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The Role of Personality Characteristics in Young Adult Driving

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Abstract

Background— Motor vehicle injury is the major cause of mortality among young adults. Information about the individual characteristics of those who drive dangerously could enhance traffic safety programs. The goal of this research was to examine the association between various personality-related characteristics and risky driving behaviors.

Methods— Young adults in Michigan, USA ($n = 5,362$) were surveyed by telephone regarding several personality factors (risk-taking, hostility, aggression, tolerance of deviance, achievement expectations) and driving behaviors (competitive driving, risk-taking driving, high-risk driving, aggressive driving, and drink/driving). Michigan driver records were obtained to examine offenses, serious offenses, driving offense points, crashes and serious crashes in the three pre-interview years. Multivariate regression analyses, adjusting for age, race, and marital status were conducted separately by sex to identify personality factors related to driving.

Results— For men and women, greater risk-taking propensity, physical/verbal hostility, aggression, and tolerance of deviance were significant predictors of a competitive attitude toward driving, risk-taking driving, high-risk driving, driving aggression, and drink/driving. Greater risk-taking propensity, physical/verbal hostility, aggression, and to a small degree, expectations for achievement predicted higher numbers of offenses, serious offenses, and points.

Conclusion— Traffic safety policies and programs could be enhanced through recognition of the role personality factors play in driving behavior and the incorporation of this knowledge into the design and implementation of interventions that modify the behaviors associated with them.

Keywords

Driving; personality; aggression; risk-taking; drink/driving; motor vehicle offenses; points

Among adolescents and young adults, motor vehicle crashes are the leading cause of injury and death, and a major public health concern (Bonnie et al., 1999; U.S. Department of Health and Human Services, 2000; Insurance Institute for Highway Safety, 2006). Research indicates that approximately 90% of all crashes are, to some extent, the result of driver characteristics and behaviors (Lewin, 1982a, 1982b). In particular, risky driving contributes to negative driving outcomes. Risky driving, including driving competitively (e.g., enjoyment of out-

maneuvering other drivers), risk-taking driving (e.g., taking driving risks for the thrill of it), high-risk driving (e.g., speeding, improper turning or passing), driving aggression (e.g., tailgating to punish other drivers, honking angrily, making rude gestures), and the attitudes and personality characteristics that promote these behaviors are seen by the American public as serious threats to safety (Neuman et al., 2003).

Individual characteristics are related to risky driving behavior and to driving outcomes such as offenses and crashes (Iversen & Rundmo, 2002). Personality characteristics such as aggressiveness, hostility, sensation seeking, normlessness, disinhibition, susceptibility to boredom, impaired risk perception, and perceived invulnerability, are associated with higher rates of risky driving behaviors and negative driving outcomes (Burns & Wilde, 1995; Furnham & Saipie, 1993; Greene et al., 2000; Iversen & Rundmo, 2002; Jonah, 1997; McMillen et al., 1991; van Beurden et al., 2005; Vavrik, 1997; Wells-Parker et al., 2002).

Driving behavior is closely linked to non-driving lifestyles and behaviors. Lifestyles reflecting high rates of risky behaviors, thrill- or risk/sensation-seeking, poor impulse control, and aggression in non-driving contexts predict high-risk driving and related negative driving outcomes (Alparslan et al., 1999; Bierness & Simpson, 1988; Jonah, 1997; Yu & Williford, 1993). Such “lifestyle” effects are not surprising, given that high-risk behaviors are influenced by personality and physiological characteristics, and in light of other research and theory (i.e., Problem Behavior Theory) showing that risky and problem behaviors typically co-occur (Jessor, 1987a, 1987b).

Individual personality characteristics are highly stable; therefore, changing these characteristics is not an appropriate objective of interventions to reduce personality-related problem behaviors. However, it is possible to change target behaviors by modifying mediating factors that link personality to the target behavior. Research evidence indicates that personality characteristics influence driving outcomes indirectly through attitudes (Sümer, 2003; Ulleberg & Rundmo, 2003). Other factors that might mediate between personality characteristics and driving behavior include an orientation toward achievement and personal aspirations regarding prosocial endeavors (Murray, 1998; Riala et al., 2003). These research results indicate that interventions to prevent/reduce risky driving and the negative outcomes associated with it may be effective by changing attitudes and modifying individual responses to personality characteristics.

Research examining the association between personality-related characteristics and driving behaviors and outcomes has consistently shown sex differences in high-risk driving behavior and its association with personality-related characteristics (Furnham & Saipie, 1993; van Beurden et al., 2005). These differences, and the potential that male and female drivers differ in which personality characteristics are associated with high-risk driving behavior, highlight the need to include sex in all examinations of this issue.

The association between individual personality characteristics and driving behavior has been examined by many studies. However, extant research examining the role of personality characteristics in driving behavior has relied on self-reported driving outcomes. This study contributes to past research on this topic by examining the relationship between personality characteristics and both self-report and observed driving behaviors and outcomes.

METHODS

Data Collection

The data included in these analyses are from a subgroup of students who have participated in two longitudinal studies that began in 1984 and 1987. Participation rates in these studies

exceeded 95% (Shope et al., 1996, 1992). In 1992 the study participants' driver history records were obtained from the Michigan Department of State (MDOS), and have subsequently been updated annually. Complete driver history records, beginning at first licensure of 13,158 participants, have been obtained, to date. The driver history data reported in this study include individual-level information on offenses and crashes.

Between 1997 and 2000, study participants were recontacted and interviewed by telephone. Of the 12,938 target participants who had a current Michigan driver license, 7,266 were contacted and 5,362 were interviewed (average age = 23.5 years). Analyses testing bias due to attrition indicated that the sub-sample recontacted did not differ markedly from the larger sample.

The sample for this study includes 5,362 participants, 23% of the men and 33% of the women were married, and a majority were white (86%) (Table I). Michigan-wide population characteristics for this age group were compared to the study sample, and indicated that the sample included a smaller proportion of non-white races than the state population, but otherwise differed very little (United States Census Bureau, 2000). In particular, the sample was similar to the state population in numbers of crashes and offenses. This study's protocol was approved by the University of Michigan Medical School's Institutional Review Board for Human Subject Research.

Measures

Outcome Variables—Driver History Measures included five outcome variables based on motor vehicle offenses were created from the driver history data. The first was the count of *all offenses*. Second, *serious offenses* was the number of offenses including speeding in excess of at least 15 miles per hour over the speed limit, reckless driving, vehicular homicide, and other major moving offenses, and non-driving drug offenses. Third was a count of *all points* accrued for offenses as assigned by the MDOS. This measure incorporated the frequency and severity of motor vehicle offenses. While some small offenses result in the accrual of a few or no points, serious offenses, such as driving under the influence of alcohol, accrue the maximum of six points. Fourth, *all crashes* was the count of all police-reported crashes. Fifth, *serious crashes* was the combined count of all alcohol-involved, single-vehicle, and at-fault crashes.

Counts of all offenses, serious offenses, and points were calculated for the three years prior to the telephone interview so that they would represent recent driving behavior. During this three-year period, 40% of women and 56% of men had at least one motor vehicle offense and 16% of the women and 32% of the men had serious offenses. The average number of points accrued was 1.2 for women and 2.4 for men (Table I).

Self-Report Outcome Measures—Competitive Attitude Toward Driving (Donovan, 1993; $\alpha = .81$) is a five-item measure. Items included: It's fun to beat other drivers when the light changes; it's really satisfying to pass other cars on the highway; it's a thrill to out-manuever other drivers; it's fun to weave through slower traffic; and, taking risks in traffic makes driving more fun. Responses ranged from 1 = strongly agree to 4 = strongly disagree. The final score was calculated by averaging across reverse-coded items so that a higher score represented a more competitive attitude.

Risk-Taking Driving (Donovan, 1993; $\alpha = .83$) is an eight-item measure. Items included: While driving, how often do you: take chances for the fun of it? see how fast you can drive out of curiosity? pass other cars because it's exciting? out-manuever other drivers for the thrill of it? drive dangerously because you enjoy it? test your skills in ways others might find risky? take some risks because it feels good? and try to beat other drivers leaving a stoplight to impress someone? Item responses ranged from 1 = very often to 4 = never. The final measure was

calculated by averaging over reverse-coded items so that a higher score indicated greater risk-taking.

High-Risk Driving (Donovan, 1993; $\alpha = .81$) is a 20-item measure that asks the number of times in the past year that a respondent engaged in each of 20 high-risk driving behaviors from the following domains: speeding (3 items); following too closely (2 items); improper passing (3 items); improper lane changes (4 items); failure to yield right of way (2 items); improper turns (3 items); and running a stop sign or stop light (3 items). The responses for all 20 items were collapsed into 14 ordinal categories, and a scale score was calculated by averaging across items, such that higher scores reflected more frequent high-risk driving.

Driving Aggression (Donovan, 1993; $\alpha = .63$) was measured by four items, including: While driving, how often do you: yell at other drivers when they do something stupid? honk your horn at drivers who cut right in front of you? make rude gestures at drivers who do things that annoy you? and tailgate other drivers to get back at them for the way they're driving? Responses ranged from 1 = very often to 4 = never. The driving aggression measure was calculated by averaging across reverse-coded items so that higher scores represented more driving aggression.

Drink/Driving (Donovan, 1993; $\alpha = .84$) was measured by five items asking how often in the prior year the participant had been involved in five drink/driving behaviors, including: Driving within an hour after having 1 or 2 drinks; driving within an hour after having 3 or more drinks; driving when they felt high or light-headed from drinking; driving when they knew that drinking had affected their coordination; and drinking in the car while driving. The scale was scored in the same manner as high-risk driving.

Predictor Variables

All predictor variables were self-reported.

Demographic Measures included: sex, race, marital status and age at the time of the telephone survey. Race was dichotomous, with 0 = white and 1 = other races. Marital status was dichotomous (1 = ever married, 0 = never married). Age was continuous and ranged from 21 to 27 years.

Risk-Taking Propensity (Donovan, 1993; $\alpha = .73$) is a four-item measure with responses ranging from 1 = not at all like me to 3 = a lot like me. Respondents were asked to indicate how well each statement described them: I'd do almost anything on a dare; I enjoy the thrill I get when I take risks; I like to live dangerously; and I like to take chances even when the odds are against me. Scale scores were calculated by averaging across items.

Physical/Verbal Hostility ($\alpha = .52$) was a seven-item measure based on a combination of two measures of hostility, one verbal and the second physical (Donovan, 1993.) The item stem was: Thinking about your life in general, how well does each of the following statements describe you? The items were: I don't think there is ever a good reason for hitting anyone; if people annoy me, I let them know exactly what I think of them; I like to argue with other people just to annoy them; if I have to use force to defend my rights, I will; when I get angry at someone, I often say really nasty things; when I really lose my temper, I've been known to hit or slap someone; and if people push me around, I hit back. Items were scored on a scale of 1 = not at all like me to 3 = a lot like me. Scale scores were calculated by averaging across items.

General aggression (Donovan, 1993; $\alpha = .46$) was measured by four items with six response choices (1 = never, 2 = once, 3 = twice, 4 = 3–5 times, 5 = 6–9 times, 6 = 10 + times). Items included: In the past 12 months, how often have you: Damaged public or private property;

started a fight and hit someone; started an argument and insulted the other person though it wasn't called for; and damaged something valuable because you were angry? Scale scores were calculated by averaging across items.

Tolerance of deviance (Rachal et al., 1975; $\alpha = .79$) was measured by ten items with responses ranging from 1 = very wrong to 4 = not wrong. The items included: How wrong do you think it is to: give a fake excuse for missing work, not showing up for a meeting, or cutting class; damage public property on purpose; start a fight and hit someone; give false information when filling out a job or loan application; shoplift something of value from a store; start an argument and insult the other person even though it isn't called for; damage something valuable because you are angry with the person it belongs to; write someone a check even though you know it might bounce; lie to people close to you to cover up something you did; and take things of value that do not belong to you? Scale scores were calculated by averaging across items.

Expectations for Achievement (Donovan 1996; $\alpha = .83$) was a four-item measure, with responses ranging from 1 = very sure to 4 = not at all sure. Individual items included: How sure are you: That other people will respect how hard you work? That you will win promotions at work because other people will recognize your abilities? That the people you work with will think highly of your work? and that you will move up the job ladder faster than others because of your skills? Scale score was calculated by averaging across reverse-coded items so that a higher score indicated expectations for greater achievement.

Self-report measures are often suspect of being biased by social acceptability. To assess this possibility, structural equation models were run to test the association between latent constructs representing self-report measures, and manifest variables measuring offenses and crashes. The results showed significant associations supporting the validity of the self-report measures.

Data Analyses—Descriptive statistics for each of the predictor and outcome variables were calculated separately for men and women. Regression analysis examined the relationship between each outcome measure and the predictor variables. Poisson regression was used for the driver history measures, and ordinary least squares (OLS) regression was used for the telephone survey measures. All regression analyses were conducted separately by sex and adjusted for age, race, and marital status. Adjusted univariate associations were examined by regressing each outcome variable on each predictor while adjusting for age, race, and marital status. Multivariate effects were examined by regressing each outcome on all of the predictors simultaneously while adjusting for age, race, and marital status. Before fitting the regression models, all five predictor variables were standardized and scaled to have a mean of 0 and a variance of 1 to simplify interpretation of the regression parameter estimates.

RESULTS

Descriptive Statistics

Table I provides a summary description of the sample by sex. While men and women did not differ significantly on racial distribution or levels of general aggression, significant differences were found for all of the other variables used in this study. As is commonly found, men had higher levels on personality characteristics related to risk, hostility and deviant behavior, and on all driving outcomes than women.

Prediction of Self-Report Outcome Measures

Table II reports results of univariate and multivariate OLS regression models predicting the self-report driving variables for men and women. The results are interpreted primarily based on the multivariate models, with the univariate models providing information about simple

associations. The models predicting competitive attitude toward driving differed for men and women. For men, competitive attitude was predicted by greater risk-taking propensity and tolerance of deviance. For women all five predictors were significant with more risk-taking propensity, physical/verbal hostility, general aggression, and tolerance of deviance predicting greater competitive driving, and lower expectations for achievement predicting a less competitive attitude toward driving. For both men and women, risk-taking propensity was the strongest predictor of competitive attitude toward driving.

Models for risk-taking driving differed for men and women only slightly. For men and women greater risk-taking propensity, general aggression and tolerance of deviance predicted more risk-taking driving. For women, more physical/verbal hostility also predicted by more risk-taking driving. For both men and women risk-taking propensity was the strongest predictor of risk-taking driving.

High-risk driving, driving aggression, and drink/driving were all predicted by greater risk-taking propensity, physical/verbal hostility, and tolerance of deviance for both men and women. For men, risk-taking propensity was the strongest predictor of high-risk driving, but for women both risk-taking propensity and tolerance of deviance were strong predictors. Physical/verbal hostility was the strongest predictor of driving aggression for men and women. Tolerance of deviance and physical/verbal hostility were the strongest predictors of drink/driving for men, and for women tolerance of deviance and risk-taking propensity were the strongest predictors of drink/driving.

Prediction of Driver History Measures

Table III reports parameter estimates for univariate and multivariate Poisson regression models predicting offenses, serious offenses and points for men and women. These models were all adjusted for participants' age, marital status and race. All offenses were predicted by greater risk-taking propensity and physical/verbal hostility for men, with physical/verbal hostility being the stronger predictor. For women, only physical/verbal hostility predicted all offenses.

Serious offenses were predicted by greater risk-taking propensity, physical/verbal hostility, general aggression, and expectations for achievement for men. For women, greater risk-taking propensity, physical/verbal hostility, and general aggression predicted more serious offenses. For both men and women physical/verbal hostility was the strongest predictor.

License points were predicted by more risk-taking propensity and physical/verbal hostility for men, with physical/verbal hostility being the strongest predictor, and for women only greater physical/verbal hostility predicted points.

Prediction of crashes was not included in Table III, due to the scarcity of significant effects. All crashes were predicted by general aggression for women ($\beta = 0.08$, s.e. = 0.04, $p < .05$). Serious crashes were predicted by physical/verbal hostility for men ($\beta = 0.13$, s.e. = 0.06, $p < .05$) and tolerance of deviance for women ($\beta = 0.18$, s.e. = 0.06, $p < .05$).

DISCUSSION

This article's primary purpose was to examine the associations of personality characteristics with self-reported and observed driving outcomes. The results of this study support past research, demonstrating a clear association between personality characteristics and self-reported driving behavior. This study adds to past research by showing that personality characteristics are associated with both self-reported and observed driving outcomes and behaviors. Past research has shown an association between personality measures and self-reported crashes or offenses (Iversen & Rundmo, 2002; Sümer, 2003), but none could be found

that used official records to obtain outcome variables, or that used ticketed offenses as an outcome of personality characteristics. The associations found between personality characteristics and offenses measured by official records are all the more impressive given that illegal driving behaviors that are ticketed are relatively rare events, and represent a small fraction of all illegal driving behaviors committed.

This study did not find many associations between personality characteristics and crashes. This could be the result of the rare nature of crashes, which happen much less frequently than offenses, and measurement error that results from the many non-systematic factors that contribute to crash occurrence. Crashes are also less specific to individual person factors than are offenses, with not all parties involved in a crash sharing equal responsibility. Singly or together, these and other factors may have reduced the ability to detect associations between personality characteristics and crashes. Nevertheless, offenses serve as a good proxy for crash risk, and were predictable.

Driving behaviors examined as outcomes in this study lend support to past research demonstrating that the association between personality characteristics and driving behavior is mediated through attitudes and other behaviors (Iversen & Rundmo, 2002; Sümer, 2003; Ulleberg & Rundmo, 2003). Specifically, this study indicated that personality characteristics predicted driving behaviors such as high-risk driving, risk-taking driving, and drink/driving. These behavioral variables are known to contribute to crashes, and provide an intermediate target for interventions to reduce motor vehicle crashes.

The identification of personality characteristics that are associated with driving behavior provide the opportunity to develop interventions that are designed to change the way a person reacts to specific personality characteristics. Many interventions have attempted to reduce risky driving, with little success. This lack of success may be the result of poor targeting, or of using an overly homogeneous intervention to change behaviors whose determinants are complex, heterogeneous across individuals, and that tend to be person-specific (Iversen & Rundmo, 2002). This study identifies specific personality characteristics related to risky driving. These personality characteristics could be used to match interventions to individuals, thereby providing a closer link between intervention message and purpose, and the characteristics of the person receiving the intervention. In today's fast-growing technological world, the development of interventions that are computer-tailored in real time to address the characteristics of individual recipients is feasible, and is being used in an increasing number of settings and to address many different behaviors (Ausems et al., 2002; Carlson et al., 2000; August et al., 2001; Chiauzzi et al., 2005; Cummins et al., 2003; Werch, 2001; Werch et al., 2005). This approach may also show promise for tailoring driving safety interventions to individuals.

The results of this study and others (Iversen, Rundmo, 2002; Sümer, 2003; Ulleberg & Rundmo, 2003) are suggestive of underlying processes that take place over time, but because this research is cross-sectional, one can only guess what are those processes and their temporal sequencing. Longitudinal research provides the means to examine the processes leading from personality and psychological characteristics to attitudes, then to driving behavior, and finally to crashes. The information such research could provide would be valuable in the design and formulation of interventions to assist people in responding to their personality-based proclivities with behavior that does not place themselves and others at risk of injury and death.

Future research should also examine the broader context of driving, and how that context interacts with individual personality characteristics to result in risky driving behavior. Some evidence suggests that high-risk driving might be decreased by altering the driving environment so that common triggers of high-risk driving behaviors are removed (Shinar et al., 2004; Shinar

& Compton, 2004). Identification of the associations, their variability across personality characteristics, and the likely triggers of risky driving would provide information that could then be used in many aspects of transportation, including policy, roadway design, traffic flow controls, enforcement, and in the development of programmatic interventions to reduce risky driving.

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Table I
Means and standard deviations for study measures by sex

	Men n = 2608		Women n = 2754	
	mean	sd	mean	sd
Demographic Characteristics				
Mean age at survey (years)	23.57	0.85	23.42	0.81*
Other race (proportion)	0.13	0.34	0.14	0.35
Married (proportion) ¹	0.23	0.42	0.33	0.47*
Independent Measures				
Risk-taking propensity	1.42	0.44	1.21	0.32*
Physical/verbal hostility	1.71	0.38	1.51	0.35*
General aggression	1.21	0.39	1.19	0.34
Tolerance of deviance	1.34	0.33	1.26	0.26*
Expectations for achievement	3.34	0.58	3.25	0.58*
Dependent Measures ²				
All offenses	1.27	1.78	0.68	1.12*
Serious offenses	0.50	0.94	0.21	0.56*
Points	2.39	3.49	1.20	2.20*
Competitive attitude regarding driving	1.70	0.61	1.44	0.49*
Risk-taking driving	1.25	0.36	1.11	0.22*
High-risk driving	4.99	3.64	3.90	3.50*
Driving aggression	1.82	0.57	1.76	0.53*
Drink/driving	1.75	2.45	0.84	1.68*

* Significant at .05 level.

¹ Missing values on marital status for 3 women and 6 men.

² Offenses and crashes counted over three-year interval prior to young adult telephone survey.

Table II
Results of regression models predicting the telephone survey outcome variables

	Men				Women			
	Univariate ¹		Multivariate ²		Univariate ¹		Multivariate ²	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
Competitive attitude toward driving								
Risk-taking propensity	0.22*	0.01	0.19*	0.01	0.21*	0.01	0.18*	0.01
Physical/verbal hostility	0.11*	0.01	0.01	0.01	0.12*	0.01	0.05*	0.01
General aggression	0.09*	0.01	0.01	0.01	0.09*	0.01	0.02*	0.01
Tolerance of deviance	0.16*	0.01	0.12*	0.01	0.14*	0.01	0.08*	0.01
Expectations for achievement	-0.02	0.01	-0.01	0.01	-0.03*	0.01	-0.02*	0.01
Risk-taking driving								
Risk-taking propensity	0.15*	0.01	0.14*	0.01	0.11*	0.01	0.10*	0.01
Physical/verbal hostility	0.08*	0.01	0.01	0.01	0.06*	0.01	0.02*	0.01
General aggression	0.07*	0.01	0.03*	0.01	0.05*	0.01	0.02*	0.01
Tolerance of deviance	0.08*	0.01	0.03*	0.01	0.06*	0.01	0.02*	0.01
Expectations for achievement	-0.01	0.01	-0.01	0.01	-0.01*	0.01	-0.01*	0.01
High-risk driving								
Risk-taking propensity	1.02*	0.06	0.75*	0.07	1.23*	0.08	0.83*	0.08
Physical/verbal hostility	0.78*	0.07	0.22*	0.07	0.78*	0.07	0.22*	0.07
General aggression	0.84*	0.07	0.47*	0.07	1.01*	0.07	0.63*	0.07
Tolerance of deviance	0.79*	0.06	0.41*	0.07	1.17*	0.07	0.75*	0.08
Expectations for achievement	-0.06	0.07	0.01	0.07	-0.05	0.07	0.11	0.06
Driving aggression								
Risk-taking propensity	0.11*	0.01	0.04*	0.01	0.12*	0.01	0.04*	0.01
Physical/verbal hostility	0.24*	0.01	0.20*	0.01	0.22*	0.01	0.19*	0.01
General aggression	0.12*	0.01	0.04*	0.01	0.12*	0.01	0.04*	0.01
Tolerance of deviance	0.11*	0.01	0.04*	0.01	0.13*	0.01	0.05*	0.01
Expectations for achievement	0.00	0.01	0.00	0.01	-0.02*	0.01	0.00	0.01
Drink/driving								
Risk-taking propensity	0.46*	0.04	0.23*	0.05	0.46*	0.04	0.32*	0.04
Physical/verbal hostility	0.57*	0.05	0.30*	0.05	0.29*	0.03	0.10*	0.04
General aggression	0.50*	0.04	0.24*	0.05	0.33*	0.03	0.18*	0.04
Tolerance of deviance	0.53*	0.04	0.35*	0.05	0.42*	0.04	0.27*	0.04
Expectations for achievement	0.02	0.05	0.08	0.05	-0.02	0.03	0.04	0.03

* Significant at .05 level.

¹ Univariate models are adjusted for age, race and marital status.

² Multivariate models are mutually adjusted for all five predictor variables and for age, race and marital status.

Table III
Results of Poisson regression predicting driver history outcome variables

	Men				Women			
	Univariate ¹		Multivariate ²		Univariate ¹		Multivariate ²	
	Beta	S.E.	Beta	S.E.	Beta	S.E.	Beta	S.E.
All Offenses								
Risk-taking propensity	0.09 *	0.02	0.06 *	0.02	0.11 *	0.03	0.06	0.03
Physical/verbal hostility	0.14 *	0.02	0.11 *	0.02	0.14 *	0.02	0.12 *	0.03
General aggression	0.07 *	0.02	0.02	0.02	0.09 *	0.02	0.04	0.03
Tolerance of deviance	0.02	0.02	-0.02	0.02	0.07 *	0.03	<0.00	0.03
Expectations for achievement	0.03	0.02	0.02	0.02	-0.02	0.02	-0.01	0.02
Serious Offenses								
Risk-taking propensity	0.10 *	0.01	0.07 *	0.01	0.11 *	0.02	0.06 *	0.02
Physical/verbal hostility	0.13 *	0.01	0.10 *	0.01	0.14 *	0.02	0.14 *	0.02
General aggression	0.07 *	0.01	0.03 *	0.01	0.08 *	0.02	0.04 *	0.02
Tolerance of deviance	0.03 *	0.01	-0.01	0.01	0.04 *	0.02	-0.02	0.02
Expectations for achievement	0.04 *	0.01	0.03 *	0.01	0.00	0.02	0.01	0.02
Points								
Risk-taking propensity	0.10 *	0.02	0.06 *	0.03	0.13 *	0.05	0.06	0.05
Physical/verbal hostility	0.16 *	0.03	0.15 *	0.03	0.22 *	0.04	0.20 *	0.05
General aggression	0.07 *	0.02	0.02	0.03	0.11 *	0.04	0.04	0.04
Tolerance of deviance	0.03	0.03	-0.03	0.03	0.10 *	0.05	0.01	0.05
Expectations for achievement	0.00	0.03	-0.02	0.03	-0.03	0.04	-0.01	0.04

* Significant at .05 level.

¹ Univariate models are adjusted for age, race and marital status.

² Multivariate models are mutually adjusted for all five predictor variables and for age, race and marital status.