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Milana Jovanov[1]

Department of Psychology, Faculty of Philosophy, University of Novi Sad

Dragana Zgonjanin Bosić

Institute for Forensic Medicine in Novi Sad, Clinical Center of Vojvodina

SENSATION SEEKING AND RISKY BEHAVIORS IN LIGHT OF GENETIC AND ENVIRONMENTAL FACTORS[2]

The study was conducted on a sample of 171 pairs of adult twins with the aim of determining the level of the genetic and environmental influence on individual differences for an optimal level of arousal (Zuckerman's sensation seeking construct), and tendencies towards risky behavior (smoking and alcohol abuse). Sensation Seeking Scale and Personal Information Questionnaire were applied. The results have shown that sensation seeking subdimensions belong to the category of highly heritable personality traits (50% - 63%), as well as the smoking addiction (75%). An unshared environmental influence has also proven to be important for these variables. As for the alcohol abuse, it has been proven that it is mostly determined by the effect of the unshared environment (68%). Additionally, the additive genetic factor mainly contributes to covariation between sensation seeking constructs and different risky behaviors.

Key words: behavioral genetics, drinking, sensation seeking, smoking, twin study

[1] Corresponding author email: milana.jovanov@yahoo.com

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Introduction

According to the World Health Organization, alcoholism and smoking are ones of the most widespread addiction diseases. It is estimated that around 2 billion people consume alcohol all over the world, with 76.3 million people having alcohol addiction. Given the fact that the alcohol consumption is associated with more than 200 types of illnesses and injuries, it has been estimated that alcohol abuse caused more than 3 million deaths worldwide in 2016 (WHO, 2018).

In Serbia, 3.4% of the population consumes alcohol on a daily base, and almost 40% of the population drinks alcohol periodically. The largest percentage of people who drink is in the age group from 20 to 34 (WHO, 2018). Not only that alcohol abuse is a socially acceptable activity, but it is also favored to the level of compulsory rituals in many social situations (celebrations, weddings, weekend nights out, etc.). Therefore, the current situation in this field is characterized by a high incidence of alcohol consumption, especially among young people. Risky drinking exceeds 14 SD (standard drinks) per week or more than 4 SD during specific situations for men, while for women it is more than 7 SD per week, or more than 2 SD during specific situations (Institute of Public Health of Serbia, 2008).

Smoking is a risk factor for 6 to 8 diseases that are leading causes of death, such as malignant diseases and cardiovascular diseases. According to the World Health Organization, there were around 1.1 billion regular smokers in the world in 2016 (WHO, 2018). It is estimated that tobacco is responsible for the deaths of half its consumers, and that the number of deaths is 6 million per year. The assumption is that the number of deaths by 2030 will reach 8 million people per year.

Data from 2013 shows that about 30% of the population smokes in Serbia. Serbia is the second country in the world by the number of heart and brain strokes caused by smoking. The worrying fact is that about 10% of smokers belong to the population of young people between 13 and 15 years old. Also, about 77% of young people of that age live with someone who smokes in their presence (WHO, 2013).

Most of the previous studies have tried to determine factors that lead to the risky behavior and a habit of abusing these psychoactive substances through examining the biological factors (genetic, neurological, and biological basis of psychological functioning), psychological development in adolescence, interpersonal (a family system, peer relationships), and environmental factors (Despotović at al., 2013). Since behavioral geneticists can evaluate the degree in which genetic and environmental factors, as well as their interaction, contribute to the variability in phenotypic characteristics, it should provide the most comprehensive understanding of these behaviors.

Smoking and Drinking: Genetic and Environmental Factors

Based on the results of the previous studies, it can be concluded that individual differences in the development of nicotine dependence are predominantly determined by genes (Vink, Willemsen, & Boomsma, 2005). These studies have estimated that the gene influence determines up to 75% of the variance of smoking addiction. These results have been explained by the neurological basis of the dopaminergic system. The results suggest that the remaining variance can be explained by an unshared environment, i.e. events and environment characteristics specific to an individual. Findings that emphasize the importance of a shared, family environment are less consistent. This is probably due to the influence of the age cohort or the culture influence (Tsuang, Bar, Harley, & Lyons, 2001). However, when it comes to initial smoking, the influence of genes and the shared environment, such as the family environment and the influence of culture, i.e., the attitudes of the environment on the consumption of cigarettes, are primarily emphasized (True et al., 1997).

The genetic contribution to alcohol abuse and alcohol dependence have been examined in a few twin studies. The results suggest that 40-60% of the variance of propensity to drink alcohol can be explained by the genetic effect. The remaining variance is explained by an unshared environment, while the shared or family environment has not proved to be significant in explaining individual differences in alcohol abuse (Goldman, Oroszi, & Ducci, 2005; Prescott et al., 2006; Tsuang et al., 2001). It is important to note that the findings supporting the genetic explanation of alcohol abuse do not only refer to alcoholism as a diagnosed psychological disorder, but also to the inclination of a person to exaggerate in drinking alcohol.

Although the results of behavioral genetic studies show little influence of the shared or unshared environment, the results of recent studies suggest that the behavior of parents is significant, but insufficiently investigated perceiving or protective factor for the development of the habit of alcohol abuse and cigarette consumption for younger and older adolescents (Kaplan Napoles-Springer, Stewart, & Perez-Stable, 2001). Based on previous research, a wide spectrum of psychosocial impacts of parents on the development of these habits in behavior can be divided into three conceptualized behaviors: a parent support, a parental control, and parental attitudes towards these forms of behavior (Wood, Read, Mitchell, & Brand, 2004).

Smoking and Abuse of Alcohol

Research has shown that the use of some psychoactive substance is often associated with the use of another psychoactive substance. Researches have shown that nicotine and alcohol dependence is comorbid: 85% of alcoholics are smokers. Studies have been carried out to determine the existence of the same genetic or environmental factors for the development of these forms of behavior (Goldman

et al., 2005). In a study by Swan et al. (Swan, Carmelli, & Cardon, 1997), the obtained results suggest that about 50% of the genetic predisposition for nicotine dependence is shared with a genetic predisposition for alcoholism, while 15% of the genetic predisposition for alcoholism is common with nicotine dependencies. Tsuang and his associates (Tsuang et al., 2001) have found that about 25% of the total risk variability for the development of alcoholism has a common genetic basis with dependency on nicotine, and that about 2.4% of the risk factors of unshared environment for the development of alcoholism overlaps with the risk factors for the development of nicotine addiction.

In contrast to these findings, some studies (Koopmans, van Doornen, & Boomsma, 1997; Young, Rhee, Stallings, Corley, & Hewitt, 2006) have found very low shared influence of genetic and environmental factors. The reason for such variability among findings can be a different approach to the operationalization of measured behaviors, which points to the necessity of exploring the common genes of the neurobiological bases of these behaviors, that is, the identification of biological mechanisms that will enable the common risks to be explicitly explained through manifest processes (Goldman et al., 2005).

Sensation Seeking and Risky Behaviors

A comprehensive understanding of the evolution of habits in one's behavior should certainly include personality traits as a lasting determinant of the behavior of an individual (Terracciano & Costa, 2004). Zuckerman constructs of sensation seeking proves to be one of the most reliable predictors of the initial use of psychoactive substances, as well as for its abuse (Kaprara & Ćervone, 2003; Pihl & Suton, 2009; Shakra et al., 2018; Zuckerman, 2007). Sensation seeking is based on the theory of existence of individual differences in the optimal level of arousal, according to which everyone has a characteristic optimal level of excitement and stimulation for motor and cognitive activity. This depends on the age of the individual, learning, experience, environmental and day cycle.

Zuckerman has defined this psychobiological construct as a personality dimension characterized by the search for new, diverse, complex, and intense sensations from the environment, which involves accepting a certain level of risk in physical, social, legal, and financial areas. This construct contains four basic subdimensions. Thrill and Adventure Seeking (TAS) refers to engage in activities involving some physical danger or risk (extreme sports activities, speed driving, etc.). Experience Seeking (ES) measure the desire for new experiences through living in a nonconforming uncoventional lifestyle and travel. Disinhibition (DIS) operationalize the need to disinhibit behaviour in the social sphere by drinking, partying, and seeking variety in sexual partners. Aversion for rutine or repetitive experiences of any kind, as well as predictable people, are defined as a Boredom Susceptibility (BS), and there is a restless reaction when things are being unchanged. Research has shown that individuals with high scores on the sensation

seeking dimensions start to use different types of psychoactive substances at an early age. They use larger amounts of these substances, being more susceptible to developing addictions, and more likely to maintain abstinence during treatment (Roberti, 2004; Zuckerman, 2007).

In many studies, the correlation between the high scores on the sensation seeking dimension and use of alcohol has been confirmed (Hittner & Swickert, 2006; Martin et al., 2002). A dominant theoretical explanation of this association derives from research that indicates a negative correlation between this dimension and the level of monoamine oxidase enzyme (MAO). MAO dissolves dopamine and norepinephrine, and in that way it regulates their level (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). Numerous studies have confirmed that people who are prone to excessive alcohol consumption have a lower level of MAO enzyme than people who are not prone to these behaviors. The assumption is that an elevated dopamine level is responsible for developing these habits in a sensation seeker for two reasons: a) dopamine motivates behavior with an appetizing reward, in particular when the reward is biologically (substantially) stimulating (Zuckerman, 1994); and b) the use of alcohol stimulates the release of dopamine in the "pleasure center" (ventral striatum and nucleus accumbens) in the brain (Koob & Le Moal, 1997).

The positive correlation of cigarettes consumption and sensation seeking construct has also been proven in many studies (Dinn, Aycicegi, & Harris, 2004; Frankenberger, 2004; Kopstein, Crum, Celentano, & Martin, 2001; Roberti, 2004; Zuckerman, 2007). Studies with smokers have shown that sensation seeking is associated with the higher urge for cigarettes (Doran, Cook, McChargue, & Spring, 2009), stronger symptoms of negative affectivity, and anhedonia during nicotine abstinence (Carton, Le Houezec, Lagrue, & Jouvent, 2000; Leventhal et al., 2007), as well as higher recurrence rates after attempts of quitting (Kahler, Spillane, Metrik, Leventhal, & Monti, 2009). These findings suggest that sensation seeking plays an important role in initiating, escalating and maintaining this behavior. One of the explanations is the preference for unusual and intense taste and sensory stimulation characteristic for sensation seekers (Zuckerman, 1994, 2007). These studies have shown that even simple experimental manipulation with a new taste of cigarettes increases the intent for them to consume cigarettes.

Sensation Seeking: Genetic and Environmental Factors

Research has shown that biochemical mechanisms provide a significant support for the sensation seeking construct and related biological systems (Balada, Torrubia, & Arque 1993; Ballenger et al., 1983; Daitzman & Zuckerman, 1980; Dellu, Piazza, Mayo, Le Moal, & Simon 1996; Piazza et al., 1993). The assumption was that the construct with confirmed biological bases should have a significant influence on the genes in explaining the individual differences in its variability in the population.

Fulker et al. conducted the first major study of twins for assessing the heritability of sensation seeking construct (Fulker at al., 1980). The study was conducted on 422 pairs of adult twins, in collaboration with Zuckerman. The results of the study supported the assumption of a significant gene contribution to the existence of individual differences on this construct, given that the estimated heritability explained 58% of the variance. The resulting percentage of heritability was quite high for the estimation of the personality dimension, so the assumption of the researcher was that sensation seeking was predominantly determined by the additive genes (Fulker at al., 1980). The authors linked the estimated heritability to the level of MAO enzymes.

A significant contribution of genes was confirmed in the study by Koopmans and associates (Koopmans, Boomsma, Heath, & van Doornen, 1995). Their study with 1591 twin pairs confirmed high heritability. The study also showed that 58% of individual differences on this dimension could be explained by genes. Unlike previous studies, the researchers used a multivariate model for calculating the proportion explained by the variance among the subdimensions, so the covariance among variables was also calculated. The obtained results suggested that the genetic variation was the highest for subdimension Threats and Adventures (62% for men, 63% for women), and subdimension Disinhibition (62% for men, 60% for women), and the lowest for subdimension Boredom Sensitivity (48% for men, 58% for women). Estimated genetic variance for the Search for Experience was 56% on the male sample, and 58% on the female sample. Effects of the unshared environments were smaller, but also significant, while the effects of the shared environment did not appear to be significant. By testing the gender differences, no evidence was found that different genes affected the expression of this dimension in men and women.

The basic problem of the research is the determination of common and specific genetic and environmental factors of individual differences in optimal sensation (arousal) level, and tendency to risky behaviors: smoking and drinking. Based on previous research, a significant genetic contribution can be assumed. Also, it can be expected that the unshared environment will also be significant. Based on a previously confirmed relation between the dimension of sensation seeking and these types of risky behavior, the assumption is that the study results will show a significant overlapping of genetic and unshared environment variables.

Method

The Sample and Procedure

The sample included 171 pairs of twins from the general population in Serbia, aged between 18 and 60 (M = 24.80, SD = 7.61). Participants were 91 female and 21 male monozygotic twin pairs, and 27 female, 9 male, and 23 opposite sex

twin dizygotic pairs. We collected DNA samples by taking buccal swab in order to determine zygosity of twins. The data were collected in Novi Sad, Belgrade, Zrenjanin, Novi Pazar, and Niš in the period from 2011 to 2018. Participation of the twins was voluntary, and every respondent signed an information consent for participation in the research which was the part of Serbian wide national project.

Instruments

Sensation Seeking Scale form V (SSS-V; Zuckerman, 1994). SSS-V intend to measure individual differences in behavioral expression of sensation seeking. The scale consists 40 dichotomous items with forced choice of answering. The items are grouped in the four subdimensions: TAS - Thrill and Adventure Seeking, ES - Experience Seeking, DIS – Disinhibition, and BS - Boredom Susceptibility. Answers are coded as 1 (if item refers to some type od sensation seeking behavior), or 0 (if the item refers to other behaviors). The Cronbach reliability coefficient was .82 for TAS, .63 for ES, .67 for DIS, and .63 for BS. According to Loewenthal (2004), reliability coefficients above .60 could be considered as satisfactory.

Personal Information Questionnaire. By using this questionnaire we collected the information about frequency of cigarettes consumption, and frequency of alcohol drinking. The frequency values were determined in relation to the respondents' answers to the question of how many cigarettes they consumed per day (offered answers: up to 5, up to 20, up to 40, more than 40), and to the question of how often they got drunk (offered answers: once or twice a month; twice a week, several times a week, daily).

Results

Descriptive Statistics and Gender Differences

Table 1 shows descriptive statistics for the used variables. All SSS-V variables are normally distributed (skewness and kurtosis are lower/higher than 1.50/-1.50) according to Tabachnick & Fidell (2013). Frequency of cigarettes consumption had not been normally distributed, so we normalized it by using Tuckey data transformation. Gender differences were detected only in favour of males for Thrill and Adventure Seeking (t = 2.89, p < .01), Experience Seeking (t = 2.07, p < .05), Disinhibition (t = 3.32, p < .01), Boredom Susceptibility (t = 2.60, p < .01), and alcohol frequency (t = 3.35, p < .01).

Table 1
Descriptive statistics for sensation seeking sub-scales and risky behaviors

	Monozygotic twins				Dizygotic twins			
	M	*SD*	*Sk*	*Ku*	*M*	*SD*	*Sk*	*Ku*
Thrill and Adventure Seeking	6.09	2.91	-0.42	-0.92	6.33	2.67	-0.41	-0.81
Experience Seeking	4.76	2.16	-0.06	-0.53	5.25	2.25	-0.09	-0.81
Disinhibition	3.62	2.28	0.70	0.63	4.28	2.48	0.20	-0.66
Boredom Susceptibility	3.28	2.03	0.43	-0.26	3.49	2.18	0.56	0.26
Cigarettes consumption	1.34	0.74	1.95	2.49	1.41	0.85	1.91	2.33
Alcohol frequency	1.29	0.47	1.21	0.11	1.59	0.67	1.07	1.39

Note. M – mean, *SD* – standard deviation, *Sk* – skewness, *Ku* – kurtosis.

Relations between Different Risk Behaviours: Cross Twin – Cross Trait Correlations

Intraclass correlations and cross twin-cross trait correlations are presented in Table 2. Both types of correlation coefficients are calculated separately for the monozygotic and dizygotic group of twins.

Table 2
Intraclass and cross twin – cross trait correlations

	TAS		ES		DIS		BS		Cigarettes		Alcohol	
	MZ	DZ	MZ	DZ	MZ	DZ	MZ	DZ	MZ	DZ	MZ	DZ
TAS	.45**	.26*										
ES	.17	.11	.54**	.36**								
DIS	.21*	-.06	.32**	.19	.58**	.21*						
BS	.06	-.29*	.16	-.05	.33**	.28	.48**	.26*				
Cigarettes	-.04	-.06	.01	.04	-.04	.07	-.07	.15	.73**	.22*		
Alcohol	.07	-.01	.13	.13	.20	.37**	.13	-.04	.10	.19	.39**	.22*

Notes. MZ – monozygotic twins, DZ – dizygotic twins. TAS - Thrill and Adventure Seeking, ES - Experience Seeking, DIS – Disinhibition, BS - Boredom Susceptibility. Diagonal numbers represent intraclass, while the remaining ones represent cross twin-cross trait coefficients of correlation.
* $p < .05$. ** $p < .01$.

The cross twin – cross trait correlations in the group of monozygotic twins are signify higher than the correlation of the variables in the group of dizygotic

twins by both types of correlation. This provides evidence that genetic factors are likely to significantly contribute to covariance between all types of examined behaviours. The differences in correlations coefficients are most striking in the case of cigarettes consumption and Disinhibition, so it can be assumed that genetic factors will play a decisive role in shaping these phenotypes.

Multivariate Genetic Analysis

In order to assess the genetic and environmental influences in the dimension of seeking sensations, and the frequency of cigarettes consuming and drinking, a multivariate gene analysis was applied. Various full and reduced structural models (ACE, AE, CE), which represented the standard in genetic structural modeling (independent and common pathway), were compared by several fit criteria. Analysis parameters were calculated by using the ML method. Model evaluation was conducted based on the Bayesian Information Criterion (BIC), Akaike Information Criterion (AIC), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the quotient $\chi 2/df$ (Table 3). It was found that the best fit had an independent AE model ($\chi^2/df = 1.41$, $p = .27$, CFI = .92, TLI = .91, RMSEA = .06, AIC = 101.35, BIC = 7330.2).

Table 3
Parameters estimation of the AE independent model

	TAS	ES	DIS	BS	Cigarettes	Alcohol
Ac^2	.22 (.08 - .48)	.11 (.06 - .22)	.54 (.35 -.77)	.31 (.10 - .56)	.01 (.00 -.02)	.20 (.11 - .46)
As^2	.41 (.19 - .58)	.39 (.19 - .59)	.07 (.03 - .13)	.20 (.11 - .34)	.75 (.47 - .88)	.12 (.06 - .26)
ΣA	.63	.50	.61	.51	.76	.32
Ec^2	.02 (.00 - .03)	.31 (.13 - .51)	.04 (.02 - .10)	.02 (.00 - .06)	.01 (.00 - .02)	.00 (.00 - .03)
Es^2	.35 (.21 - .55)	.19 (.10 - .36)	.35 (.22 - .51)	.47 (.17 - .66)	.23 (.11 - .36)	.68 (.31 - .88)
ΣE	.37	.50	.39	.49	.24	.68

Note. TAS - Thrill and Adventure Seeking, ES - Experience Seeking, DIS – Disinhibition, BS - Boredom Susceptibility. Ac^2 – a common genetic factor, As^2 – a unique genetic factor, ΣA^2 - total genetic variance, Ec^2 – a common non-shared environmental factor, Es^2 – a unique non-shared environmental factor, ΣE^2 - total environmental variance.

Genetic factors contribute significantly to the manifestation of TAS, DIS, BS, and cigarette consuption, while the environmental factor is more important for drinking. Equal genetic and environmental variance is detectable in case of ES. Heritability of DIS mainly refers to common genetic factors (89%), as well as in the case of BS (61%), and drunking (63%), while heritability of cigarettes consumption (99%), ES (78%), and TAS (95%) mailny refers to specific genetic factor. A common non-shared environmental factor is more important for manifestation of ES (62%), while in other cases a specific non-shared environmental factor plays a more significant role.

Phenotypic correlations between different types of sensation seeking and risk behaviours are presented in Table 4.

Table 4
Genetic and nonshared environmental contributions to phenotypic correlations

Sources of variance	r_f	*Ac(%)*	*Ec(%)*
TAS X Cigarette consumption	.06	83	17
TAS X Drinking	.06	100	0
ES X Cigarette consumption	.09	33	67
ES X Drinking	.15	100	0
DIS X Cigarette consumption	.09	78	22
DIS X Drinking	.33	100	0
BS X Cigarette consumption	.07	86	14
BS X Drinking	.25	100	0
Cigarette consumption X Drinking	.05	100	0

Note. TAS - Thrill and Adventure Seeking, ES - Experience Seeking, DIS – Disinhibition, BS - Boredom Susceptibility. r_f – a coefficient of phenotypic correlations, *Ac* – a common genetic factor, *Ec* – a common non-shared environmental factor.

Phenotypic correlations between sensation seeking dimensions and risk behaviours are low to moderate ($.05 \leq r \leq .33$). Genetic factors have a main role in explainig the covariations between drinking and all other variables (100%), while environmental factors have more significant role in explaining the covariations between ES and Cigarette consumption (67%). In all other cases genetic factors explain a higher percentage of variance than environmental factors.

Discussion

The main question of the research was a coherence between the personality dimension and the risky forms of behavior. More specifically, the aim of the re-

search was to determine common and specific genetic and environmental factors of individual differences in an optimal sensation (arousal) level, and tendency to risky behaviors: smoking and drinking. The fact that the construct of sensation seeking was proven to be one of the most reliable predictors of the initial use and abuse of psychoactive substances (Kaprara & Ćervone, 2003; Pihl & Suton, 2009; Shakra et al., 2018; Zuckerman, 2007) gives a scientifically significant base for more detailed examination of the relationship of these variables. Also, since smoking and drinking were ones of the most frequent forms of risky behavior in the population (Institute of Public Health of Serbia, 2008; WHO, 2018), the research could have the significant practical value.

The results indicate the significance of gene effects, the effects of an unshared environment on the subdimensions of Sensation Seeking Scale, and the examined forms of risky behaviors. The results are in accordance with previous studies of sensation seeking (Fulker at al., 1980; Koopmans et al., 1995). People inherit a characteristic level of excitement and stimulation for motor and cognitive activity, so some individuals are predetermined to search for more new experience.

As Zuckerman has defined, and the previous studies confirm (Zuckerman, 2007), an optimal level of arousal for an individual also depends on the unique experience of a person (learning, life events etc). Influence of the unshared environment has been mostly smaller, but also significant in most of the research, while the effects of the shared environment have not been significant. The subdimension Experience Seeking has the same percentage of the influence of genes and unshared environment. Since this dimension relates to nonconforming unconventional lifestyle, "the need to live different from the environment", it could be concluded that the environment has a significant influence on forming this kind of attitude and lifestyle. As the impact of the environment is significant in our study, further studies should focus more on cultural differences.

The results implicate that genes dominantly (99%) affect the development and maintenance of the nicotine addiction, and that this addiction is mostly determined by specific genes. This leads to the conclusion that genes are not responsible for the correlation of the sensation seeking and this kind of addiction. Sensation seeking could have the important role in initiating, and maybe escalating addiction (Dinn et al., 2004; Frankenberger, 2004; Kopstein et al., 2001; Roberti, 2004; Zuckerman, 2007), but not in the maintenance of this kind of behavior. Therefore, the conclusion is that a high tendency for sensation seeking can provoke the initial consumption of cigarettes, which later, under the influence of neurological processes determined by specific genes, becomes an addiction.

The tendency of alcohol abuse is dominantly explained by an unshared environment. Drinking, in this case, does not refer to alcoholism as a disorder, so the assumption is that people in our sample practice this type of risk behavior because it is acceptable or desirable in a social situation. The alcohol is consumed because of the satisfaction, not because there is a physiological need based on the addiction. The high percentage of shared genetic influence (100%), with the

subdimensions of sensation seeking, can be explained with the determined correlation of the level of MAO enzymes within "sensation seekers" and people who tend to enjoy alcohol. The lower level of MAO enzymes is negatively correlated with dopamine levels, which is responsible for a sense of satisfaction during these types of behaviors.

The results lead to the conclusion that it is wrong to perceive sensation seeking as a predictor of nicotine dependence and alcohol abuse. However, high scores on this dimension should be considered as one of the main risk factors for developing these risky behaviors. Results have shown that the environment also has a significant influence on development and expression of these kinds of behavior, and thus there is a good possibility for preventive programs. The next study should be more focused on the factors of an unshared environment that could explain the individual differences in these variables. It could make a significant contribution to prevention programs.

Also, furder examination of this topic should involve more variance in the age of the participants. The participants are mostly in their twenties, with the average of 24 years old. The fact that sensation seeking is the highest in the early twenties (Zuckerman, 2007) makes this sample appropriate. Also, people in that age represent a very high percentage of the population who consumes cigarettes and abuse alcohol (Institute of Public Health of Serbia, 2008). However, there is still a question of the variability of this dimension and its correlation depending on the age cohort. The fact that a need for sensation is decreasing over the years of a person's life (Zuckerman, 1994) could influence its correlation with smoking and alcohol abuse, and also show significant changes in the level of influence of shared and specific genetics, and environmental factors on these behaviours.

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Milana Jovanov

Odsek za psihologiju, Filozofski fakultet, Univerzitet u Novom Sadu

Dragana Zgonjanin Bosić

Institut za sudsku medicinu u Novom Sadu, Klinički centar Vojvodine

TRAŽENJE SENZACIJA I RIZIČNA PONAŠANJA U SVETLU GENSKIH I SREDINSKIH ČINILACA

Istraživanje sprovedeno na 171 paru odraslih blizanaca imalo je za cilj da odredi stepen doprinosa genskih i sredinskih činilaca formiranju optimalnog nivoa senzacija (Zakermanov konstrukt traženja senzacija), kao i sklonostima ka rizičnim oblicima ponašanja - konzumiranju cigareta i napijanju. U istraživanju je primenjena Skala traženja senzacija, kao i Upitnik o ličnim informacijama. Rezultati ukazuju na visoku heritabilnost pojedinačnih subdimenzija traženja sezacija (50% - 63%), kao i navike konzumiranja cigareta (75%). Doprinos nedeljene sredine se takođe pokazao kao značajan za objašnjenje individualnih razlika na ovim dimenzijama. Sa druge strane, na osnovu dobijenih rezultata može se zaključiti da nedeljena sredina ostvaruje najveći doprinos na razvoj sklonosti ka zloupotrebi alkohola (68%). Takođe, aditivni genski činioci ostvaruju većinski doprinos kovariranju mera traženja senzacija i različitih rizičnih ponašanja.

Ključne reči: bihejvioralna genetika, blizanačka studija, napijanje, pušenje, traženje senzacija