

## Personality, High-Risk Activities and Aggressive Behaviour among Illegal Street Racers

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### Abstract

The prevalence of motorcycle street racing is increasing in Malaysia and has become a major public concern. As a major focus of the international studies were on illegal car racing overseas, and there are only a limited number of studies address illegal motorcycle street racing. Thus, this study aims to examine the high-risk activities of motorcycle street racers, their personality and the association of personality with aggressiveness. This cross-sectional study involved 138 at risk adolescents who were engaged in illegal motorcycle street racing. Data were collected using three validated questionnaires – Big Five Inventory to measure personality, Impulsive Sensation Seeking Scale to measure sensation seeking trait, and the Buss and Perry Aggression Questionnaire to assess aggressiveness. The results showed that the majority of the respondents were not only engaged in illegal street racing but also involved in other high-risk activities, such as pornography, illegal abortion, fighting, and gambling. Neuroticism and sensation seeking were found to be associated and were good predictors of the aggression domain, such as physical aggression and anger. However, only sensation seeking and neuroticism were good predictors for verbal aggression and the hostility domain. Hence, it is very important to understand their personality trait and level of aggression beforehand in order to develop a suitable programme for this special group of adolescents as well as to find ways to channel their sensation seeking behaviour or aggression to positive effect.

**Keywords:** personality, high risk behaviour, aggressive, illegal street racer

### 1. Introduction

In Malaysia illegal street motorcycle racing phenomena has become a great concern among the public. Every year the number of young adolescents involved in this activity is increased. It is estimated that over one hundred thousand young people involved in this phenomenon nationwide (Ismail, 2014). Statistics from the Royal Malaysian Police showed that the number of riders who are caught racing illegally constantly increasing. For example, in eight years (from 2001 to 2008) a total of 5265 arrests were made, and on average a total of 658 arrests were made every year (Ismail, 2014).

Illegal motorcycle street racing is popular in Malaysia compared to illegal car racing as reported among developed countries. Illegal motorcycle street racing is dangerous and a public concern as it involves reckless and risky riding behaviour and illegal activities including snatching, anti-social behaviour, substance abuse, and spending time in non-organized activities (Bina, Graziano, & Bonino, 2006 ; Falconer & Kingham, 2007; Ismail & Borhanuddin, 2009; Vaaranen, 2004; Vaaranen & Wieloch, 2002). Illegal motorcycle street racing involved the use of underbone motorcycles (Kapcai) on public roads. This behaviour is locally referred as 'merempit' and it is a form of risky behaviour among young men (or Mat rempit as locally refer to) in Malaysia. These *mat rempit* comprise of young men who are school leavers, unemployed and those who are still in school or college, or are already secured a job such as blue collar workers (Falconer & Kingham, 2007; Folkman, 2005; Leigh (1996; Vaaranen, 2004; Vaaranen & Wieloch, 2002).

The individuals involved in street racing are often associated with the aggressive personality, and riding motorcycle or driving car in an aggressive manner without much regard for the safety of other drivers. Aggressiveness is potential explanatory factor for the developmental basis of reckless riding and driving behaviour because the hormones related to aggressiveness have a developmental trajectory that is similar to the trajectory of many types of reckless behaviour. In particular, testosterone, which has been repeatedly found to be related to aggression, increases eighteen fold by the end

of puberty compared to at the beginning of puberty for boys, and is twice as high for girls (Nottelman et al., 1987). According to Gabbey (2013), aggressive behaviour causes physical or emotional harm, or poses a threat to others. Studies indicated that aggressiveness is related to high-speed and risky driving behaviour among adolescents and young adults (Jonah, 1986). Nowadays, aggressive driving has become a serious problem on public roadways. Aggressive riding or driving behaviour can include speeding, frequent and unnecessary lane changing, tailgating, and running red or yellow lights. Such behaviour creates unsafe situations and can lead to road rage. Studies have shown that some adolescents use automobiles to express aggressiveness by driving at high speeds and in a risky manner (Donovan, Marlatt & Salzberg, 1983). In Malaysia, teenagers who are involved in illegal motor racing not only drive dangerously and at high speeds, they also disturb other road users, run through roadblocks erected by the police, drive on the wrong side of the road, and perform various risky stunts that pose a danger to themselves and to others.

The aggressive behaviour shown by these illegal teenage street racers can be related to one of the important factors – personality. Some findings have revealed that the personality variable is positively associated with aggressive behaviour under relatively neutral and provoking conditions (Bushman, 1995; Giancola & Zeichner, 1995; Muntaner, Llorente, & Nagoshi, 1989; Parrott & Zeichner, 2002). According to Jensen-Campbell, Knack, Waldrip, and Campbell (2007), low levels of agreeableness are related to aspects of reactive aggression, such as disinhibiting of disagreeable responses when confronted with provocation. Moreover, anger is only related to aggression in individuals who are low in conscientiousness, suggesting that individuals with higher levels of conscientiousness are better able to regulate their behaviour when they experience anger (Jensen-Campbell et al., 2007). Sensation seeking is another personality trait examined in this study. According to Zuckerman (1979), sensation seeking is a personality trait characterized by the extent of a person's desire for novelty. In addition, numerous studies have supported the relation between sensation seeking and a wide variety of reckless behaviour including dangerous driving practices (Zuckerman & Neeb, 1980; Arnett, 1995), sexual experiences (Zuckerman, Tushup & Finner, 1976), consumption of alcohol (Schwarz, Burkhart & Green, 1978), drug use (Satinder & Black, 1984), and minor criminal behaviour (Perez & Torrubia, 1985). These traits are associated with behavioural inhibitions in novel situations, particularly those of a social nature (Kagan, Reznick, & Snidman, 1988).

When scrutinized, many previous studies focused on aggressive behaviour and personality, but a very few studies pertained to illegal motorcycle racing, which is rampant in Malaysia. Therefore, this study aims to identify the extent of the involvement in other risky activities of the youth who are engaged in illegal motorcycle racing. In addition, the study will determine the relationship and the influence of certain types of personality including sensation seeking towards aggressive behaviours, such as physical, verbal aggressive, anger and hostile, among those at risk adolescents.

## **2. Method**

### **2.1 Sample**

This study employed a cross-sectional survey design involved 138 at risk male adolescents who were engaged in illegal motorcycle street racing. Their age range between 14 to 26 years old and willing to participate in the study with written consent were included in this study. Those who were unwilling to participate, and unable to read and write in Malay Language were excluded from the study. All the participants who fulfilled the inclusion and exclusion criteria were briefed about the research before they gave their informed consent. Structured interviews using validated questionnaires – Big Five Inventory (BFI), Impulsive Sensation Seeking Scale (SSS) and Buss and Perry Aggression Questionnaire – were used in this study.

### **2.2 Questionnaires**

The questionnaire for this study is divided into four parts. Part one comprises of the particulars relating to the participant, which include the socio-demographic information and details of the high-risk activities in which they participate. Parts two to four comprise of the Big Five Inventory to measure personality; the Impulsive Sensation Seeking Scale to measure sensation seeking; and the Buss and Perry Aggression Questionnaire to assess aggressiveness.

### **2.3 Big Five Inventory (BFI)**

This questionnaire was developed by John and Srivastava (1999). It measures five personality domains – openness, conscientiousness, extraversion, agreeableness, and neuroticism. It is easily administered by the respondents using a

Likert scale ranging from 1=strongly disagree to 5=strongly agree. The extraversion personality includes trait characteristics, such as excitability, sociability, talkativeness, assertiveness, and high amounts of emotional expressiveness. The agreeableness personality dimension includes attributes, such as trust, altruism, kindness, affection, and other pro-social behaviours. The common features of conscientiousness include high levels of thoughtfulness, with good impulse control and goal-directed behaviours. Those individuals who are high in conscientiousness tend to be organized and mindful of details. Individuals high in the neuroticism trait tend to experience emotional instability, anxiety, moodiness, irritability, and sadness. The openness trait features characteristics, such as imagination and insight, and those who are high in this trait also tend to have a broad range of interests. For this study, the Cronbach's alpha reliability coefficient for all subscales of the big five Personality is fair and moderate, for example extraversion ( $\alpha = .47$ ), agreeableness ( $\alpha = .61$ ), conscientiousness ( $\alpha = .65$ ), neuroticism ( $\alpha = .45$ ) and openness ( $\alpha = .66$ ).

#### 2.4 Sensation Seeking Scale

The Sensation Seeking trait is measured using the Sensation Seeking Scale-Form V (SSS-V) (Zuckerman, 1994). The original scale of SSS-V consists of 40 items with four main subscales; Thrill and Adventurous (TAS), Experience Seeking (ES), Boredom Susceptibility (BS) and Disinhibition (DIS). However, the adapted scale consists of only 19 items to measure the sensation seeking level within individuals in certain situations. Currently, the Sensation Seeking Scale is widely used cross-culturally and supported by the largest volume of normative data (Zuckerman, 1994). The normative sample (age range of 17–23 years) for the SSS-V consists of 410 male and 807 female undergraduate students from the University of Delaware (Zuckerman, 1994). The total scale score is the sum of the subscale scores. The Cronbach's alpha reliability coefficients ranged from .85 to .90 for all scales. For the present study, the Cronbach's alpha reliability coefficient for the 19 items of the Sensation Seeking Scale is high ( $\alpha = .79$ ).

#### 2.5 Buss and Perry Aggression Questionnaire

The Buss-Perry Aggression Questionnaire (BPAQ) (Buss & Perry, 1992) represents a revised Buss-Durkee Hostility Inventory (BDHI), including revisions on the response format and the item content to improve its clarity. The BAPQ has four subscales: Physical Aggression, Verbal Aggression, Anger, and Hostility. The internal consistency for the four subscales and total score range from .72 (Verbal Aggression) to .89 (Total BPAQ score). The retest reliability for the BPAQ over nine weeks is also satisfactory (correlations ranged from .72 for Anger to .80 for Physical Aggression and for the total score (Buss & Perry, 1992). The reliability of BPAQ in this study ranged from 0.50 to 0.79 and the total score for aggression was 0.90.

### 3. Results

Data analysis was performed using SPSS, and the results of the socio demographic analysis is shown in Table 1. These results indicate that 45 participants are in the 14–17 years old age group, while 73 participants are aged between 18–21, and the remaining 20 people are aged between 22–26 years. The majority of the participants (63) reported that they had higher secondary education, while 47 participants only with lower secondary certificate and the rest only completed the primary certificate (28). All of the respondents are Malays and Muslims. From the 138 subjects, 76 are working, 38 are unemployed, and 24 are still studying.

**Table 1.** Demographic profile of participants

Demographic Variable	Frequency	Percentage
<b>Age (N = 138)</b>		
14–17	45	32.6
18–21	73	52.9
22–26	20	14.5
<b>Education level</b>		
Primary school	28	20.3
Lower secondary	47	34.1
Higher secondary education	63	45.6
<b>Ethnicity</b>		
Malay	138	100

<b>Religion</b>		
Muslim	138	100
<b>Working status</b>		
Employed	76	55.1
Unemployed	38	27.5
Student	24	17.4

The results in Table 2 indicate the percentage of the involvement of the subjects in risky activities. From the 138 subjects, almost all of them were smoking (130). Although some of the subjects were no longer at school, most of the participants had skipped class (92). In addition, a total of 34 participants were involved in sniffing glue and drug abuse (10), drinking alcohol (35), vandalism (20), loitering (86), and bullying (46). More than half of the participants had seen pornographic pictures or movies, 25 participants practiced free sex, and about 56 of the respondents admitted that they had allowed their girlfriends to undergo illegal abortions. The subjects also admitted to having been in fights (46) and gambling (44).

**Table 2.** Involvement in high-risk activities

	Participants			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Smoking	130	94.2	8	5.8
Truancy	92	66.7	46	33.3
Sniffing and inhaling drug substances	34	24.6	104	75.4
Drug addiction	10	7.2	128	92.8
Drinking	35	25.4	103	74.6
Vandalism	20	14.5	118	85.5
Hanging out	86	62.3	52	37.7
Bullying	46	33.3	92	66.7
Watching pornography	87	63.0	51	37.0
Free sex	25	18.1	113	81.9
Illegal abortion	56	40.6	82	59.4
Fighting	46	33.3	92	66.7
Gambling	44	31.9	94	68.1

Table 3 shows that there is a significant positive relationship between neuroticism and sensation seeking with physical aggression. This indicates that the higher the neuroticism traits in a participant the higher their physical aggression. Similarly, the higher the sensation seeking trait in a participant the higher their physical aggression. Furthermore, conscientiousness, extraversion and sensation seeking personalities are also positively correlated with verbal aggression. However, anger is only positively correlated with neuroticism and sensation seeking. Finally, only neuroticism is correlated with hostility.

**Table 3.** Correlation between personality and aggression

Variable	Physical aggression (r)	Verbal aggression (r)	Anger (r)	Hostility(r)
Openness	0.132	0.098	0.007	0.095
Conscientiousness	0.085	.194*	0.054	0.096
Extraversion	0.07	.176*	0.114	0.149
Agreeableness	0.057	0.136	0.031	0.115
Neuroticism	.193*	0.131	.181*	.216*
Sensation seeking	.307**	.227**	.304**	0.097

\*p< 0.05 \*\* p<0.01

In table 4, all variables connected with the aggression sub-domain were included in a regression equation. The results show that neuroticism and sensation seeking are predictors of physical aggression and anger, and account for 12.8% and 12.1%, respectively. In addition, for the verbal aggression domain, sensation seeking is the only significant predictor found, accounting for 9% input. Only neuroticism is found to be a significant predictor for hostility with a 4.7% contribution.

**Table 4.** Predictors of the sub-domain of aggression

<i>Physical aggression</i>					
Variable	B	Std. Error	Beta	t	R <sup>2</sup>
Constant	7.260	4.123		1.761	0.128
Neuroticism	0.339	0.149	0.183	2.274*	
Sensation seeking	0.969	0.259	0.301	3.743**	

\*p< 0.05 \*\* p<0.01

<i>Verbal aggression</i>					
Variable	B	Std. Error	Beta	t	R <sup>2</sup>
Constant	5.453	2.543		2.145	0.090
Conscientiousness	0.110	0.079	0.134	1.395	
Extraversion	0.089	0.094	0.092	0.953	
Sensation seeking	0.342	0.133	0.213	2.574*	

\*p< 0.05 \*\* p<0.01

<i>Anger</i>					
Variable	B	Std. Error	Beta	t	R <sup>2</sup>
Constant	6.950	3.194		2.176*	0.121
Neuroticism	0.244	0.116	0.171	2.114*	
Sensation seeking	0.740	0.201	0.298	3.692**	

\*p< 0.05 \*\* p<0.01

<i>Hostility</i>					
Variable	B	Std. Error	Beta	t	R <sup>2</sup>
Constant	15.712	3.335		4.711	0.047
Neuroticism	0.356	0.138	0.216	2.582*	

\*p< 0.05 \*\* p<0.01

#### 4. Discussion

This study involved 138 male adolescents who are engaged in illegal street racing. Almost all of them are Malay Muslims. Over 50% of the respondents are working and the rest are either unemployed or still studying. Based on the findings of previous studies and the current phenomenon in Malaysia, most of those involved in illegal motor racing are indeed Malays. In fact, they are sometimes made up from different groups with different group names. Some of these groups are "Apache Sereng", "Budak Shell" and "Pangkah Benneton". They come to hang out around the city during the weekend nights. When on their motorcycles, they race in groups and performing dangerous stunts. Nevertheless, some do not directly engage with any group but are actively involved with their fellow colleagues just for fun.

The findings of this study indicate that most of the adolescents who are involved in the illegal racing activities are also involved in other risky activities, such as smoking, truancy, glue sniffing, drug addiction, drinking, vandalism, bullying, pornography, free sex, illegal abortion, fighting and gambling. More than 50% of these teenagers are smokers, hang around and watch pornography. These findings are in accord with those of Vaaranen & Wieloch (2002), Folkman (2005), Falconer and Kingham (2007), Leigh (1996), and Vaaranen (2004), who concluded that most street racers are predominantly young, working class males, often in blue collar jobs or unemployed although some have attended trade schools or technical colleges. Many have performed poorly in school and engaged in other risky activities, such as substance use, risky driving, and criminal activity (Falconer & Kingham, 2007; Vaaranen 2004; Vaaranen & Wieloch, 2002). Apart from street racing, they are also involved in antisocial behaviours, tobacco smoking and spend time in non-organized activities (Bina et al, 2006). In addition, Fergusson, Swain-Campbell, and Horwood (2003) linked street racing with externalizing behaviours (early onset of conduct and attention problems), deviant peer affiliations, substance abuse, and criminal activities. This shows that youth involved in illegal racing are at risk of eventually becoming involved in other negative activities that will cause harm to themselves and the surrounding communities. Hence, the government has introduced several programmes to help these teenagers to change their lifestyle to one that is of benefit to them. Among the programmes conducted by the government is Rakan Muda (Young Colleague Programme); although there are also other programmes organized by other parties, these programmes have not been effective in overcoming this phenomenon.

The present study also indicated that some personality types are associated with aggressive behaviour in terms of physical or verbal aggression, anger or hostility. The conscientiousness and extraversion personalities are positively related with verbal aggression. Neuroticism is related to physical aggression, anger and hostility, and, sensation seeking is significantly related to physical aggression and anger. However, based on the regression analysis, it was found that the major contributors to physical aggression are neuroticism and sensation seeking. The major contributor to verbal aggression is only sensation seeking, while the major contributors to anger behaviour include neuroticism and sensation seeking. For hostility, only the neuroticism personality is the major contributor. This finding indicates that some personalities, particularly sensation seeking and neuroticism, contribute to adolescent aggressive behaviour.

Some studies, including this study, have found that certain types of personality are correlated with aggressive behaviour (Anderson & Huesmann, 2003; Campbell & Muncer 2009). Neuroticism and sensation seeking contribute greatly to physical aggressive behaviour among the young illegal racers. Thus, this study supports the findings by Sharpe and Desai (2001) in that neuroticism is correlated with aggressive behaviour. Caprara, Barbaranelli, and Zimbardo (1996) and Ruiz, Smith, and Rhodewalt (2001) also reported positive correlations between the neuroticism trait and aggressiveness. Those individuals who are high on Neuroticism/Negative Emotionality (NEM) are anxious, vulnerable to stress, guilt-prone, lacking in confidence, moody, angry, easily frustrated, and insecure in relationships. Whereas individuals low on this trait are emotionally stable and adaptable (Caspi, Roberts, & Shiner, 2005). According to Eisenberg (2000), children high on Negative Emotionality or low on Constraint have a variety of social difficulties concurrently, and, over time.

Furthermore, this study found that higher levels of sensation seeking are related to verbal, physical aggression, and anger. This could be partially explained by the presence of high sensation seeking behaviour among adolescents. This sensation seeking behaviour is associated with their engagement in risky behaviour (Arnett, 1995; Zuckerman, 1994). Their sensation seeking behaviours reflect to their drive to seek thrills, involvement in highly stimulating action and risky behaviours (Arnett, 1995). Similarly, high sensation seeking behaviour among *mat rempit* is potential to promote them to look for excitement, and tend to engage in dangerous riding behaviours such as speeding and aggressive or risky rides. According to Kelly, Schochet, and Landry, (2004) the sensation-seeking trait is related to a variety of delinquent behaviours, such as alcohol use, the use of illegal drugs, and criminality during adolescence. These are similar to this study in that most of these at risk teenagers not only race illegally but also undertake unhealthy activities, such as consuming alcohol, drugs, and bullying.

The finding of this study supported the notion that *mat rempit* activity is a form of sociocultural consequences of the contemporary social change process in the Malaysian society. The activities and the specific of the *mat rempit* subculture such as spoken language, appearance, and the norms and values to which members subscribed representing new subculture of young population in Malaysia (Ismail, 2014). The *mat rempit* subculture evolved and perpetuated through group learning processes, and was characterised by counterculture elements. However such acts of rebellion sometimes turn violent and even deadly. Thus, relevant authorities must stop this activity before it will become uncontrolled.

## 5. Conclusion

The involvement of youngsters engaging in illegal motorcycle racing in Malaysia is very alarming. They not only impose a danger to themselves but also to other road users. This study aims to determine whether these groups of *mat rempit* have a different kind of personality trait and to what extent it is related to aggressiveness. This study found that these teenagers were not only engaged in illegal racing but were also involved in other negative activities. The findings also showed that some personalities display influencing factors towards aggressiveness among the youth who are involved in illegal motorcycle racing. Hence, the government, non-government organizations (NGOs), and psychologists alike should promote awareness on the negative implications and the risks they have to bear if they continue pursuing this risky activity. In addition, these young illegal racers should be given guidance concerning how to recognize their personality and how to channel these traits to lead a better life. In addition, coping with and properly managing their aggressive behaviours should be considered so that the youngsters can improve and enhance their self-esteem, and enable them to see and chart their future.

## References

Anderson, C.A., & Huesmann, R. L. (2003). Human aggression: A social-cognitive view. In M. A. Hogg, & J. Cooper (Eds.). *The sage handbook of social psychology* (pp.259-287). Thousand Oaks, CA: Sage Publication.

- Arnett, J. J. (1995). The young and reckless: Adolescent reckless behaviour. *Current Directions in Psychological Science*, 4, 67–71.
- Bina, M., Graziano, F., & Bonino, S. (2006). Risky driving and lifestyle in adolescence. *Accid Anal Prev*, 38, 472-481.
- Bushman, B. J. (1995). Moderating role of trait aggressiveness in the effects of violent media on aggression. *Journal of Personality and Social Psychology*, 69, 950–960.
- Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, 63, 452-459.
- Campbell, A., & Muncer, S. (2009). Can 'risky' impulsivity explain sex differences in aggression? *Personality and Individual Differences*, 47, 402-406.
- Caprara, G. V., Barbaranelli, C., & Zimbardo, P. G. (1996). Understanding the complexity of human aggression: Affective, cognitive, and social dimension of individual differences in propensity toward aggression. *European Journal of Personality*, 10, 133-155.
- Caspi, A., Roberts, B.W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annu. Rev. Psychol*, 56(17), 17.1-17.32.
- Donovan, D. M., Marlatt, G. A., & Salzman, P. M. (1983). Drinking behavior, personality factors, and high-risk driving. *Journal of Studies on Alcohol*, 44, 395-428.
- Eisenberg, N. (2000). Emotion, regulation, and moral development. *Annu. Rev. Psycho*, 51, 665–97.
- Falconer, R., & Kingham, S. (2007). 'Driving people crazy': A geography of boy racers in Christchurch, New Zealand. *New Zealand Geographer*, 63(3), 181-191.
- Fergusson, D., Swain-Campbell, N., & Horwood, J. (2003). Risky driving behaviour in young people: Prevalence, personal characteristics and traffic accidents. Australian and New Zealand. *Journal of Public Health*, 27, 337-342.
- Folkman, L. M. (2005). *Queensland's anti-hoon legislation and policing methods used to prevent hooning behavior. Proc. Australasian Road Safety Research, Policing and Education Conference*. Wellington, New Zealand.
- Gabbey, A. E. (December 23, 2013). Aggressive behavior. *Healthline*. Retrieved from <http://www.healthline.com/health/aggressive-behavior#Overview1>
- Giancola, P. R., & Zeichner, A. (1995). Construct validity of a competitive reaction-time paradigm. *Aggressive Behavior*, 21, 199–204.
- Ismail, R. (2014). Fenomena Rempit di Malaysia: Isu dan Cabaran. Dewan Bahasa dan Pustaka, Kuala Lumpur.
- Ismail, R., & Borhanuddin, B. (2009). Pendefinisian semula konsep Mat rempit. *Journal Psikologi Malaysia*, 29.
- Jensen-Campbell, L. A., Knack, J. N., Waldrup, A. M., & Campbell, S. D. (2007). Do big five personality traits associated with self-control influence the regulation of anger and aggression? *Journal of Research in Personality*, 41, 403–424.
- John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102-138). New York: Guilford Press.
- Jonah, B. A. (1986). Accident risk and risk-taking behavior among young drivers. *Accident Analysis and Prevention*, 18, 255- 271.
- Kagan, J., Reznick, J.S., & Snidman, N. (1988). Biological bases of childhood shyness. *Science*, 240, 167-171.
- Kelly, A. E., Schochet, T., & Landry, C. (2004). Risk taking and novelty seeking in adolescence. *Annals of New York Academy of Science*, 1021, 27–32.
- Leigh, A. (1996). Youth and street racing. *Curr. Issues Crim. Justice*, 7, 388-393.
- Muntaner, C., Llorente, M., & Nagoshi, C. (1989). Evaluative instructions and interpersonal aggression in the Type A behavior pattern. *Aggressive Behavior*, 15, 161–170.
- Nottelman, E. D., Susman, E. J., Blue, J. H., Inoff-Germain, G., Dorn, L. D., Loriauz, D. L., . . . Chrousos, G.P. (1987). Gonadal and adrenal hormone correlates of adjustment in early adolescence. In R. M. Lerner & T. T. Fochs (Eds.), *Biological-Psychological Interactions in Early Adolescence*. Hillsdale, NJ: Lawrence Erlbaum.
- Parrott, D. J., & Zeichner, A. (2002). Effects of alcohol and trait anger on physical aggression in men. *Journal of Studies in Alcohol*, 63, 196–204.
- Perez, J., & Torrubia, R. (1985). Sensation seeking and antisocial behavior in a student sample. *Personality and Individual Differences*, 6, 401- 403.
- Ruiz, J. M., Smith, T. W., & Rhodewalt, F. (2001). Distinguishing narcissism and hostility: Similarities and differences in interpersonal circumplex and five factor correlates. *Journal of personality Assessment*, 76, 537-555.
- Satinder, K. P., & Black, A. (1984). Cannabis use and sensation seeking orientation. *Journal of Psychology*, 116, 101-105.
- Schwarz, R. M., Burkhardt, B. R., & Green, B. (1978). Turning on or turning off sensation seeking or tension reduction as motivational determinants of alcohol use. *Journal of Consulting and Clinical Psychology*, 46, 1144 - 1145.
- Sharpe, J. P., & Desai, S. (2001). The revised Neo Personality Inventory and the MMPI-2 Psychopathology Five in prediction of aggression. *Personality and Individual Differences*, 31, 505-518.
- Vaaranen, H. (2004). The emotional experience of class: Interpreting working-class kids' street racing in Helsinki. *Ann. Am. Acad. Pol. Soc. Sci.*, 595, 91-107.
- Vaaranen, H., & Wieloch, N. (2002). Car crashes and dead end careers: Leisure pursuits of the Finnish subculture of the Kortteliralli street racing. *Young Nordic Journal of Youth Research*, 10, 42-58.
- Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. Cambridge: Cambridge University Press.
- Zuckerman, M., & Neeb, M. (1980). Demographic influences in sensation seeking and expressions of sensation in religion, smoking, and driving habits. *Personality & Individual Differences*, 1, 197-206.
- Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale: Lawrence Erlbaum.
- Zuckerman, M., Tushup, R., & Finner, S. (1976). Sexual attitudes and experience: Attitude and personality correlates and changes produced by a course in sexuality. *Journal of Consulting and Clinical Psychology*, 44, 7-19.