure was created by averaging the scores for all seven violent game categories. Cronbach's α for this scale was .88. A composite score for driving games was also created by averaging street racing, circuit racing, and violence/driving scores. While the objective of the violent/driving category is not strictly driving, it is used extensively throughout the game to accomplish game objectives, and the driving that occurs is often violently aggressive and highly illegal. Cronbach's α for all three categories was .51, but when Cronbach's α was run for the two racing categories, exclusively, that value rose to .77. Each of the three categories from which the composite was calculated was

also individually examined. Both the street racing and violent/driving categories were from the list of violent games while the circuit racing category was from the list of non-violent games.

Risky driving behavior. The next measure that was administered was a modified version of the Manchester Driver Behavior Questionnaire (DBQ) used by Lajunen, Parker, and Summala (2004), which was originally devised by Reason, Manstead, Stradling, Parker, Baxter and Campbell (1991). The scale administered in this study (Appendix C) altered some of the verbiage of the version modified by Lajunen, et al. Phrases such as "queuing up to turn onto a main road" and "pulling out of a junction" were changed to "merging onto a highway" and "pulling out into an intersection" so as to "Americanize" them and make them more understandable. The modified DBQ used in this study consisted of 27 items in which participants rated how often they engaged in certain driving behaviors on a six-point scale ranging from "1 = never" to "6 = nearly all the time," with higher scores indicating a greater degree of risky driving behavior. All responses were averaged to determine an overall score of risky driving behavior with higher scores indicating more risk. Cronbach's α for the overall risky driving behavior scores was .90. Additionally, the 27 items are commonly divided into four subscales to obtain a score for aggressive violations (deliberate deviations from accepted safe driving practices that carry with them some interpersonally aggressive component), ordinary violations (deliberate deviations from accepted safe driving practices that lack specifically aggressive intent), errors (mistakes in driving), and lapses (attention and memory failures that, while potentially embarrassing, are not likely to impact safe driving) by averaging the scores for all questions in that particular category. Cronbach's α values for the subcategories were as follows: for aggressive violations α = .77, for ordinary violations α = .83, for errors α = .77, and for lapses α = .71. For the purposes of this study, aggressive violations, ordinary violations, and errors were

examined. Because lapses are associated more with passive accident involvement, as seen in the elderly, these scores were not considered.

Moral disengagement. The final scale that was administered was Bandura's Moral Disengagement Scale (Appendix D) developed by Bandura, et al. (1996) which measured disengagement from moral self-sanctions. It consisted of 32 items in which participants were asked to rate the degree to which they agree or disagree with each of the statements on a five point Likert scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree," with higher scores indicating a greater degree of moral disengagement. Responses were averaged to form an overall composite score of moral disengagement. Cronbach's α for this scale was .90.

Design

For H1, the predictor variable was unmitigated agency and the outcome variable was risky driving behavior as measured by the DBQ. Additionally, the subcategories of risky driving behavior were examined as outcomes, including total violations, aggressive violations, ordinary violations and mistakes, because these have been determined to be associated with crashes (Lajunen, et al., 2004). Once a relation between the predictor and the outcomes was established, moral disengagement was examined as a mediator between each relation(H2).

For H3, the predictor variable was video game exposure and the outcome variable was risky driving behavior as measured by the DBQ. Once again, each of the categories of the DBQ used in the previous regressions was used for the outcome variable in separate regression analyses. In addition to overall violent video game exposure, composite driving game exposure, consisting of street racing games, circuit racing games, and violence/driving games, was also examined as a predictor, as were each of these subcategories, independently. Again, once a

relation between the predictor and the outcome was established, moral disengagement was examined as a mediator between the two (H4). All participants were measured on all variables.

Procedure

Participants answered each question for the four online surveys by clicking on their choice of answers which were presented in numerical scales for each measurement on the survey. Conducting the study online was highly efficient and reduced the likelihood of data input errors. There may be some question regarding the use of an online format versus a traditional, direct pencil and paper format, but it has been found that, "Internet findings…are not adversely affected by non-serious or repeat responders, and are consistent with findings from traditional methods," (Gosling, Vazire, Srivastava, & John, 2004, p. 93). It is just as likely that a student would carelessly and quickly answer survey questions in a paper and pencil format as online.

Results

Means and standard deviations for all variables by sex are presented in Table 1, along with the results for independent samples *t*-tests comparing the sexes on each variable. There was no difference between male and female participants on any measure of risky driving behavior; thus, sex is not a predictor of risky driving.

Correlations between predictors and outcomes are presented in Table 2. Unmitigated agency was significantly positively correlated with each measure of risky driving behavior. Violent video game exposure was not significantly correlated with either ordinary violations or mistakes on the DBQ. Likewise, violent/driving games were not significantly correlated with either ordinary violations or mistakes. Otherwise, all video game categories were significantly correlated with all measures of risky driving behavior, with the strongest positive relations being between circuit racing and total risky driving, aggressive violations, and mistakes.

Correlations between all predictor variables are presented in Table 3. Correlations between all outcome variables are presented in Table 4. Correlations between the mediator and all predictor variables are presented in Table 5. Correlations between the mediator and all outcome variables are presented in Table 6.

Hypothesis 1

To examine the ability of unmitigated agency to predict risky driving behavior as measured by the DBQ (H1), regression analyses were conducted with the independent variable (unmitigated agency) entered into the model as the predictor and the dependent variable (risky driving behavior) entered as the outcome. A separate regression was conducted for each of the four measures of risky driving behavior as outcomes: total risky driving behavior, aggressive

22

violations, ordinary violations, and mistakes. Results are presented in Table 7 under the column labeled, "C-Path" which represents the direct relation between unmitigated agency and risky driving behavior. Unmitigated agency significantly predicted all four measures of risky driving behavior; thus, in all cases, H1 was supported.

Hypothesis 2

To examine moral disengagement as a mediator of the relation between unmitigated agency and risky driving behavior (H2), mediation analysis was conducted using the method presented by Baron and Kenny (1986). The first step is to establish a relation between the independent variable (unmitigated agency) and dependent variable (risky driving behavior) using regression. As previously reported, results for the first step are presented in Table 7 under the column labeled, "C-Path." In the case of all four outcomes, significant relations were established.

The second step is to establish a relation between the independent variable (unmitigated agency) and the mediator (moral disengagement) using regression. These results, presented in Table 7 under the column labeled, "A-Path," show a significant relation between unmitigated agency and moral disengagement.

The final step is to conduct a third hierarchical regression with the independent variable (unmitigated agency) entered into the model as a predictor at step one and the mediator (moral disengagement) entered into the model as a predictor at step two and the dependent variable (risky driving behavior) entered into the model as the outcome. Regressions were conducted for each of the four outcome variables. The ability of the mediator to predict the dependent variable with the independent variable in the model is presented in Table 7 under the column labeled "B-Path." In all four cases, there was a significant relation between moral disengagement and measures of risky driving behavior.

Because significance was established in each of the previous pathways, the ability of the independent variable to predict the dependent variable with the mediator in the model was examined. Results are presented in Table 7 under the column labeled, "C'-Path." The existence of mediation can be established if the association between the independent variable and the dependent variable is reduced when the mediator is added to the regression model. If the predictive ability of the independent variable is reduced to non-significance, there is full mediation, but if statistical significance remains, there is partial mediation. In the case of all four outcomes, the relations between unmitigated agency and each measure of risky driving behavior was reduced when moral disengagement was put into the model, but the p-value remained below the established significance level of .05.

A Sobel test (1982) for each of the mediation analyses was conducted to determine if the reductions in regression coefficients between the C-Paths and the C'-Paths were significant. Results for the Z-scores for each of the Sobel tests are presented in Table 7 under the column labeled, "Sobel Test Z." In all four cases, the Z-scores for the Sobel tests were significant, indicating a significant reduction in β between the C-Path and the C'-Path and thus, mediation. However, because the regression coefficients remained significant, mediation was only partial. Therefore, H2 was partially supported. The ability of unmitigated agency to predict the four measures of risky driving behavior was partially explained by moral disengagement.

Hypothesis 3

To examine the ability of video game exposure to predict risky driving behavior as measured by the DBQ (H3), regression analysis was conducted with the independent variable (exposure to video game category) entered into the model as the predictor and the dependent variable (risky driving behavior) entered as the outcome. A separate regression was conducted

24

for each of the five video game categories (all violent games, all driving games, circuit racing games, street racing games, and violent/driving games) as predictors against each of the four measures of risky driving behavior (total risky driving behavior, aggressive violations, ordinary violations, and mistakes) as outcomes for a total of twenty separate analyses. Results are presented in Table 8 under the column labeled "C-Path." Exposure to all violent games did not significantly predict ordinary violations or mistakes. Likewise, violent/driving game exposure did not significantly predict ordinary violations or mistakes. These relations are also reflected in the correlation matrix presented in Table 1. Otherwise, exposure to all remaining video game categories significantly predicted each of the measures of risky driving behavior. Thus, for the most part, H3 was supported.

Hypothesis 4

To examine moral disengagement as a mediator of the relation between violent video game exposure and risky driving behavior (H4), mediation analysis was again conducted using the method presented by Baron and Kenny (1986). As previously reported, results for the first step are presented in Table 8 under the column labeled, "C-Path." Significant relations were established for all video game categories and measures of risky driving behavior with the exceptions of all violent video game exposure and violent/driving game exposure against ordinary violations and mistakes. Because initial relations between the independent variable and the dependent variable were not established in the C-Path for these two video game categories and these two measures of risky driving behavior, mediation could not be tested.

Second, the relation between the independent variable (exposure to video game category) and the mediator (moral disengagement) was examined using regression. Results are presented in

Table 8 under the column labeled "A-Path." Each video game category significantly predicted moral disengagement.

Finally, a third hierarchical regression was conducted with the independent variable (exposure to video game category) entered into the model as the predictor at step one and the mediator (moral disengagement) entered into the model as the predictor at step two and the dependent variable (risky driving behavior) entered into the model as the outcome. A separate regression was conducted for each of the five video game categories against each of the four measures of risky driving. The ability of the mediator to predict the dependent variable with the independent variable in the model is presented in Table 8 under the column labeled "B-Path." In all cases, there was a significant relation between moral disengagement and measures of risky driving behavior.

The ability of the independent variable to predict the dependent variable with the mediator in the model was examined. Results are presented in Table 8 under the column labeled "C'-Path." When moral disengagement was placed in the model, the following regression coefficients were reduced and they became statistically non-significant, with p-values above .05, thus indicating full mediation: exposure to all violent games predicting total risky driving, exposure to all driving games predicting ordinary violations, exposure to street racing games predicting ordinary violations, and exposure to violent/driving games predicting total risky driving. In each of these cases, the ability of exposure to these particular categories of video games to predict these particular measures of risky driving behavior are fully explained by moral disengagement. Because initial relations between the independent variable and the dependent variable were not established in the C-Path for all violent video game exposure and violent/driving game exposure against both ordinary violations and mistakes, mediation could

26

not be established. For all remaining video game categories, regression coefficients between the

C-Paths and the C'-Paths were reduced but remained significant, thus indicating partial

mediation. So, the ability of each of these video game categories to predict measures of risky

driving behavior is at least partially explained by moral disengagement.

A Sobel test (1982) for each of the mediation analyses was conducted to determine if the

reductions in regression coefficients between the C-Paths and the C'-Paths were significant.

Results for the *Z*-scores for each of the Sobel tests are presented in Table 9 under the column

labeled, "Sobel Test *Z*." In all cases, the *Z*-scores for the Sobel tests were significant, thus

indicating mediation. H4 was partially supported.

Discussion

Because there are no differences in any measure of risky driving behavior between male and female drivers, risky driving variability may not be a function of sex. This finding appears to contradict prior research reporting that young males are consistently found to be the most risky drivers in virtually every country (Blockley and Hartley, 1995; Doherty, Andrey, and MacGregor, 1998, Ozkan & Lajunen, 2005). However, this study, coupled with other recent research (Sutton 2008a; Sutton, 2008b) in which there were no differences found in risky driving behavior based on sex, suggests a possible reversal of this trend. Risky driving is becoming a universal activity regardless of sex, and young women, in particular, are closing the gap. Between 1992 and 2002, the fatality rate for male drivers involved in automobile crashes rose by 15%, while the fatality rate for female drivers increased by 42% (NTHSA, 2002). The cause for this increase is unclear. Perhaps it is because female teens are driving 70% more than 20 years ago (NTHSA, 2002). Perhaps the women's movement has led to more masculine behavior and attitudes in women than observed in previous cohorts. Examination of this increase in female crashes is an intriguing and important direction for research in this field.

Results for H1 also reinforce the assertion that risky driving behavior may be a function of gender rather than sex. For all four measures of risky driving behavior, unmitigated agency was found to be a significant predictor. This finding is supported in previous studies of the effects of sex and gender on risky driving behavior in which no sex difference was found for risky driving, but unmitigated agency was found to be a significant predictor of risky driving behavior (Sutton, 2008a; Sutton 2008b).

Results for H2 indicated that moral disengagement partially explained the relation between unmitigated agency and risky driving behavior. The addition of moral disengagement to the model increased the variance explained in total risky driving from 9% to 14%. Total risky driving was disaggregated into aggressive violations, ordinary violations and mistakes because it was anticipated that moral disengagement might exert a greater mediation effect for aggressive violations than for ordinary violations or mistakes, which proved to be partially true. While the addition of moral disengagement resulted in some difference between aggressive violations and ordinary violations, any difference between aggressive violations and mistakes was barely evident. Furthermore, the model containing mistakes explained slightly more variance than the model containing ordinary violations. Since ordinary violations encompass such intentional behaviors as speeding, tailgating and running red lights, and mistakes include such accidental behaviors as failing to notice various aspects of one's surroundings, underestimating the speed of oncoming traffic and braking too quickly on a wet road, it is logical to suppose that moral disengagement would exert greater mediation for ordinary violations than for mistakes. Therefore, the results for mistakes are difficult to interpret.

In addition to other risk behaviors such as smoking and drinking (McCreary, et al., 2006), this study indicates that unmitigated agency is also a risk factor for risky driving behavior and that this relation is partially explained by moral disengagement. This is an important distinction to make when trying to generalize to the type of driver most likely to engage in dangerous driving and the possible effect that exposure to video games might have on that behavior. For hyper-masculine drivers who react to situations with negative masculine stereotypical behavior, risky driving can be partially explained by being able to make excuses for inflicting harm on others in order to maintain a clear conscience. An examination of the correlations between

predictors indicated that of all the video game categories, unmitigated agency was most highly related to all violent games, and in the mediation analysis in which unmitigated agency was included as a covariate, the only mediation that remained for all violent games was for aggressive violations. While relations and amount of variance explained remained stronger for the driving categories, it is possible that for teens that are high in unmitigated agency, exposure to violent video games may yield more aggressive violations.

Results for H3 were as expected. It was anticipated that exposure to video game categories in which driving was the primary focus (all driving games, circuit racing games, and street racing games) would exert the greatest influence on risky driving behavior. While it was anticipated that more violent games would predict aggressive driving behavior, such games were not expected to be strong predictors of less aggressive driving behaviors. Thus, it was no surprise that there was no relation between all violent games or violent/driving games and ordinary violations or mistakes. What was unexpected was that circuit racing games accounted for more variance in all types of risky driving behavior than street racing games, including aggressive violations. Because street racing games take place on streets and highways rather than closed tracks, they more closely simulate the conditions under which players would actually drive. Additionally, these games usually require the driver to engage in aggressive and illegal moves against other drivers to win. These two aspects were expected to elicit a greater relation between street racing games and risky driving behavior than circuit racing games, especially in aggressive violations. However, in every measure of risky driving, circuit racing games accounted for more variance in risky driving than street racing games. Perhaps this unexpected finding can be explained by the fact that some drivers use actual driving on the road as a proxy for driving on a race track to which most of them do not have any access. They view street racing as the only

available means by which they can practice and enhance their racing skills which could only be "truly" demonstrated on a closed circuit. Additionally, street racing games provide more impediments to the racing experience such as stopped cars, street lights, intersections, stop signs, etc., so these serve to make street racing feel like a less "realistic" racing experience than circuit racing might be anticipated to be. Street racing games might also provide a reminder, along with daily news stories and traffic reports, that racing on a street can prove to be dangerous in real life, but very few drivers have actual experience with track racing, so they have no true conception of how perilous it is. Therefore, players might assume that circuit racing is not as dangerous, and so they might be more inclined to take chances that they would not attempt in a street racing game.

Results for H4 were mixed. It was anticipated that mediation effects of moral disengagement would be stronger for aggressive violations than for ordinary violations or mistakes. However, when full mediation occurred it was only between exposure to a video game category and total risky driving or ordinary violations. There is no video game category for which moral disengagement fully mediated the relation between exposure to it and aggressive violations. Moral disengagement only partially explained the ability of any video game category to predict aggressive violations. In all cases, however, the regression coefficient between the mediator (moral disengagement) and the dependent variable (risky driving behavior) was the highest for the relation between moral disengagement and aggressive violations, indicating the strongest relation. So, taking this relation in isolation, moral disengagement predicts aggressive violations more than any other measure of risky driving. Because aggressive violations involve some conscious decision to engage in driving behavior that could put other drivers at risk, it is expected that moral disengagement would be most complicit in this type of violation so that the

31

driver maintains a clear conscience about jeopardizing others. This explanation is supported by previous research by Grussendor, et al. (2002); through the process of moral disengagement, people are able to make excuses for inflicting harm or suffering onto others while maintaining a clear conscience.

Once again, the unexpected findings were in the models for exposure to circuit racing games. There was no mediation model for which moral disengagement fully explained the relation between exposure to circuit racing games and any of the measures of risky driving behavior. However, the risky driving measure for which there was the greatest amount of variance explained by the mediation was total risky driving rather than aggressive violations. But, much more surprising, the amount of variance explained by the model for mistakes was almost equivalent to that for aggressive violations. Again, because aggressive violations are intentional and mistakes are accidental, it would stand to reason that the mediation effect on aggressive violations would be much greater than on mistakes. This finding is curious and difficult to explain.

In previous published work, Raney (2004) suggested that the relation of moral disengagement to video game play should be examined. As can best be determined, this is the first study to attempt to do that. Based on Bandura's research on modeling of aggressive behavior (Bandura and Huston, 1961; Bandura, et al., 1961), it would be safe to assume that the video games that utilize violence would produce the most aggressive behaviors and would be most mediated by moral disengagement. Anderson and Bushman's longitudinal study (2001) in which violent video games were demonstrated to increase aggression in adolescents would support these suppositions. As a result, the most aggressive driving behavior should be produced by exposure to the most violent video games. However, surprisingly, the opposite was found.

Video game categories in which violence was the prime feature, all violent games and violent/driving games, yielded the lowest regression coefficients and explained the least amount of variance in both mediation models for all four measures of risky driving behavior. The video game category that yielded the highest coefficients and explained the most variance was the least violent, circuit racing. This is an important finding for parents of teen drivers who also play video games.

Although violent video game exposure may be a risk factor for some forms of risky behavior, driving does not appear to be one of them. The Pew Internet and American Life Project (2008) indicated that racing games are considered to be the most popular video game category played by teens, and it has been established that frequent play of these games is positively associated with competitive driving and car crashes and negatively associated with driving carefully (Fischer, et al., 2007). However, in these instances all driving games were considered together. As can best be determined, this is the first study to disaggregate the various types of video game categories, which is an important innovation. Before this study was conducted, it was believed that street racing games would prove to be more dangerous than circuit racing games, that circuit racing games would be the least troublesome of any category. The results of this study actually indicate that the opposite is true, which is valuable information for parents to consider in deciding what gaming media to allow their children to consume.

Given all of the attention that has been focused on the effects of playing violent video games, parents are more heedful of their children playing them and are assisted in government and industry efforts to regulate their sale and play. However, games that are less violent, such as circuit racing games, are often ignored because they appear to be more innocuous. While it makes sense for parents to monitor play of violent games for other reasons, risky driving

33

behavior in their children does not seem to be one of them. This study indicates that parents need to concentrate their efforts on monitoring play of circuit racing games if their concern is the effect that playing video games might be having on their children's driving behavior. Circuit racing games give teens the opportunity to practice risky driving frequently in a highly realistic setting, sometime for several years before they are actually allowed to drive a car, thereby creating deeply ingrained attitudes and driving behaviors. Once they begin to drive, they are able to utilize these behaviors, sometimes on a daily basis. Given the frequency with which teens are exposed to driving, as compared to alcohol, drugs, violence or other threats to safety, the danger that risky driving behavior presents is much more ubiquitous.

One of the weaknesses of this study is that it relies fully on self report of risky driving behavior. This could be overcome by placing participants in a driving simulator, examining their driving records as a measure of real driving behavior, or even installing various recording devices in their cars to measure actual real-time driving behavior. Another possible weakness is using moral disengagement as the mediation variable. There are probably other personality variables that are also affecting the relation between unmitigated agency or video game exposure and risky driving behavior. Perhaps an examination of the mediation of some measure of psychopathy, sensation seeking, or one of the Big Five personality traits might be in order to more fully examine these relations. Finally, an argument can be made that there is a possibility for Type I errors to occur in the conduction of so many regression analyses, but this is always a possibility in using regressions. Unlike Bonferroni, Tukey, or LSD correction models utilized in ANOVA models to reduce Type I errors, there are no such conventions that exist for regressions (J. Leeper, personal communication, June 24, 2010). Additionally, over 80% of the regression analyses that were conducted were significant, a level that is still above chance. Had the video

34

game categories and the driving measures not been disaggregated, several interesting and previously unknown findings would have been ignored.

For the future, risky driving in women should be a focus of research. Female teens are driving 70% more than 20 years ago, and their crash rate has increased nearly three times as fast as for their male counterparts between 1992 and 2002 (NHTSA, 2002). Additionally, women already outnumber men in on-line video game play (Williams, Consalvo, Caplan, & Yee, 2009), and with 97% of all adolescents between 12 and 17 reporting that they play some kind of video game (Pew Internet & American Life Institute, 2008), the gap is closing for other forms of video games. In this study, both circuit racing and street racing were the only two video categories in which there was no significant difference in exposure based upon sex. Given the disturbing nature of the trend in crash rates for female teen drivers, the exacerbating effects of video game play should be examined for both sexes, not just males.

Additionally, while no main effect of sex on risky driving behavior was found in this study, moderation analysis should be conducted to determine if there is an interaction between sex and gender on risky driving behavior. It might also be interesting to investigate whether or not unmitigated agency is mediating the relation between video game exposure and risky driving behavior. If moderation analysis can determine an interaction between unmitigated agency and moral disengagement, this interaction term could also be utilized in a moderated mediation analysis. An examination of the correlations between predictors indicated that of all the video game categories, unmitigated agency was most highly related to all violent games; it is possible that for teens that are high in unmitigated agency, exposure to violent video games may yield more risky driving if there is an interaction between unmitigated agency and moral disengagement.

35

Finally, more research needs to be done regarding the parental role in teen driving. According to the Liberty Mutual Research Institute for Safety (2006), parents who set clear consequences for violating driving rules, and follow through with them, significantly reduce the likelihood that their teen driver will do so. This is an action that can be taken by parents regardless of whether their child plays video games, or not. Research also indicates that 75% of fathers and 63% of mothers report engaging in at least two distracting or dangerous driving behaviors when they drive a car and that 60% of high school students report that they believe that their parents are the greatest influence on their driving (Liberty Mutual Research Institute for Safety, 2009). Given all that we know about modeling from Bandura's research (Bandura, Ross, & Ross, 1961; Bandura, Ross, & Ross, 1963a: Bandura, Ross, & Ross, 1963b), further examination of the direct influence parental examples actually have on their children's driving behavior is more than warranted.

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Extended Self-Perception Survey

The items below inquire about what kind of person you think you are. Use the scale below ("very much like me" to "not at all like me") to determine the extent to which you feel each item describes **you**.
1 = Not at all like me
2 = Hardly like me
3 = Slightly like me
4 = Moderately like me
5 = Extremely like me

Agency, communion, and unmitigated agency (Spence et al.)

1.Independent	1	2	3	4	5
2. Emotional	1	2	3	4	5
3. Arrogant	1	2	3	4	5
4. Active	1	2	3	4	5
5. Devoted to others	1	2	3	4	5
6. Look out only for myself	1	2	3	4	5
7. Gentle	1	2	3	4	5
8. Helpful	1	2	3	4	5
9. Boastful	1	2	3	4	5
10. Competitive	1	2	3	4	5
11. Kind	1	2	3	4	5
12. Greedy	1	2	3	4	5
13. Aware of others' feelings	1	2	3	4	5
14. Make decisions easily	1	2	3	4	5
15. Hostile	1	2	3	4	5
16. Never give up easily	1	2	3	4	5
17. Egotistical	1	2	3	4	5
18. Self-confident	1	2	3	4	5
19. Dictatorial	1	2	3	4	5
20. Feel superior	1	2	3	4	5
21. Understand others	1	2	3	4	5
22. Stand up well under pressure	1	2	3	4	5
23. Cynical	1	2	3	4	5
24. Warm with others	1	2	3	4	5

The items below inquire about what kind of person you think you are. Use the scale below ("very much like me" to "not at all like me") to determine the extent to which you feel each item describes **you**.
1 = Not at all like me
2 = Hardly like me
3 = Slightly like me
4 = Moderately like me
5 = Extremely like me

Unmitigated Communion (based on Helgeson)

1.I place the needs of others above my own.	1	2	3	4	5
2. I cannot be happy unless others are happy.	1	2	3	4	5
3. When I am away, I worry about how those close to me are getting along without me.	1	2	3	4	5
4. I find myself getting overly involved in other people's problems.	1	2	3	4	5
5. I have great difficulty getting to sleep at night when someone close to me is upset.	1	2	3	4	5
6. I have difficulty satisfying my own needs when they interfere with the needs of others.	1	2	3	4	5
7. I am unable to say no when someone asks me for help.	1	2	3	4	5
8. Even when exhausted I will help a friend.	1	2	3	4	5

APPENDIX B

Violent Video Game Scale

For the following video game categories, please rate how often you play these types of games using the following scale (note – the list of games provided are just examples):

Rarely   Occasionally   Often
1   2   3   4   5   6
          7

1. First Person Shooter (Halo, Rainbow Six, Doom, Half-Life, Quake)	1	2	3	4	5	6	7
2. Third Person Shooter (GTA series, Gears of War, Resident Evil, Star Wars series, Tomb Raider, Metal Gear Solid, Hitman)	1	2	3	4	5	6	7
3. Role Playing (World of Warcraft, Everquest, Final Fantasy, Fable)	1	2	3	4	5	6	7
4. God-games (The Sims Series, Caesar, Civilization)	1	2	3	4	5	6	7
5. Street Racing (Need for Speed, Midnight Club, Burnout, Driv3r, Project Gotham)	1	2	3	4	5	6	7
6. Circuit Racing (Gran Turismo, Indianapolis 500, Nascar)	1	2	3	4	5	6	7
7. Fighting (Street Fighter, Virtual Fighting, Smackdown vs. Raw, Mortal Combat vs. DC)	1	2	3	4	5	6	7
8. Sports (Madden Football, NCAA Football, NBA, MLB)	1	2	3	4	5	6	7
9. Survival Horror (Resistance, Left for Dead, Silent Hill, Manhunt)	1	2	3	4	5	6	7
10. Party (Dance Dance Revolution, Rock Band, Guitar Hero)	1	2	3	4	5	6	7
11. Combat (Call of Duty, Command & Conquer, Brothers in Arms, Red Alert)	1	2	3	4	5	6	7
12. Puzzle (Tetris, Deal or No Deal, Who Wants to be a Millionaire, Brain Age, Trivial Pursuit, Rayman)	1	2	3	4	5	6	7
13. Violence/Driving (Grand Theft Auto Series, Driv3r, Mas Payne)							
14. Family Games (Trivial Pursuit, Deal or No Deal, Who Wants to be a Millionaire)							

For the following video game categories, please rate how violent you think the *content* of these types of games are using the following scale (note – the list of games provided are just examples):

Not at all   Extremely
Violent   Violent

1   2   3   4   5   6
          7

1. First Person Shooter (Halo, Rainbow Six, Doom, Half-Life, Quake)	1	2	3	4	5	6	7
2. Third Person Shooter (GTA series, Gears of War, Resident Evil, Star Wars series, Tomb Raider, Metal Gear Solid, Hitman)	1	2	3	4	5	6	7
3. Role Playing (World of Warcraft, Everquest, Final Fantasy, Fable)	1	2	3	4	5	6	7
4. God-games (The Sims Series, Caesar, Civilization)	1	2	3	4	5	6	7
5. Street Racing (Need for Speed, Midnight Club, Burnout,	1	2	3	4	5	6	7

Driv3r, Project Gotham)							
6. Circuit Racing (Gran Turismo, Indianapolis 500, Nascar)	1	2	3	4	5	6	7
7. Fighting (Street Fighter, Virtual Fighting, Smackdown vs. Raw, Mortal Combat vs. DC)	1	2	3	4	5	6	7
8. Sports (Madden Football, NCAA Football, NBA, MLB)	1	2	3	4	5	6	7
9. Survival Horror (Resistance, Left for Dead, Silent Hill, Manhunt)	1	2	3	4	5	6	7
10. Party (Dance Dance Revolution, Rock Band, Guitar Hero)	1	2	3	4	5	6	7
11. Combat (Call of Duty, Command & Conquer, Brothers in Arms, Red Alert)	1	2	3	4	5	6	7
12. Puzzle (Tetris, Deal or No Deal, Who Wants to be a Millionaire, Brain Age, Trivial Pursuit, Rayman)	1	2	3	4	5	6	7
13. Violence/Driving (Grand Theft Auto Series, Driv3r, Mas Payne)							
14. Family Games (Trivial Pursuit, Deal or No Deal, Who Wants to be a Millionaire)							

For the following video game categories, please rate how violent you think the *graphics* of these types of games are using the following scale (note – the list of games provided are just examples):

Not at all   Extremely
Violent   Violent

1   2   3   4   5   6

        7

1. First Person Shooter (Halo, Rainbow Six, Doom, Half-Life, Quake)	1	2	3	4	5	6	7
2. Third Person Shooter (GTA series, Gears of War, Resident Evil, Star Wars series, Tomb Raider, Metal Gear Solid, Hitman)	1	2	3	4	5	6	7
3. Role Playing (World of Warcraft, Everquest, Final Fantasy, Fable)	1	2	3	4	5	6	7
4. God-games (The Sims Series, Caesar, Civilization)	1	2	3	4	5	6	7
5. Street Racing (Need for Speed, Midnight Club, Burnout, Driv3r, Project Gotham)	1	2	3	4	5	6	7
6. Circuit Racing (Gran Turismo, Indianapolis 500, Nascar)	1	2	3	4	5	6	7
7. Fighting (Street Fighter, Virtual Fighting, Smackdown vs. Raw, Mortal Combat vs. DC)	1	2	3	4	5	6	7
8. Sports (Madden Football, NCAA Football, NBA, MLB)	1	2	3	4	5	6	7
9. Survival Horror (Resistance, Left for Dead, Silent Hill, Manhunt)	1	2	3	4	5	6	7
10. Party (Dance Dance Revolution, Rock Band, Guitar Hero)	1	2	3	4	5	6	7
11. Combat (Call of Duty, Command & Conquer, Brothers in Arms, Red Alert)	1	2	3	4	5	6	7
12. Puzzle (Tetris, Deal or No Deal, Who Wants to be a Millionaire, Brain Age, Trivial Pursuit, Rayman)	1	2	3	4	5	6	7
13. Violence/Driving (Grand Theft Auto Series, Driv3r, Mas Payne)							
14. Family Games (Trivial Pursuit, Deal or No Deal, Who Wants to be a Millionaire)							

APPENDIX C

Driving Behavior Questionnaire

For the following items, please indicate how often you engage in the following behaviors using the following scale:

1 = Never
2 = Hardly Ever
3 = Occasionally
4 = Often
5 = Frequently
6 = All the time

1. Hit something when backing-up that you had not previously seen. (4)	1	2	3	4	5	6
2. Intending to drive to one destination, you found yourself on the road to a different destination. (4)	1	2	3	4	5	6
3. Get into the wrong lane when approaching an intersection or exit. (4)	1	2	3	4	5	6
4. Merging onto a highway, you pay such close attention to the main stream of traffic that you almost hit the car in front of you that is also trying to merge. (3)	1	2	3	4	5	6
5. Fail to notice pedestrians crossing the street when turning onto a side street from the main road. (3)	1	2	3	4	5	6
6. Sound your horn to indicate your annoyance to another driver. (1)	1	2	3	4	5	6
7. Fail to check your rear-view mirror before pulling out, changing lanes, etc. (3)	1	2	3	4	5	6
8. Break too quickly on a slippery road or steer the wrong way into a skid. (3)	1	2	3	4	5	6
9. Pull so far out into an intersection that the driver with the right of way has to stop to let you in. (2)	1	2	3	4	5	6
10. Disregard the speed limit on a residential road. (2)	1	2	3	4	5	6
11. Turn on one thing inside the car (such as the headlights) when you meant to turn on something else (like the windshield wipers). (4)	1	2	3	4	5	6
12. When making a right turn, nearly hit a bicyclist who has come up beside you on the passenger's side. (3)	1	2	3	4	5	6
13. Miss a "Yield" sign & narrowly avoid colliding with traffic that has the right of way. (3)	1	2	3	4	5	6
14. "Punch it" when a traffic light turns green. (4)	1	2	3	4	5	6
15. Attempt to overtake someone who is making a left-hand turn. (3)	1	2	3	4	5	6
16. Become angered by another driver & chase them with the intention of "giving them a piece of your mind." (1)	1	2	3	4	5	6
17. Stay in a lane that you know will close ahead until the last minute before forcing your way into the other lane so that you can "beat" all a the traffic standing still. (2)	1	2	3	4	5	6
18. Forgot where you parked your car in a parking lot. (4)	1	2	3	4	5	6
19. Overtake someone who is driving slowly in the left lane by passing them on the right. (2)	1	2	3	4	5	6
20. Race away from a traffic light with the intention of "beating" the driver next to you. (2)	1	2	3	4	5	6
	1	2	3	4	5	6

21. Misread the exit signs from the highway & take the wrong exit. (4)						
22. Drive so closely to the car in front of you that it would be difficult to stop in an emergency. (2)	1	2	3	4	5	6
23. Cross on intersection even though you know that the light is turning red. (2)	1	2	3	4	5	6
24. Become angry at a certain type of driver & indicate you hostility by whatever means you can. (1)	1	2	3	4	5	6
25. Realize that you have no clear memory of the road on which you have just been driving. (4)	1	2	3	4	5	6
26. Underestimate the speed of an oncoming vehicle. (3)	1	2	3	4	5	6
27. Disregard the speed limit. (2)	1	2	3	4	5	6

(1) = Aggressive Violations
(2) = Ordinary Violations
(3) = Mistakes
(4) = Lapses

APPENDIX D

Moral Disengagement Survey

For each of the following statements, indicate the degree to which you agree or disagree using the following scale:
1 = Strongly Disagree
2 = Disagree
3 = Neither Disagree Nor Agree
4 = Agree
5 = Strongly Agree

1. It is alright to fight to protect your friends.	1	2	3	4	5
2.Slapping & shoving someone can be just a way of joking	1	2	3	4	5
3. Damaging some property is no big deal when you consider that others are beating people up.	1	2	3	4	5
4. A kid in a gang should not be blamed for the trouble that the gang causes.	1	2	3	4	5
5. If kids are living under bad conditions, they cannot be blamed for behaving aggressively.	1	2	3	4	5
6. It is okay to tell some small lies because they don't really do any harm.	1	2	3	4	5
7. Some people deserve to be treated like animals.	1	2	3	4	5
8. If kids fight & misbehave in school, it is the teacher's fault.	1	2	3	4	5
9. It is alright to beat up someone who badmouths your family.	1	2	3	4	5
10. To hit someone who is obnoxious is just teaching them a "lesson"	1	2	3	4	5
11. Stealing some money is not too serious compared to those who steal a lot of money.	1	2	3	4	5
12. A kid who only suggests breaking rules should not be blamed if other kids go ahead & do it.	1	2	3	4	5
13. If kids are not disciplined, they should not be blamed for misbehaving.	1	2	3	4	5
14. Children do not mind being teased because it shows that you have an interest in them.	1	2	3	4	5
15. It is okay to treat badly someone who behaved like a "worm".	1	2	3	4	5
16. If people are careless where they leave their things, it is their own fault if those things get stolen.	1	2	3	4	5
17. It is alright to fight when your group's honour is threatened.	1	2	3	4	5
18. Taking someone's bicycle without their permission can be "just borrowing" it.	1	2	3	4	5
19. It is okay to insult someone because beating them is worse.	1	2	3	4	5
20. If a group gets together to do something harmful, it is unfair to blame any one person in the group for it.	1	2	3	4	5
21. Kids cannot be blamed for using bad words when all their friends do it.	1	2	3	4	5
22. Teasing someone does not really hurt them.	1	2	3	4	5
23. Someone who is obnoxious does not deserve to be treated like a human being.	1	2	3	4	5
24. People who get mistreated usually do things to deserve it.	1	2	3	4	5
25. It is alright to lie to keep your friends out of trouble.	1	2	3	4	5
26. It is not a bad thing to get "high" once in a while.	1	2	3	4	5
27. Compared to the illegal things that people do, taking some things from a store without paying for them is not very serious.	1	2	3	4	5
28. It is unfair to blame a child who played only a small part in the harm caused by a group.	1	2	3	4	5

29. Kids cannot be blamed for misbehaving if their friends pressured them to do it.	1	2	3	4	5
30. Insults among children are harmless.	1	2	3	4	5
31. Some people have to be treated roughly because don't have any feelings that can be hurt.	1	2	3	4	5
32. Children are not at fault for misbehaving if their parents force them too much.	1	2	3	4	5

Table 1

Means, standard deviations, and T-tests for all variables by sex

	Males		Females		Diff. Between Sexes
	M	*SD*	*M*	*SD*	*T-test*
Unmitigated Agency	2.53	.662	2.16	.613	-5.088**
All Violent Games	26.64	16.138	13.35	9.343	-8.554**
All Driving Games	17.42	12.323	10.41	8.335	-5.682**
Circuit Racing Games	7.65	9.913	6.50	6.689	-1.157
Street Racing Games	12.65	14.104	10.12	8.539	-1.845
Violent/Driving Games	31.96	24.972	14.62	16.542	-6.980**
Moral Disengagement	2.32	.473	2.09	.505	-4.105**
DBQ Total Scores	2.39	.681	2.46	.673	.892
DBQ Aggressive Violations	2.27	1.10	2.19	1.12	-.653
DBQ Ordinary Violations	2.80	.880	2.91	.840	1.071
DBQ Mistakes	2.07	.695	2.11	.669	.525

*p < .05 (two-tailed), **p < .01 (two tailed)

Table 2

Correlations between predictor variables and outcome variables

| | Outcome Variables | | | |
	DBQ Total Scores	DBQ Aggressive Violations	DBQ Ordinary Violations	DBQ Mistakes
Predictor Variables				
Unmitigated Agency	.301**	.238**	.244**	.277**
Violent Video Games	.165**	.233**	.085	.105
Driving Video Games	.271**	.327**	.154**	.215**
Street Racing Games	.267**	.280**	.120*	.252**
Circuit Racing Games	.372**	.350**	.163**	.400**
Violence/Driving Games	.120*	.203**	.102	.037

*p < .05 (two-tailed), **p < .01 (two tailed)

Table 3

Correlations between predictor variables

	Unmitigated Agency	Violent Video Games	Driving Video Games	Street Racing Games	Circuit Racing Games
Violent Video Games	.225**				
Driving Video Games	.167**	.803**			
Street Racing Games	.077	.455**	.744**		
Circuit Racing Games	.109	.287**	.610**	.662**	
Violence/Driving Games	.164**	.829**	.848**	.326**	.180**

*$p < .05$ (two-tailed), **$p < .01$ (two tailed)

Table 4

Correlations between outcome variables

	DBQ Total Scores	DBQ Aggressive Violations	DBQ Ordinary Violations
DBQ Aggressive Violations	.822**		
DBQ Ordinary Violations	.846**	.591**	
DBQ Mistakes	.815**	.523**	.585**

*p < .05 (two-tailed), **p < .01 (two tailed)

Table 5

Correlations between mediator variable and predictor variables

	Unmitigated Agency	Violent Video Games	Driving Video Games	Street Racing Games	Circuit Racing Games	Violence /Driving Games
Moral Disengagement	.360**	.235**	.275**	.182**	.203**	.232 **

*p < .05 (two-tailed), **p < .01 (two tailed)

Table 6

Correlations between mediator variable and outcome variables

	DBQ Total Scores	DBQ Aggressive Violations	DBQ Ordinary Violations	DBQ Mistakes
Moral Disengagement	.317**	.324**	.249**	.245**

p < .05 (two-tailed), **p* < .01 (two tailed)

Table 7

Tests of moral disengagement as a mediator of the relation between unmitigated agency and risky driving behavior

Predictor	Outcome	C-path β (R^2)	A-path β	B-path β	C'-path β (R^2)	Sobel Test Z
Unmitigated Agency	Total Risky Driving	.307** (.090)	.274**	.322**	.219** (.140)	3.54**
	Aggressive Violations	.399** (.057)	.274**	.602**	.234* (.116)	3.85**
	Ordinary Violations	.316** (.059)	.274**	.316**	.230** (.089)	2.83**
	Mistakes	.284** (.077)	.274**	.226**	.222** (.101)	2.57*

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

Table 8

Tests of moral disengagement as a mediator of the relation between video game exposure and risky driving behavior

Predictor	Outcome	C-path β (R²)	A-path β	B-path β	C'-path β (R²)	Sobel Test Z
All Violent Games	Total Risky Driving	.008** (.027)	.008**	.396*	.004 (.109)	3.17**
	Aggressive Violations	.018** (.054)	.008**	.627**	.013** (.131)	3.24**
	Ordinary Violations	.005 (.007)	.008**	.414**	.002 (.063)	2.90**
	Mistakes	.005 (.011)	.008**	.316**	.002 (.062)	2.85**
All Driving Games	Total Risky Driving	.017** (.073)	.013**	.353**	.012** (.137)	3.19**
	Aggressive Violations	.033** (.107)	.013**	.557**	.026** (.166)	3.16**
	Ordinary Violations	.012** (.024)	.013**	.382**	.007 (.070)	2.88**
	Mistakes	.013** (.046)	.013**	.272**	.010** (.084)	2.72**
Circuit Racing Games	Total Risky Driving	.030** (.139)	.012**	.338**	.026** (.199)	3.06**
	Aggressive Violations	.047** (.122)	.012**	.581**	.039** (.189)	3.12**
	Ordinary Violations	.017* (.027)	.012**	.384**	.012* (.075)	2.81**
	Mistakes	.033** (.160)	.012**	.231**	.030** (.188)	2.50**
Street Racing Games	Total Risky Driving	.016** (.072)	.008**	.373**	.013** (.146)	3.15**
	Aggressive Violations	.027** (.078)	.008**	.622**	.022** (.155)	3.18**
	Ordinary Violations	.009** (.014)	.008**	.401**	.006 (.068)	2.88**
	Mistakes	.015** (.064)	.008**	.279**	.013** (.105)	2.72**
Violent/Driving Games	Total Risky Driving	.004* (.014)	.005**	.411**	.001 (.103)	3.68**
	Aggressive Violations	.010** (.041)	.005**	.644**	.007* (.122)	3.62**
	Ordinary Violations	.004 (.010)	.005**	.407**	.002 (.064)	3.19**
	Mistakes	.001 (.001)	.005**	.338**	.000 (.061)	3.27**

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

Figure Captions

Figure 1. Mediation model for H2: moral disengagement mediating the effects of unmitigated agency on risky driving behavior.

Figure 2. Mediation model for H4: moral disengagement mediating the effects of video game exposure on risky driving behavior.
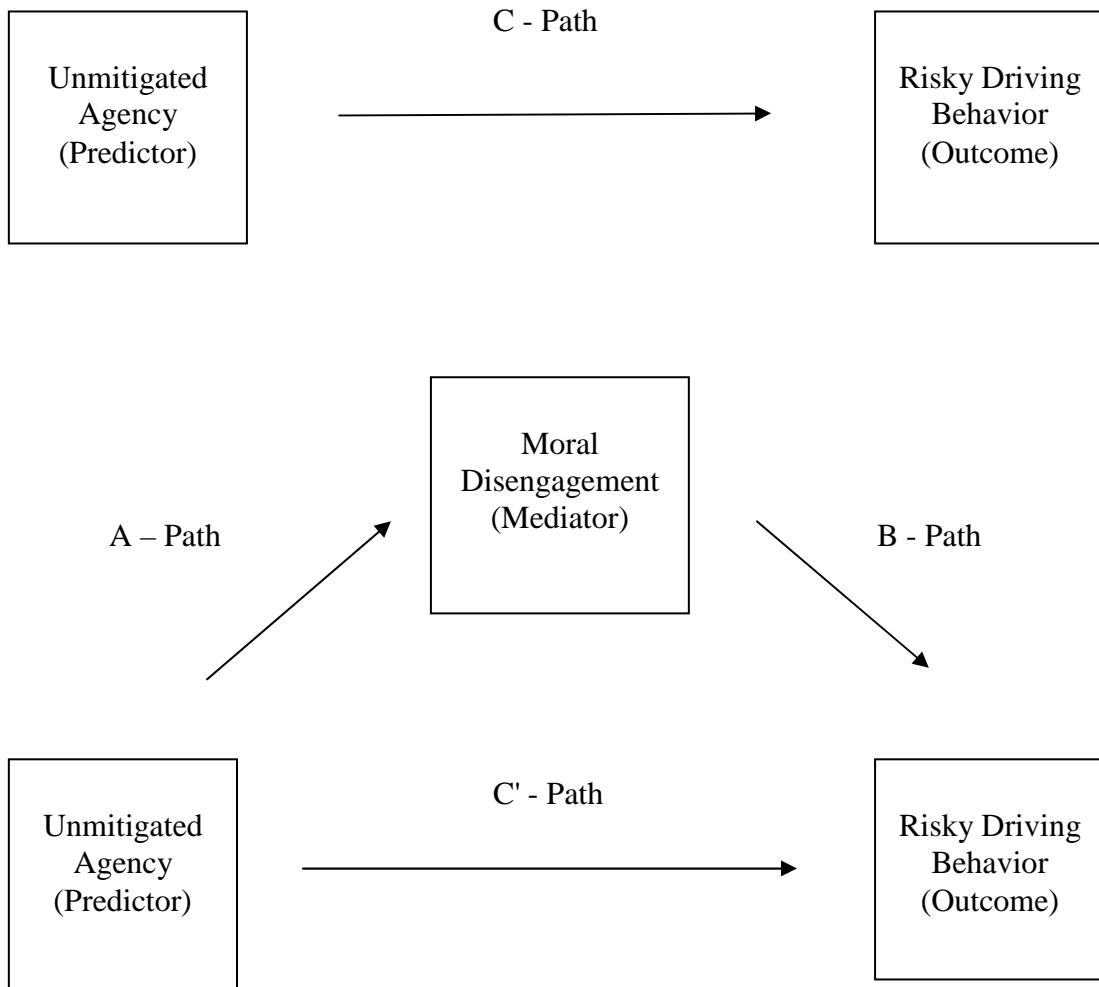
Figure 1

Unmitigated
Agency
(Predictor)

C - Path

Risky Driving
Behavior
(Outcome)

A – Path

Moral
Disengagement
(Mediator)

B - Path

Unmitigated
Agency
(Predictor)

C' - Path

Risky Driving
Behavior
(Outcome)

Figure 2

C - Path

Video Game
Exposure
(Predictor)

Risky Driving
Behavior
(Outcome)

A – Path

Moral
Disengagement
(Mediator)

B - Path

C' - Path

Video Game
Exposure
(Predictor)

Risky Driving
Behavior
(Outcome)