The prediction of criminal recidivism in male juvenile delinquents

Miloš Stanković[1*], Nikola Simonović, Jelena Bulatović,
Jelena Stojiljković[2], Marina Hadži Pešić[3], and Milkica Nešić[3, 4]

[1] *General and Experimental Psychology, Department of Psychology,*
Ludwig-Maximilians-Universität München, Munich, Germany
[2] *Faculty of Philosophy, University of Belgrade, Serbia*
[3] *Department of Psychology, Faculty of Philosophy, University of Niš, Serbia*
[4] *Faculty of Medicine, University of Niš, Serbia*

Previous studies have demonstrated a strong association of criminal behavior of juvenile delinquents with delinquents' personality traits and family interactions. However, little is known about the extent to which family interactions and personality traits are associated with criminal recidivism. The present study aimed to examine these relationships, using the Velikih pet plus dva (Big Five Plus Two) – short version (assessing Neuroticism, Extraversion, Openness to experience, Conscientiousness, Aggressiveness, Positive Valence, Negative Valence), The Quality of Family Interaction Scale (Satisfaction with family, Mother and Father Acceptance/Rejection), and official data from criminal records. The study included 61 institutionalized delinquents and 64 non-delinquents, 15 to 18 years of age. Neuroticism, Openness to experience, Conscientiousness, Negative valence, acceptance by father and rejection by mother are statistically significant predictors of criminal recidivism in juvenile delinquents. Delinquents showed higher Neuroticism, lower Conscientiousness and acceptance by mother compared to non-delinquents.

Key words: juvenile delinquents, criminal recidivism, prediction, personality traits, family interaction

Corresponding author: milos.uroboros@gmail.com

*   ORCID: 0000-0001-9767-5634

Highlights:

- Perceived mother rejection is a significant predictor of criminal recidivism.
- Perceived father acceptance is a significant predictor of criminal recidivism.
- Personality traits are significant predictors of criminal recidivism.
- Delinquents showed higher neuroticism and lower conscientiousness than non-delinquents.

Criminal behavior of juvenile delinquents is becoming a significant issue in many countries worldwide. Antisocial individuals have a negative impact both on themselves and society (Rhee et al., 2013), and impose up to ten times higher costs of healthcare and social protection on society compared with healthy individuals (Blair, 2013). Criminal behavior in juvenile delinquents is often related with criminal recidivism. According to the U.S. National Institute of Justice (https://www.nij.gov), recidivism is defined as a "person's relapse into criminal behavior, often after the person receives sanctions or undergoes intervention for a previous crime". This is consistent with the interpretation of recidivism by the institutions of the Republic of Serbia, defining recidivism as a failure of the implemented special prevention measures. Criminal recidivism may initially occur in youth, and a general rule states that the more an individual is antisocial, the earlier antisocial behavior occurs (DeLisi et al., 2013; Rhee et al., 2013). Recent data (Durose, Cooper, & Snyder, 2014) from the U.S. and Europe (Cuervo & Villanueva, 2018) are alarming due to warning of high recidivism among juvenile delinquents and the threat of recidivism in the further development of criminal behavior among young people.

Criminal behavior and criminal recidivism have often been discussed in prominent criminological theories such as Patterson's Coercion theory, with early- and late-onset delinquency phases (Patterson, 2002; Patterson, Reid, & Dishion, 1992). According to this social-interaction theory anti-social, aggressive and criminal behavior is learned in the family through family interactions by a four-step coercion mechanism: a parent imposes his/her request; the child responds with an aversive behavior (arguing, yelling, etc.); the parent withdraws and desists from requesting; the child reduces the aversive behavior and calms down. Such behavior of the child is functional as it stops the aversive behavior of other family members. Coercive behavior that occurs frequently as a significant part of family interactions leads to the early development of delinquent behavior (Patterson, 2002). Early antisocial behavior of a child exacerbates social interaction with peers and leads to peer rejection, thus further strengthening antisocial behavior and reducing opportunities for developing social skills. Rejected children begin to socialize with other rejected and aggressive children, thus further supporting the development of antisocial behavior. Apart from the early onset, there is a late onset of delinquency that is not largely determined by

the coercion mechanism. However, the late-onset delinquency is characterized by low social competence and socializing with delinquent peers, frequently due to reduced parental monitoring (Patterson & Yoerger, 2002).

Patterson's social-interaction approach to explaining the mechanism of the development of delinquency through family interactions is indirectly in line with the influential Parental Acceptance/Rejection theory (PART). PART provides a possibility for explaining family interactions between children and parents through the dimension of parental warmth. Acceptance is at one end of parental warmth and rejection is at the other (Rohner, 1999). Parental rejection leads to the development of negative self-representation in childhood and adolescence, thus resulting in destructive consequences, such as substance abuse and delinquent behavior, while parental acceptance, providing love, care and warmth leads to emotional stability and the formation of a healthy personality of a child and of an adolescent (Rohner, 1999; Rohner, 2008). Recent studies (Patterson, DeBaryshe, & Ramsey, 2017) indicate that delinquent behavior develops through a number of life experiences; ineffective parenting practices primarily result in disruptive behavior, peer rejection and depressed mood, as well as involvement with deviant peer groups and the development of chronic delinquent behavior. Early family/parent training programs can be an effective prevention of delinquency and antisocial behavior (Piquero et al., 2016), thus demonstrating both positive and negative effects of the family on the formation of personality traits.

Furthermore, nuclear and extended family environments may have a fundamental influence on the formation of personality traits associated with delinquent behavior. For the last three decades, personality has been one of the most significant explanatory constructs in criminology (Asscher et al., 2011; Jones, Miller, & Lynam, 2011; Međedović, 2009; Van Dam, Janssens, & De Bruyn, 2005), whereas factor models of personality have played a dominant role in explaining criminal and delinquent behavior of young people and adults. Personality dispositions represent a stable pattern of behavior that may be related to delinquency and recidivism.

Growing evidence suggests the association between Big-Five personality domains and delinquent behavior (John, Naumann, & Soto, 2008). Big Five Plus Two (Čolović, Smederevac, & Mitrović, 2014), that includes Negative Valence (manipulation), is a model of personality particularly suitable for delinquency examination. This model proved valuable in studies that examined socially inadequate behaviors (Dujmović & Čolović, 2012). Moreover, personality traits may be a framework for the interpretation of criminal behavior and recidivism. Although research on personality traits in juvenile delinquents was largely ignored by mainstream criminology in the past (Miller & Lynam, 2001; Jones, Miller, & Lynam, 2011), recent studies have reported the link between personality traits and delinquent behavior (Kodžopeljić et al., 2014; Somma et al., 2018), and personality traits and criminal recidivism (Barrett et al., 2014; Van Dam, Janssens, & De Bruyn, 2005). The absence of empathy, lack of guilt

and exploitation of others are relatively stable personality traits during childhood and adolescence and can thus cause particularly dangerous, aggressive and stable patterns of antisocial behavior in young persons (Frick & White, 2008; Kostić et al., 2016; Marsh et al., 2011; Marsh et al., 2013). Stanković et al. (2015) have reported on the association of an individual's criminal behavior with emotion recognition deficits, thus partly explaining the lack of empathy in perpetrators.

Some studies that used Serbian samples showed a significant link between factor models of personality and delinquent behavior of young or adult convicts. Juvenile delinquents display high neuroticism and low conscientiousness (Kodžopeljić et al., 2014), and the combination of these personality traits is predictable for youth risk behavior (Obradović & Dinić, 2010). A study by Dinić et al. (2016) indicated that two types of violent convicts may be identified on the basis of personality traits: a class of aggressive and a class of emotionally stable convicts. Reactive aggressiveness and neuroticism are higher in the class of violent aggressive convicts, whereas neuroticism is higher in the class of emotionally stable convicts, thus confirming the importance of neuroticism in adults and juveniles. In addition, there is a significant negative correlation between agreeableness and the number of criminal sentences, as well as between extraversion and penal recidivism in a sample of adult convicts, although the most important predictors of the number of penalties and prison sentences are actually antisociality and amorality (Kujačić, Međedović, & Knežević, 2015).

Little is yet known about the association of personality traits and family interactions with criminal recidivism in juvenile delinquents. The aim of this study was to examine: a) the association of family interactions (satisfaction with family, mother and father acceptance/rejection) and the seven-factor model of personality (Neuroticism, Extraversion, Openness to experience, Conscientiousness, Aggressiveness, Positive Valence, and Negative Valence) with criminal recidivism (the number of criminal offenses and official arrests) in juvenile delinquents; b) mean differences between juvenile delinquents and non-delinquents in regard to family interaction variables and the seven-factor model of personality traits expression. In line with previous studies demonstrating the association of inadequate family models/parenting (Barrett et al., 2014; Wolff & Baglivio, 2017), high negative valence/manipulative behavior (Lynam et al., 2009), neuroticism (Van Dam, Janssens, & De Bruyn, 2005), and aggressiveness (Barrett et al., 2014) with criminal recidivism of juvenile delinquency, we hypothesize that the perception of parents as rejecting, Negative Valence, Neuroticism, and Aggressiveness are significant predictors of criminal recidivism in juvenile delinquents. In line with previous studies demonstrating that delinquents perceived higher parental rejection (Rohner, 2002; Patterson, DeBaryshe, & Ramsey, 2017) and report higher Neuroticism (Le Corff & Toupin, 2009) as well as lower Openness to experience (Van Dam, Janssens, & De Bruyn, 2005) than non-delinquents, we hypothesize that juvenile delinquents perceive higher parental rejection, and display higher Neuroticism and lower Openness to experience compared to non-delinquents.

Method

Participants

The study included 125 Caucasian male participants (aged 15 to 18 years); 61 institutionalized juvenile delinquents (M_{age} = 17.22, SD = 0.66) and 64 non-delinquents (M_{age} = 16.56, SD = 0.75). Nine out of 70 initially scanned delinquents refused to participate in the study, whereas there were no refusals in the group of non-delinquents. Institutionalized juvenile delinquents were recruited at the Youth Correctional Facility in Kruševac, Serbia. The majority of delinquents attend the Technical High School in Kruševac. Juvenile perpetrators of criminal offenses who attained 14 years of age (the minimum age for criminal responsibility in the Republic of Serbia) are detained in this facility, whereas educational measures may be applied until the age of 23 (legal maximum). In accordance with the law of the Republic of Serbia juvenile criminal offenders in our sample are subjected to sanctions for the following criminal offenses: a) criminal offenses against life and limb, including severe bodily injuries, light bodily injuries, involvement in a physical fight (43%); b) criminal offenses against property, including theft of different degrees of severity (28%); c) robbery (12%), and d) criminal offense of causing danger to life or body of people or to property by a generally dangerous act or generally dangerous means (17%). Non-delinquents were recruited at a local electrotechnical high school in Niš, Serbia and the inclusion criteria required the participants who had not committed a criminal offense and had never been arrested. This study included male participants exclusively, since males represent the majority of admissions to Serbian juvenile correctional institutions. Delinquents and non-delinquents come from families of different social status, parents' education, parents' marital status and right of custody (Table 1).

Table 1
Socio-demographic data about delinquents' and non-delinquents' parents

		Delinquents Frequency (%)	Non-delinquents Frequency (%)
Family status	Complete nuclear family	25 (41%)	51 (79.7%)
	Incomplete nuclear family with one parent	26 (42.6%)	12 (18.8%)
	Foster family	5 (8.2%)	1 (1.6%)
	Other	3 (4.9%)	-
	Missing data	2 (3.3%)	-
Father's level of education	Incomplete primary school	12 (19.7%)	
	Primary school	29 (47.5%)	4 (6.3%)
	High school	17 (27.9%)	28 (43.8%)
	Two-year college	3 (4.9%)	21 (32.8%)
	University	-	11 (17.2%)
Mother's level of education	Incomplete primary school	14 (23%)	-
	Primary school	26 (42.6%)	2 (3.1%)
	High school	15 (24.6%)	33 (51.6%)
	Two-year college	5 (8.2%)	17 (26.6%)
	University	1 (1.6%)	12 (18.8%)
Marriage status	Divorced	38 (62.3%)	9 (14.1%)
	Married	21 (34.4%)	55 (85.9%)
	Missing data	2 (3.3%)	-
Custody of parents	No custody	7 (11.5%)	-
	Under custody	54 (88.5%)	64 (100%)

Instruments

The Quality of Family Interaction Scale (KOBI; Vulić-Prtorić, 2002). The scale consists of 55 items rated on a Likert-type scale from 1 – *not at all true*, to 5 – *yes, completely true*, and measures a child's perception of parental acceptance and rejection. The scale was designed on the basis of PART (Rohner, 2002) and the dimension of parental warmth through conceptual dimensions of acceptance and rejection. Family interactions are measured using five subscales: satisfaction with family (11 items, e.g., "To me, family is the source of comfort and satisfaction"), acceptance by mother (10 items, e.g., "My mother is full of love for me"), acceptance by father (10 items, e.g., "My father has a lot of understanding for my problems"), rejection by mother (12 items, e.g., "My mother does not have enough time for me"), and rejection by father (12 items, e.g., "My father does not care about what I actually feel"). Higher scores on the acceptance subscale indicate greater intimacy, emotional warmth and love between a child and the mother/father, while higher scores on the rejection subscale indicate a greater amount of prohibitions, physical roughness and the lack of love from the mother/father. Higher scores on the subscale of satisfaction with family indicate positive mood and emotions of a child in relation to parents and other family members. This scale demonstrated adequate factor validity and reliability in previous studies (Stojiljković & Stanković, 2018; Vulić-Prtorić, 2002).

Big Five Plus Two, short version (VP+2–70; Čolović, Smederevac, & Mitrović, 2014). This questionnaire measures seven dimensions of personality: Neuroticism (e.g., "I am an unhappy person"), Extraversion (e.g., "I socialize with a large number of people"), Conscientiousness (e.g., "I am very diligent and hard-working"), Aggressiveness (e.g., "I like to give orders"), Openness to experience (e.g., "I have various interests"), Positive Valence (e.g., "I think I am very talented"), and Negative Valence (e.g., "It is not a problem for me to deceive somebody"). Neuroticism indicates negative affect and depression; Extroversion indicates friendliness, sociability and cordiality; Openness to experience indicates orientation towards art and intellectual curiosity; Conscientiousness mainly indicates persistence, perseverance, accountability, and discipline; Aggressiveness indicates rage, bad temper, and intransigence; Positive Valence corresponds to a positive image of oneself and narcissistic tendencies, whereas Negative Valence primarily indicates a tendency toward manipulative behavior, and to a lesser extent a negative image of oneself. The questionnaire contains 70 items rated on a Likert-type scale from 1 – *I completely disagree* to 5 – *I completely agree*, 10 items for each dimension, applicable to persons over the age of 15. The questionnaire is designed based on a 184-item Big Five Plus Two (BF+2; Smederevac et al., 2010) that measures seven lexical dimensions of personality in Serbian language. The seven-factor model has demonstrated satisfactory reliability and predictive validity among Serbian population (Čolović, Smederevac, & Mitrović, 2014; Sadiković, Fesl, & Čolović, 2016).

Criminal recidivism. According to the U.S. National Institute of Justice (https://www. nij.gov), recidivism is measured by "criminal acts that resulted in rearrests, reconviction, or returns to prison with or without sentencing during a three-year period following the prisoner's release", whereas in the Republic of Serbia recidivism is defined as a failure of the implemented special prevention measures. Criminal recidivism, in juvenile delinquents in this study was recorded based on the official criminal records data according to: a) the total number of criminal offenses; b) the total number of arrests. The establishment of the criteria for criminal recidivism on the basis of the number of official arrests was the method used in previous studies (Caudy et al., 2015; Zettler et al., 2015). Descriptive data showed 33 (54.1%) delinquents had committed a criminal offense at least 2 times or more (recidivism), while 28 (45.9%) delinquents had committed a single criminal offense, at the time this study was conducted. 35 (57.4%) delinquents had been arrested 2 times or more (recidivism) while 26 (42.6%) delinquents had been arrested only once.

Procedure

We obtained the approval for data collection from the Ministry of Justice of the Republic of Serbia and the Ethics Committee of the Youth Correctional Facility prior to conducting the study. In addition, we obtained informed written consent for collecting data from non-delinquents from the participants' parents and the School Ethics Committee. The research was conducted in accordance with the ethical standards of the American Psychological Association and World Medical Association (The Declaration of Helsinki). Institutionalized juvenile delinquents completed the questionnaires in the dayroom at the Youth Correctional facility, whereas non-delinquents did this at a school classroom. Group examination was carried out in both situations. After collecting informed written consent for voluntary participation in the study from all participants, a researcher provided instructions for completing the questionnaires. Juvenile delinquents who did not have a mother or a father ($N = 7$) were instructed to provide answers regarding their guardians/foster parents. There was no time limit for completing the questionnaires and it took about 40 minutes on average. The participation in the study was voluntary and there was no monetary compensation.

Statistical Analysis

Pearson correlation coefficients and logistic regression analysis were applied to test the predictive characteristics of age, grade point average, family interactions and personality traits in relation to criminal recidivism in delinquents. Criminal recidivism was defined as a binary variable regarding criminal offenses (0 – *one criminal offense*, 1 – *more than one*) and official arrests (0 – *one official arrest*, 1 – *more than one*). Logistic regression analysis was conducted with backward elimination. A total of fourteen predictors were included at the beginning of the regression procedure, whereas non-significant predictors were excluded in a step-by-step manner. The final statistical step (model) contained only statistically significant predictors. Only data regarding the first and the final step are shown as the most relevant for this analysis. Wald chi square (Wald χ^2) testing the significance of logistic regression coefficients and exponentiation of the B coefficient (ExpB) were reported (see Tabachnick & Fidell, 2007). Criminal offenses and official arrests measures were applied as in a previous study (Zettler et al., 2015). Analysis of covariance (ANCOVA) was conducted to compare the groups of juvenile delinquents and non-delinquents regarding family interactions and personality traits, whereas age and education (grade point average) were set as covariates. Effect size was determined by Cohen's *d* and partial eta squared (η^2) (see Button et al., 2013) whereas the instrument reliability was calculated using internal consistency coefficient Cronbach's Alfa (α). Analyses were conducted using the IBM SPSS Version 22.0.

Results

Correlations between Personality Traits and the Quality of Family Interactions in Delinquents and Non-delinquents

Results showed statistically significant correlations between family interactions and personality traits in the sample of delinquents; correlation coefficients ranged from low correlation ($r = .27, p < .05$) to medium correlation ($r = .67, p < .01$), whereas in the sample of non-delinquents correlation coefficients ranged from low correlation ($r = -.26, p < .05$) to medium correlations ($r = .68, p < .01$) (Table 2).

Table 2
Pearson correlation coefficients between the quality of family interactions and personality traits, means, standard deviations, and internal consistency in juvenile delinquents and non-delinquents

	1	2	3	4	5	6	7	8	9	10	11	12	*M*	*SD*
1. Neuroticism	1	-.21	-.03	.16	.18	.22	.68**	-.46**	-.38**	-.16	.53**	.37**	24.71	7.73
2. Extraversion	.31*	1	.54**	.11	-.12	.45**	-.09	.24	.41**	.27*	-.23	-.09	39.43	6.37
3. Openness to exp.	.39**	.67**	1	-.01	-.10	.40**	-.12	-.05	.31*	.12	-.15	.06	38.06	6.14
4. Conscientiousness	.16	.32*	.19	1	-.02	.14	.07	-.28*	-.20	-.28*	.02	.05	37.16	5.78
5. Aggressiveness	.09	.15	.07	-.14	1	.13	.21	-.05	-.29*	-.12	.24	.07	28.26	8.11
6. Positive Valence	.35*	.57**	.55**	.28*	.05	1	.22	-.01	.11	.11	.11	.12	32.84	7.24
7. Negative Valence	.12	.12	.10	.05	-.15	.51**	1	-.39**	-.43**	-.03	.66**	.48**	21.09	7.13
8. Satisfaction with family	-.34*	-.05	-.11	.16	.17	-.23	-,40**	1	.49**	.32**	-.52**	-.50**	46.35	8.37
9. Acceptance by father	.00	-.02	.03	-.11	.29*	.03	-.14	.63**	1	.24	-.65**	-.11	38.79	7.31
10. Acceptance by father	-.14	.02	.06	-.22	-.16	-.19	-.25	.32*	.29*	1	.01	-.26*	40.18	5.60
11. Rejection by father	.19	-.00	-.24	-.21	-.11	.10	.33*	-.45**	-.23	-.11	1	.47**	23.74	10.83
12.Rejection by mother	.05	.12	.11	-.16	-.12	.32*	.56**	-.66**	-.39**	-.34**	.39**	1	23.04	6.98
M	32.62	38.98	38.25	32.42	28.60	33.46	22.83	45.29	37.73	36.36	24.85	23.65		
SD	8.30	7.01	8.48	5.64	8.30	9.21	7.42	7.81	10.37	10.11	10.77	8.46		
Cronbach's Alpha (α)	.80	.71	.77	.63	.76	.82	.77	.82	.90	.89	.88	.73		

Note. $^*p < .05$; $^{**}p < .01$; Correlations for delinquents are shown below the diagonal and for non-delinquents above the diagonal. Means and standard deviations are presented horizontally for delinquents and vertically for non-delinquents, whereas internal consistency measured by Cronbachs alpha is shown for the whole sample.

Prediction of Criminal Offenses in Juvenile Delinquents

In the first step of logistic regression models, Openness to experience ($B = .45$, $p < .05$), Negative Valence ($B = .43$, $p < .01$), and rejection by mother ($B = -.39$, $p < .05$) were statistically significant predictors of criminal offenses; recidivists reported higher Openness to experience and Negative Valence, whereas non-recidivists reported higher rejection by mother. In the final step, Neuroticism ($B = -.28$, $p < .01$), Openness to experience ($B = .29$, $p < .01$), Negative Valence ($B = .35$, $p < .01$), and rejection by mother ($B = -.28$, $p < .01$) were statistically significant predictors of criminal offenses; non-recidivists reported higher Neuroticism and rejection by mother, whereas recidivists reported higher Openness to experience and Negative Valence (Table 3).

Table 3
Logistic regression models for the prediction of the number of criminal offenses

	First step				Final step			
	B	*SE*	Wald χ^2	Exp*B*	*B*	*SE*	Wald χ^2	Exp*B*
Age	-.33	1.05	.10	.72				
Grade point average	-.13	.84	.02	.88				
Neuroticism	-.31	.17	3.24	.73	-.28**	.10	7.64	.76
Extraversion	-.17	.19	.84	.84				
Openness to exp.	.45*	.22	4.06	1.56	.29**	.10	8.83	1.33
Conscientiousness	-.21	.17	1.49	.81				
Aggressiveness	.12	.12	.95	1.13				
Positive Valence	.01	.11	.02	1.01				
Negative Valence	.43**	.14	9.30	1.54	.35**	.11	10.67	1.43
Satisfaction with family	.06	.21	.08	1.06				
Acceptance by father	-.12	.11	1.18	.89				
Acceptance by mother	.01	.09	.03	1.01				
Rejection by father	.03	.07	.20	1.03				
Rejection by mother	-.39*	.19	4.26	.68	-.28**	.09	8.75	.76

Note. *p < .05; **p < .01.

Prediction of the number of arrests in juvenile delinquents

In the first step of logistic regression, Negative Valence (*B* = .21, *p* = .022) was a statistically significant predictor of the number of arrests; recidivists reported higher Negative Valence than non-recidivists. In the final step, Openness to experience (*B* = .19, *p* < .01), Negative Valence (*B* = .17, *p* < .05), Conscientiousness (*B* = -.25, *p* < .05), acceptance by father (*B* = -.10, *p* < .05), and rejection by mother (*B* = -.19, *p* < .05) were statistically significant predictors of the number of arrests; recidivists reported higher Openness to experience and Negative Valence, whereas non-recidivists reported higher Conscientiousness, acceptance by father, and rejection by mother (Table 4).

Table 4
Logistic regression models for the prediction of the number of arrests

	First step				Final step			
	B	*SE*	Wald χ^2	Exp*B*	*B*	*SE*	Wald χ^2	Exp*B*
Age	-.33	.94	.12	.72				
Grade point average	-.47	.68	.47	.62				
Neuroticism	-.09	.10	.72	.91				
Extraversion	-.14	.15	.88	.87				
Openness to exp.	.31	.16	3.74	1.36	.19**	.06	8.41	1.21
Conscientiousness	-.26	.15	2.71	.77	-.25**	.10	6.40	.78
Aggressiveness	.11	.09	1,52	1.11				
Positive Valence	.05	.10	.28	1.05				
Negative Valence	.21*	.09	5.23	1.24	.17*	.07	5.73	1.18
Satisfaction with family	.06	.15	.18	1.06				
Acceptance by father	-.17	.09	3.54	.85	-.10*	.05	4.19	.91
Acceptance by mother	.05	.07	.46	1.05				
Rejection by father	.01	.05	.02	1.01				
Rejection by mother	-.20	.11	3.49	.81	-.19*	.08	6.22	.83

Note. *p < .05; **p < .01.

Differences in Personality Traits and the Quality of Family Interactions between Delinquents and Non-delinquents

Results of ANCOVA showed a statistically significant difference in Neuroticism, ($F(1, 110) = 30.32, p < .01, \eta^2 = .22$) and Conscientiousness, ($F(1, 111) = 11.32, p < .01, \eta^2 = .09$), after controlling for grade point average and age, with a large effect size; Neuroticism was higher in delinquents than in non-delinquents and Conscientiousness was higher in non-delinquents than in delinquents. There was a statistically significant difference in acceptance by mother, ($F(1, 113) = 8.80, p < .01, \eta^2 = .07$), after controlling for grade point average and age, with an intermediate effect size; acceptance by mother was higher in non-delinquents than in delinquents. The covariate, grade point average, was significantly related to Negative Valence, ($F(1, 109) = 5.02, p < .05, \eta^2 = .04$), with a small effect size, and rejection by mother, ($F(1, 113) = 9.90, p < .01, \eta^2 = .08$) (Table 5).

Table 5
Analysis of covariance of the quality of family interactions and personality traits in juvenile delinquents and non-delinquents

		SS	MS	*F*-value	Effect Size
Neuroticism	Age	78.18	78.18	1.22	-0.99
	Grade point average	26.60	26.60	.42	
	Group	1940.28	1940.28	30.32**	
Extraversion	Age	23.43	23.43	.51	0.07
	Grade point average	29.11	29.11	.63	
	Group	.14	.14	.00	
Openness to exp.	Age	4.19	4.19	.08	-0.03
	Grade point average	6.19	6.19	.112	
	Group	14.32	14.32	.27	
Conscientiousness	Age	.85	.85	.03	0.83
	Grade point average	43.59	43.59	1.34	
	Group	368.79	368.79	11.32	
Aggressiveness	Age	137.16	137.16	2.08	-0.04
	Grade point average	48.02	48.02	.73	
	Group	35.51	35.51	.54	
Positive Valence	Age	1.72	1.72	.02	-0.07
	Grade point average	.02	.02	.00	
	Group	12.81	12.81	.18	
Negative Valence	Age	.27	.27	.00	-0.24
	Grade point average	250.19	250.19	5.02*	
	Group	33.04	33.04	.66	
Satisfaction with family	Age	19.44	19.44	.32	0.13
	Grade point average	88.93	88.93	1.48	
	Group	.26	.26	.00	
Acceptance by father	Age	7.52	7.52	.09	0.12
	Grade point average	40.73	40.73	.51	
	Group	8.51	8.51	.11	
Acceptance by mother	Age	1.61	1.61	.02	0.47
	Grade point average	232.51	232.51	3.52	
	Group	581.73	581.73	8.80**	
Rejection by father	Age	7.26	7.26	.06	-0.10
	Grade point average	60.44	60.44	.53	
	Group	1.75	1.75	.01	
Rejection by mother	Age	58.21	58.21	1.04	-0.08
	Grade point average	552.04	552.04	9.90**	
	Group	.19	.19	.00	

Note. *$p < .05$; **$p < .01$; Cohen's *d* = Effect Size; SS = Sum of Squares; MS = Mean Square.

Discussion and Conclusion

In line with previous findings (Barrett et al., 2014; Lynam et al., 2009; Van Dam, Janssens, & De Bruyn, 2005; Wolff & Baglivio, 2017) we hypothesized that the perception of rejecting parents, Negative Valence, Neuroticism, and Aggressiveness are significant predictors of criminal recidivism in juvenile delinquents. The results of the present study confirmed this expectation, showing that Neuroticism, Openness to experience, Conscientiousness, Negative Valence, and rejection by mother are significant predictors of criminal recidivism (criminal offenses). Such result confirmed prior findings demonstrating the relation between parental rejection, delinquency and recidivism in delinquents (Cottle, Lee, & Heilbrun, 2001; Laub & Sampson, 2003), and a link between personality disposition, the commission of criminal acts and recidivism in youth (Asscher et al., 2011; Marsh et al., 2011). Negative Valence and Openness to experience are correlated positively with the number of criminal acts (recidivism), whereas the correlation with Neuroticism, Conscientiousness, and rejection by mother is negative. This indicates a tendency towards manipulation and openness to the world in juvenile delinquents prone to recidivism, since Negative Valence reflects manipulative personality trait and negative image of oneself, whereas Openness to experience reflects intellectual curiosity and orientation towards art (Čolović, Smederevac, & Mitrović, 2014). Openness to experience is manifested as novelty and sensation seeking and there is a strong link between excitement seeking and positive risk behavior, e.g., extreme sports (Obradović & Dinić, 2010) and excitement seeking and negative risk behavior (crime and socially unacceptable activities) in adolescents (Hansen & Breivik, 2001). Since Neuroticism in the seven-factor model captures depression and a negative affect, whereas Conscientiousness captures persistence, perseverance, accountability, and discipline (Čolović, Smederevac, & Mitrović, 2014), the results of this study actually indicate a less prominent pattern of criminal recidivism in more neurotic and more conscientious delinquents, and vice versa: recidivism proneness is more prominent in non-persistent, undisciplined and irresponsible juvenile delinquents. A negative correlation between Conscientiousness and the number of prison sentences in adults has also been found in other studies (Međedović, Kujačić, & Knežević, 2012).

Individuals who experienced parental rejection in childhood form negative interpretations of themselves and their own experiences, which is associated with later development of juvenile delinquency (Rohner & Britner, 2002), and interestingly, non-recidivists perceive higher rejection by mother than delinquents who are prone to recidivism. This indicates that criminalized juveniles are more supported and accepted by mothers than delinquents with a smaller number of criminal offenses and is therefore consistent with Patterson's socio-interaction theory (Patterson, 2002; Patterson, Reid, & Dishion, 1992) of an early onset of delinquency development through a coercion mechanism. Hence, antisocial juvenile delinquents possibly obtained more maternal care and acceptance by a coercive mechanism and aversive behavior compared to

delinquents less prone to criminal recidivism. In addition, children's exposure to crimes in communities, deviant peers and harsh and violent parenting practices leads to crime (Simon & Burt, 2011), whereas the children of criminal parents are likely to exhibit criminal behavior themselves (Farrington, Coid, & Murray, 2009). Family interactions between delinquents and their parents are further complicated by the fact that antisocial traits and behavior in children and parents produce a two-way effect on one another (Jackson & Beaver, 2015), since imitation and looking up to a model of rejection by mother may increase criminal tendencies in delinquents. This requires further testing in future studies. Additionally, the results showed that Openness to experience, Conscientiousness, Negative Valence, the perception of acceptance by father and rejection by mother are significant predictors of criminal recidivism (the number of arrests). Unlike criminal recidivism, this predictive model involves the perception of acceptance by father instead of Neuroticism. This indicates only a relative difference between these two forms of recidivism.

Results have confirmed that reduced parental supervision is associated with delinquent and antisocial behavior (Patterson & Yoerger, 2002) i.e., adverse childhood experiences encourage juvenile recidivism delinquency (Wolff & Baglivio, 2017). Interestingly, recidivist juvenile delinquents' perception of the mother and the father is diametrically opposite. Within the framework of Patterson's Coercion Theory, this may be interpreted as an inadequate parental relation with sons that even encourages criminal recidivism. Poor social adjustment of the sons is related to unskilled parenting of antisocial mothers (Capaldi & Patterson, 1991). However, since anti-sociality of parents was not included in the current study, this claim requires further research.

In line with previous findings (Le Corff & Toupin, 2009; Rohner, 2002; Patterson, DeBaryshe, & Ramsey, 2017; Van Dam, Janssens, & De Bruyn, 2005) we hypothesized that the perception of parental rejection and Neuroticism are more prominent in delinquents compared with non-delinquents, whereas Openness to experience is less prominent in delinquents compared with non-delinquents. This hypothesis has been partly confirmed since the results of the present study demonstrate that delinquents are more neurotic, less conscientious and less accepted by their mothers compared with non-delinquents. The obtained difference partly corresponds to the difference occurring between psychopathic and non-psychopathic persons. High Neuroticism and low Conscientiousness are dimensions interpreted as emotional instability and the tendency towards novelty and excitement seeking somewhat corresponds to the description of a psychopathic person. Previous studies have reported a positive correlation between Neuroticism, antisocial personality disorder and psychopathy (Decuyper et al., 2009; Jones, Miller, & Lynam, 2011), as recorded indirectly in our study. This potential association of personality traits, antisocial personality disorder and psychopathy in delinquents requires further research. Interestingly, grade point average as a covariate was significantly related to Negative Valence and rejection by mother, thus confirming the importance of education in understanding criminal recidivism in juveniles, as has also been reported in other studies (Cuervo & Villanueva, 2018).

Limitations and Future Directions

The limitation of this study is a relatively small sample of male juvenile delinquents and non-delinquents which may have impacted the obtained results and the scope of derived generalizations. The limitations of the study also relate to the impossibility of recording potential criminal offenses of the delinquents, for which they have not been arrested or convicted. There is a possibility that some of the delinquents have been registered with a single criminal offense and arrest, although there may be a number of criminal offenses that remained undiscovered by official institutions. Little is known whether parents of delinquents in our sample encouraged their children's criminal activities or raised them in a socially adequate manner. In addition, not enough is known about potential criminality of delinquents' parents since handling these research questions required the inclusion of parents into the study and this was difficult to implement in practice.

Future studies should determine whether and to what extent convicted parents of juvenile delinquents encourage and support or impose sanctions on the criminal behavior in their children and whether criminal recidivism is related to psychopathic traits in delinquents. Additionally, further research should test a mediating role of personality traits in the relationship between family interactions and criminal recidivism in delinquents.

The contribution of this study is in providing new insight into the importance of family interactions and personality traits for understanding criminal recidivism. Programs for the prevention of criminal recidivism should focus on the enhancement of family interactions in male delinquents by involving parents (primarily mothers) in the process of prevention and resocialization.

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Predviđanje kriminalnog recidivizma
kod muških maloletnih delinkvenata

Miloš Stanković[1], Nikola Simonović, Jelena Bulatović,
Jelena Stojiljković[2], Marina Hadži Pešić[3] i Milkica Nešić[3, 4]

[1] *General and Experimental Psychology, Department of Psychology,*
Ludwig-Maximilians-Universität München, Munich, Germany
[2] *Filozofski fakultet, Univerzitet u Beogradu, Srbija*
[3] *Departman za psihologiju, Filozofski fakultet, Univerzitet u Nišu, Srbija*
[4] *Medicinski fakultet, Univerzitet u Nišu, Srbija*

Rezultati dosadašnjh istraživanja su ukazali na jaku vezu između kriminalnog ponašanja maloletnih delinkvenata sa jedne strane i crta ličnosti i odnosa u porodici sa druge strane. Međutim, još uvek se malo zna o tome koliko su odnosi unutar porodice i karakteristike ličnosti povezani sa kriminalnim recidivizmom. Cilj istraživanja bio je da ispita ove odnose koristeći kraću verziju skale Velikih pet + dva (Neuroticizam, Ekstraverzija, Otvorenost za iskustvo, Savesnost, Prijatnost, Pozitivna valenca, Negativna valenca), Skalu kvaliteta porodičnih interakcija (zadovoljstvo porodicom, prihvatanje/odbacivanje od strane majke/oca) i zvanične podatke iz kriminalnih dosija. Istraživanje je sprovedeno na 61 institucionalizovanom delinkventu i 64 ne-delinkventa, uzrasta od 15 do 18 godina. Neuroticizam, Otvorenost za iskustvo, Savesnost, Negativna valenca, prihvatanje od strane oca i odbacivanje od strane majke su statistički značajni prediktori kriminalnog recidivizma maloletnih delinkvenata. Delinkventi su pokazali statistički značajno više skorove na Neuroticizmu, kao i niže na Savesnosti i prihvatanju od strane majke u odnosu na ne-delinkvente.

Ključne reči: maloletni delinkventi, kriminalni recidivizam, predikcija, crte ličnosti, porodični odnosi