



OPEN The impact of personality traits and the mediating role of self-efficacy and self-control on criminogenic behavior among Romanian inmates: a psychological perspective

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The study aimed to evaluate the possible mediating effect of two independent variables, self-efficacy and self-control, and to analyse the role of personality traits in the manifestation of criminogenic behavior. A total of 850 detainees from Romania, aged between 21 and 71 years (mean age = 38.7; standard deviation = 10.58), completed the CP5F Personality Questionnaire, the Criminogenic Cognitions Scale (SCC), the Machiavellianism Scale, and the Self-Efficacy Scale. The mediation model showed the following. Self-efficacy and self-control parallelly mediate the relationship between personality ($p < 0.05$) and the negative attitude toward the individual/authority ($p < 0.01$). As the score for self-efficacy increases, the score for Machiavellianism and the score for the negative attitude toward the individual also increase. As the score of self-control increases, the score for Machiavellianism decreases. The personality score explains approximately 27% of the variance in the self-efficacy score and 7.2% of the variance in the self-control score ($p < 0.001$). Self-control and self-efficacy are psychological dimensions that must be developed from adolescence, but in the direction of desirable, prosocial behaviours to prevent the formation of a criminal identity. Strengthening personality factors (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Autonomy) can lead to a decrease in negative attitudes toward authority and the individual, which can result in a decrease in recidivism.

Keywords Self-efficacy, Self-control, Personality, Prisoners, Criminogenic behavior

According to the National Institute of Corrections¹, there are over 10.35 million incarcerated individuals worldwide, with the majority being in the United States – more than 2.2 million. Across all continents, the prison population continues to grow², therefore reducing recidivism is of great interest to society. To explain why many offenders desist from crime and why some persist, criminological research seeks to identify the factors responsible for criminal decision-making^{3–6}. Baskin-Sommers et al.⁷ found that there is a connection between criminal thinking and cognitive-affective dysfunctions. According to them, detainees with psychopathy are characterized by criminogenic cognitions that predispose them to the use of illicit substances and an inability to consider important contextual information. Although specialized interventions can contribute to changing criminal thinking, according to a meta-analysis conducted on a sample of 20,685 participants, there are situations in which a subsequent change in criminal behavior did not occur⁸. Investigating the relationships between criminal thinking and time spent in detention, Walters⁹ found that this association predicted a high number of offenses in detention, which, in turn, predicted increased levels of recidivism after release from prison. Moreover, there

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is research that concluded that a poor prison environment can reduce executive functions, prefrontal cortex functioning, and self-regulation capacity, factors that may contribute to maintaining the criminal behavior^{10,11}.

Although numerous studies support that low self-control is significantly associated with various forms of criminality^{12–14}, some findings indicate that offenders still possess relatively high self-control¹⁵. Therefore, the complexity of the effect that self-control can have on the manifestation of criminality necessitates detailed studies, as finding evidence that can reduce the incidence of recidivism is a major goal in the criminal justice system worldwide. This dimension will be analyzed in the present study.

Studies observe that self-control is often correlated with self-efficacy^{16–18}. Viewed as the belief of a person that they possess effective skills to successfully perform an action, self-efficacy becomes a key trait that strongly influences how a person engages in any activity¹⁹. Self-efficacy is a dimension more often addressed in the study of academic performance^{20,21} and professional performance^{16,22}. However, there is an interest in this concept within the realm of criminality as follows. Muthuswamy and Varshika²³ found that there is a correlation between self-efficacy and the level of workplace crime, while other authors found that a high level of self-efficacy and religiosity positively mediates criminal behavior²⁴. Considering that deprivation of liberty can be a major source of stress, Zaman and Qayyum²⁵ found that self-efficacy can also be a significant predictor of Machiavellianism; therefore, these two factors may represent a potential obstacle in the process of social reintegration.

In the penitentiary environment, the Machiavellian trait has a complex significance, as it is a construct that illustrates the relationship between the attitudes and beliefs of the inmate towards the outside world. Moreover, Machiavellianism can influence the significance of the meaning of life in relation to socially accepted norms²⁶. The author concluded that there is a significant relationship between the Machiavellian syndrome and the presence of meaning in life, with a high Machiavellianism score being correlated with a lower intensity of the search for and presence of meaning in life. Todeancă and Dumbravă²⁷, starting from the hypothesis that the level of Machiavellianism in the penitentiary environment is significantly higher than in the general population, found that Machiavellian traits are not always directly related to criminal behavior, thus bringing into discussion other personality traits that may play a decisive role in this regard.

Comparative studies that have analyzed scores for certain personality traits for both groups of detainees and the general population have often found that detainees exhibit higher scores in agreeableness and conscientiousness, as opposed to non-offender individuals^{28,29}. Another study, however, reported that there are no significant differences regarding conscientiousness³⁰.

Shimotsukasa, Oshio, Tani et al.³¹, analyzing personality traits, found variability in scores for extraversion, conscientiousness, and openness, depending on the crime committed. Therefore, these results likely indicate that the behavior exhibited by detainees is actually an adaptation to the rigorous discipline of prison, which is absolutely necessary for reducing their sentence, but is devoid of authenticity, thus representing a problem that requires attention³⁰.

Moreover, a meta-analysis regarding personality and antisocial behavior concluded that individuals who commit criminal acts exhibit tendencies of selfishness and hostility, as well as difficulties in impulse control³². Additionally, Jones and his colleagues³³ and Cunha and his team³⁴ found that personality traits predict criminal behavior, regardless of sex, race, age, or geographical area.

As can be seen, the personality of individuals represents an essential component of the overall profile, thus becoming the subject of considerable empirical attention in recent decades, both in studies on the general population regarding various aspects such as academic achievements, professional success³⁵, resilience³⁶, as well as in those that correlate these traits with various indicators of criminal behavior³⁷.

Although the criminal justice system, through laws, courts, and correctional officers in prisons (the supervision and rehabilitation of offenders), constantly works to prevent criminal behavior, implementing various theories and programs both during and outside of detention, conclusive and significant reductions have yet to be observed.

Considering that a number of studies have yielded different results regarding certain dimensions of personality and that the influence of criminogenic thinking in the context of criminality is unclear, the present study, which addresses these aspects, may be useful in identifying factors that can be acted upon to prevent recidivism and the social reintegration of incarcerated individuals.

Thus, by analyzing previous research, it becomes evident that the issue of criminality from the perspective of possible mediating factors on personality and behavior towards authority or individuals has not been fully explored. This has led the authors to formulate specific objectives that address unclear aspects.

Methods

The specific objectives of this research were as follows:

01. Testing the possible mediating effect of self-efficacy and self-control independently in the relationship between personality and the three variables in the criminogenic framework.

02. Analyzing the role of personality in the manifestation of criminogenic behavior.

03. Evaluating the role of self-efficacy and self-control in the commission of criminal acts.

To achieve the objectives, the following assessment tools were applied to 850 persons deprived of liberty, with final convictions, and held in the penitentiary environment in Romania:

The 5-factor personality questionnaire CP5 F, developed and calibrated on the Romanian population by Monica Albu³⁸, Criminogenic Cognitions Scale³⁹, used for research purposes with the written consent of the author June Tangney; Self-Efficacy Scale⁴⁰ - tested on a group of 335 subjects from the general population in Romania, by Vasiliu, Pascal and Marinescu⁴¹; Self-Control Scale⁴², and Machiavellianism Scale⁴² from The Romanian adaptation of the International Personality Item Pool: IPIP-Ro⁴³ (Table 1).

The following hypotheses have been formulated:

Tool	Number of items	Measures	Author and year
CP5 F personality questionnaire		The five super factors of the big five model	Monica Albu (2008)
Extraversion	23		
Agreeableness	24		
Conscientiousness	25		
Emotional stability	21		
Autonomy	22		
Social desirability	15		
Criminogenic cognitions questionnaire		Cognitive distortions that serve to rationalize and perpetuate criminal behavior	Tangney, Stuewig, Furukawa, Kopelovich, Meyer, and Cosby (2012)
Locus of control	5		
Legal concepts	5		
Negative attitude toward authority	5		
Need for immediate gratification	5		
Insensitivity to the impact of crime	5		
Machiavellianism scale		The degree to which a person exhibits unscrupulous behavior	Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, and Gough (2006)
Machiavellianism	6		
Self-control scale		The individual's ability to control themselves	Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, and Gough (2006)
Self-control	10		
Self-efficacy scale		A person's belief that their actions can/will be responsible for the success of a particular activity	Schwarzer and Jerusalem (1995)
Self-efficacy	10		

Table 1. General information regarding tools used.

H1. It is assumed that self-control and self-efficacy are parallel mediators for the relationship between Personality and Machiavellianism/Negative attitude toward the individual/Negative attitude toward authority.

H2. It is anticipated that certain personality traits reduce the risk of committing criminal acts.

H3. It is estimated that low levels of self-control and self-efficacy are independent predictors of criminality.

Research variables

The independent variable is represented by the overall personality score consisting of the scores from the scales of extraversion, agreeableness, conscientiousness, emotional stability, and autonomy. Thus, the personality variable examines the individual's attitude toward others regarding ease of contact or tendency toward isolation, the manner of presenting personal opinions, the level of conformity to socially accepted values, the attitude toward stressful situations and toward factors with the potential to influence behavior.

The dependent variables are three negative dimensions, namely the score of the Machiavellianism scale, the score regarding the negative attitude toward authority, and the negative attitude toward the individual.

The Machiavellianism scale assesses the degree to which a person exhibits unscrupulous behavior; the negative attitude toward the individual and authority aims to identify distorted thoughts that support criminal behavior by minimizing, justifying, or endorsing behavior that is inappropriate in relation to social norms.

The mediating variables are represented by the score of the self-control scale and the score of the self-efficacy scale. Self-control illustrates a person's ability to control themselves even in situations considered difficult to manage, while self-efficacy is the belief that one's own actions can be/are responsible for the success of a particular activity. In other words, an individual may have more or less firm beliefs regarding their effectiveness in a certain area, specifically in particular tasks or situations.

Data validity

Internal consistency on the personality scales was assessed using Cronbach's alpha. The α values on each scale ranged from 0.58 to 0.85 as follows: Desirability ($\alpha = 0.78$, 15 items), Extraversion ($\alpha = 0.67$, 23 items), Conscientiousness ($\alpha = 0.85$, 25 items), Agreeableness ($\alpha = 0.85$, 24 items), Stability ($\alpha = 0.77$, 21 items), and Autonomy ($\alpha = 0.58$, 22 items). Using the scores on the 6 scales above, the overall personality scale yielded Cronbach alpha = 0.80 (6 items). Internal consistency on the self-efficacy scale was very good, Cronbach alpha = 0.89 (10 items). This indicated that the scale items are well-correlated and that they measure the same construct, which gives them high reliability.

For the 10-item self-control scale, the internal consistency measured with Cronbach's alpha indicated an unsatisfactory value of $\alpha = 0.47$. However, confirmatory factor analysis indicated that the responses to the 10 items can be explained by a single factor: CFI = 0.98, TLI = 0.98, and RMSEA = 0.02, which indicated a good fit of the model. These results could indicate that, although the items are not very consistent in terms of correlation, they contribute to a common construct.

For the 6-item Machiavellianism scale, the internal consistency was marginally satisfactory, Cronbach $\alpha = 0.69$. Although this value was lower than the threshold of 0.70, it is still acceptable, considering that through bootstrapping a 95% CI confidence interval was obtained for Cronbach α [0.66, 0.73].

Research ethics

The study adhered to European and national standards for informing participants and processing data at each stage of the research in accordance with the Declaration of Helsinki. The study was approved by the Ethics Committee of the “Constantin Rădulescu-Motru” Institute of Philosophy and Psychology, Romanian Academy, Bucharest, Certificate no. 79/19.03.2021. Written informed consent was obtained from all subjects.

All data has been used anonymously, exclusively for scientific purposes, following Regulation No. 679/2016 of the European Parliament and of the Council of the European Union⁴⁴ on the protection of natural persons about the processing of personal data and the free movement of such data (GDPR), in effect since May 25, 2018. Researchers will retain (archive) the questionnaires, subject files, and primary documents to ensure that access by unauthorized persons is prohibited. The information is confidential, protected, and properly stored to ensure integrity in research and compliance with the privacy policy.

Participants

This study involved 850 subjects, individuals deprived of liberty, definitively convicted and held within the National Administration of Penitentiaries in Romania, specifically in nine detention units, being a convenience sample. The selection criteria for the subjects were: to be definitively convicted, to be at least 21 years old, to voluntarily consent to participate in the study, and to have basic reading and writing skills.

Exclusion criteria included the following:

1. history of severe psychiatric disorders: Individuals who have been diagnosed with serious psychiatric disorders (e.g., schizophrenia, severe personality disorders) that may have influenced their ability to understand or participate adequately in the study;
2. pre-conviction substance use that impairs cognitive ability: participants who, prior to conviction, used substances (e.g., alcohol or drugs) in a way that significantly impaired their ability to understand study instructions or actively participate in the study.

The age of the subjects ranged from 21 to 71 years (mean age = 38.7; standard deviation = 10.58), as follows: 21–30 = 229 (N); 31–40 = 266 (N); 41–50 = 225 (N); 51–60 = 112 (N); 61–70 years = 17 (N); 71–80 = 1 (N). Regarding gender, 812 participants were male, and 38 were female. Out of the total participants, 323 came from rural areas, while 527 were from urban areas.

Also, 61.8% had at least one child, and 21.2% reported suffering from a chronic illness. The distribution of subjects based on residence, marital status, education level, offense, and duration of sentence is presented in Table 2.

Data collection strategy

Initially, approval was obtained from the management of the National Administration of Penitentiaries in Romania for conducting the data collection phase necessary for the development of this study. The procedure involved drafting a study protocol that provided information regarding the purpose and objectives of the research, the tools used, the rights and responsibilities of the subjects, possible risks, ethical considerations, and data confidentiality.

The implementation activity took place from 2021 to 2023. Considering the legal safety measures specific to the penitentiary environment imposed by the National Administration of Penitentiaries, as well as those determined by the national and international context of the COVID-19 pandemic, the administration of the questionnaires was carried out with the help of psychologists employed at the level of the penitentiary units.

The method used consisted of a paper-and-pencil questionnaire administered in the detention room or specially designated areas for social reintegration activities, both individually and in groups. In addition to the tools used, each subject received, read, and signed a consent form regarding participation in the study and an informed consent form. These documents were signed in the presence of a staff member from the detention unit.

Printed questionnaires were distributed only to participants who agreed to take part. It was clearly stated that if anyone chose to refuse, there would be no negative consequences. Additionally, participants were informed that they had the right to withdraw from the study at any time.

The model used

The conceptual model of the study aims to explain the process by which the variability of the independent variable X (personality score) determines a variation at the level of two parallel mediating variables M1 and M2 (score for self-control and self-efficacy), which further cause the variation of the dependent variables Y (Machiavellianism score, negative attitude toward authority, and negative attitude toward the individual). The macro “PROCESS”, model 4, v4.3⁴⁵ in version 27 of SPSS, with 95% bootstrap percentile confidence intervals ($n = 5000$) was used to test the significance of the indirect effects (i.e., mediated).

The mediating variables M1 and M2 were selected based on the criterion of correlation with the dependent variable and on the analysis of the specialized literature that studied the relationship between the variables whose relationship is to be analyzed, according to the mediator identification methods proposed by MacKinnon⁴⁶.

The overall personality score was formed from the scores from the scales of Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Autonomy.

Socio-demographic and legal variables	Total group, <i>n</i> (%)
Residential environment	
Rural	323 (38)
Urban	527 (62)
Marital status	
Married	221 (26)
Divorced	128 (15)
Widowed	17 (2)
Cohabiting or single	484 (57)
Educational level	
Primary school	38 (4.5)
Elementary school	440 (51.7)
High school	253 (29.8)
Vocational courses	37 (4.4)
Higher education	82 (9.6)
Criminal category	
Murder	185 (21.7)
Robbery	54 (6.4)
Sexual offenses	212 (24.9)
Theft	147 (17.3)
Drugs	252 (29.7)
Duration of sentence, years	
1–5	415 (48.8)
6–10	201 (23.6)
11–15	127 (15)
15–20	42 (5)
> 20	65 (7.6)

Table 2. Basic structure of the sample (*n* = 850).

The negative attitude toward the individual was calculated from the scores of criminogenic cognitions, using the average of the four scores for the dimensions concerning the individual, namely: legal concepts/requests regarding expected respect, locus of control/failure to assume responsibility, need for immediate gratification, and insensitivity to the impact of criminality.

The negative attitude toward authority was obtained from the mean score of the negative attitude toward authority scale, specifically the fifth scale of the criminogenic cognitions questionnaire.

The conceptual model of the analyzed variables can be seen in Fig. 1.

Results

Testing the relationships between the independent variable (Personality), dependent variable (Machiavellianism), and mediators (Self-efficacy/Self-control)

Considering the conditions that must be met to test a mediation model⁴⁷, the coefficients of correlation between the variables included in the model were analyzed. According to the results, the correlation between personality and self-efficacy score is of medium intensity ($r = 0.516$, $p < 0.001$) and low between personality and self-control score ($r = 0.268$, $p < 0.001$).

The results indicate that personality score explains approximately 27% of the variance in self-efficacy score ($R^2 = 0.266$, $p < 0.001$), 7.2% of the variance in self-control score ($R^2 = 0.072$, $p < 0.001$), and that the scores for personality, self-efficacy, and self-control explain approximately 10% of the variance in the score for Machiavellianism ($R^2 = 0.103$, $p < 0.001$).

The correlation coefficient of the regression test for the relationship between personality and self-efficacy is 0.397 ($t(848) = 17.541$), which means that there is a fairly strong relationship between the two. This has been statistically verified, and the result is significant ($p < 0.001$). Additionally, the correlation coefficient for the relationship between personality and self-control is 0.055 ($t(848) = 8.129$), which indicates that the relationship between them is weaker, but this result is also statistically significant ($p < 0.001$) (Table 3).

There is a negative but quite weak correlation (-0.277) between the scores for Machiavellianism and self-control, which means that as the score for Machiavellianism increases, self-control tends to decrease. This was confirmed by statistical analysis ($t(848) = -8.135$, $p < 0.001$). On the other hand, there is no significant relationship between Machiavellianism and self-efficacy ($b1 = 0.049$), indicating that there is no evidence that someone with higher scores in Machiavellianism would have higher or lower self-efficacy. Additionally, the direct mediated effect between these variables is very small (-0.010), suggesting that neither self-efficacy nor self-control directly influences the relationship between personality traits and Machiavellianism (according to Table 3).

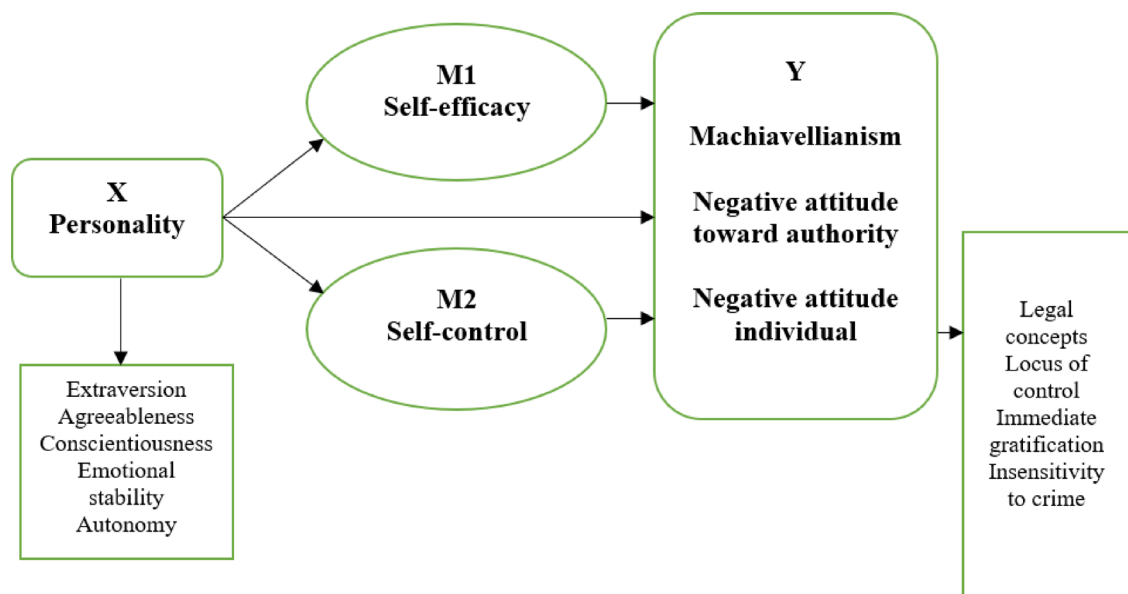


Fig. 1. Conceptual model.

Model and dependent variable	Coeff	SE	T	P	Model summary			
					R	R-sq	F	P
Self-efficacy					0.516	0.266	307.715	0.000
Constant	3.856	1.839	2.096	0.0363				
Personality	0.397	0.022	17.541	0.000				
Self-control					0.268	0.072	66.092	0.000
Constant	13.069	0.558	23.404	0.000				
Personality	0.0559	0.006	8.129	0.000				
Machiavellianism					0.322	0.103	32.695	0.000
Constant	11.826	0.713	16.588	0.000				
Personality	−0.010	0.008	−1.321	0.186				
Self-efficacy	0.049	0.010	4.743	0.000				
Self-control	−0.277	0.043	−8.135	0.000				

Table 3. Testing the relationships with the dependent variables self-efficacy, self-control, and machiavellianism. Notes:.. Testing the direct and indirect effect (Y = Machiavellianism).

Effect	SE	T	P	LLCI	ULCI
−0.0109	0.0083	−1.3211	0.1868	−0.0271	0.0053

Table 4. Direct effect of model personality → machiavellianism (X on Y).

The direct influence of the personality score on the Machiavellianism score is negative (−0.010), which means that as the personality score increases, the Machiavellianism score decreases. However, this influence is not considered statistically significant ($p > 0.05$) (Table 4).

The indirect effect of self-efficacy of 0.019, situated within the confidence interval (0.011; 0.027, which does not include the value 0), demonstrates that as the level of self-efficacy increases, the level of Machiavellianism also increases. Regarding self-control, the indirect effect is negative (−0.015), also statistically significant, indicating that as the level of self-control increases, the level of Machiavellianism decreases. (Table 5) (Fig. 2).

Testing the relationships between the independent variable (Personality), dependent (Negative attitude authority/individual), and mediators (Self-efficacy/Self-control)

According to the results, the score for personality, self-efficacy, and self-control explains approximately 1% of the variance in the score for the negative attitude toward authority ($R^2 = 0.095$, $p < 0.001$) and approximately 25% of the variance in the score for the negative attitude toward the individual ($R^2 = 0.256$, $p < 0.001$). The direct

Variables	Effect	BootSE	BootLLCI	BootULCI
Total	0.0040	0.0049	−0.0058	0.0138
Self-efficacy	0.0195	0.0041	0.0115	0.0277
Self-control	−0.0155	0.0027	−0.0210	−0.0107

Table 5. Indirect effects of model personality → machiavellianism (X on Y).

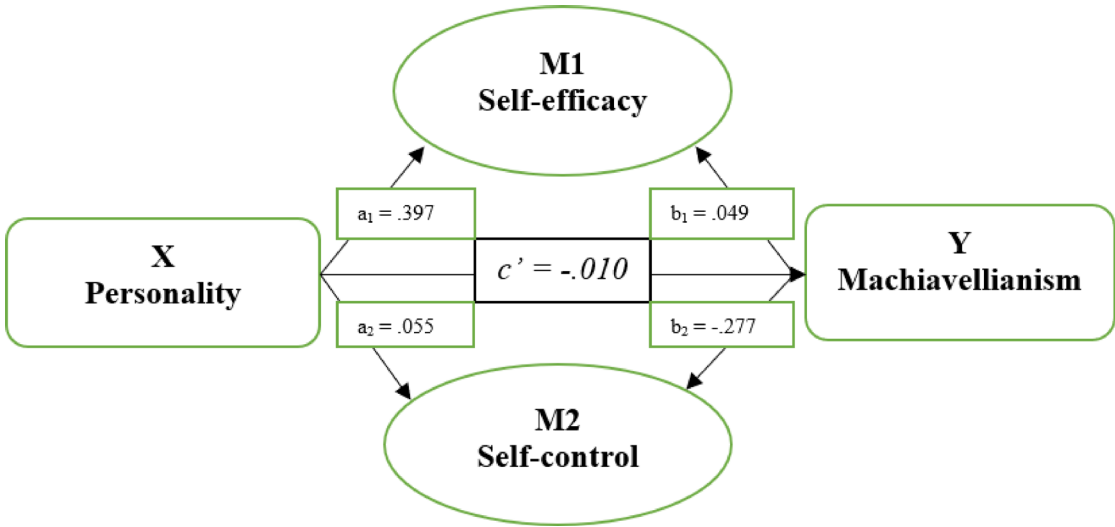


Fig. 2. Mediation model Personality → Self-efficacy/Self-control → Machiavellianism.

Model and dependent variable	Coeff	SE	T	P	Model summary			
					R	R-sq	F	P
Negative attitude authority					0.309	0.095	29.836	0.000
Constant	4.812	0.277	17.313	0.000				
Personality	−0.019	0.003	−6.185	0.000				
Self-efficacy	−0.002	0.004	−0.680	0.496				
Self-control	−0.043	0.0133	−3.304	0.001				
Negative attitude individual					0.506	0.256	97.119	0.000
Constant	4.579	0.200	22.879	0.000				
Personality	−0.033	0.002	−14.316	0.000				
Self-efficacy	0.029	0.002	10.082	0.000				
Self-control	−0.043	0.009	−4.587	0.000				

Table 6. Testing the relationships with the dependent variable negative attitude authority/individual. Notes: Testing the direct and indirect effect (Y = Negative attitude toward authority/individual).

mediated effect is -0.019 ($t(848) = -6.185, p < 0.05$) and -0.033 ($t(848) = -14.316, p < 0.01$). This means that both self-confidence (self-efficacy) and self-control act to influence the relationship between personality and negative attitude towards authority.

The values obtained for the relationship self-efficacy → negative attitude authority ($b_3 = -0.002$) and self-control → negative attitude authority ($b_4 = -0.043$) as well as the values for the relationship self-efficacy → negative attitude toward individual ($b_5 = 0.029$) and for self-control → negative attitude toward individual ($b_6 = -0.043$) are observed in Table 6.

The direct effect of personality on the negative attitude toward authority/individual is negative, $-0.019/-0.033$, which means that as the score for personality increases, the score for the negative attitude toward authority/individual decreases. This effect is statistically significant ($p < 0.001$) (Table 7).

The indirect effect of self-efficacy is -0.001 ($a_1 \cdot b_3$) and 0.0116 ($a_1 \cdot b_5$). These values are partially statistically significant. The value 0 is included in the confidence interval ($-0.042; 0.019$), but it is not included in the interval ($0.008; 0.015$). This means that as the score for self-efficacy increases, the score for negative attitude towards

Effect	SE	T	P	LLCI	ULCI
−0.0199	0.003	−6.185	0.000	−0.026	−0.013
−0.033	0.002	−14.316	0.000	−0.037	−0.028

Table 7. Direct effect of model personality → negative attitude toward authority/individual (X on Y).

Dependent variable	Effect	BootSE	BootLLCI	BootULCI
Negative attitude toward authority				
Total	−0.003	0.001	−0.007	0.0002
Self-efficacy	−0.001	0.001	−0.004	0.001
Self-control	−0.002	0.0008	−0.0004	−0.0009
Negative attitude toward individual				
Total	0.009	0.002	0.005	0.013
Self-efficacy	0.011	0.001	0.009	0.005
Self-control	−0.002	0.0007	−0.003	−0.001

Table 8. Indirect effects of model personality → negative attitude toward authority/individual (X on Y).

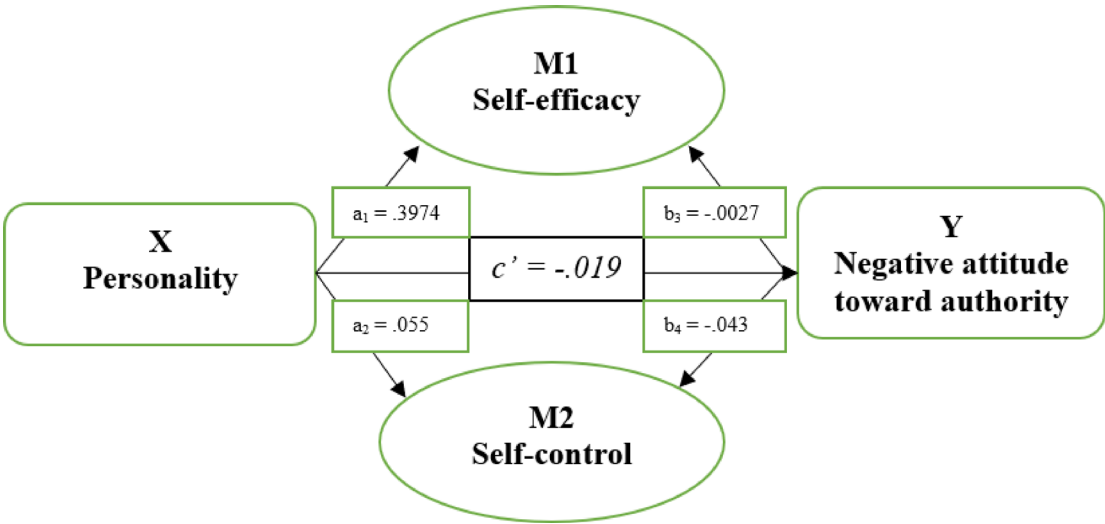


Fig. 3. Mediation model Personality → Self-efficacy/Self-control → Negative attitude toward authority.

authority decreases, but this decrease is not significant. In contrast, the score for negative attitude towards individuals increases significantly (Table 8).

There is an inverse relationship between self-control and negative attitude towards authority, meaning that as an individual's self-control score increases, their negative attitude towards authority tends to decrease. The value of the indirect effect is $-0.002 (a_2 \times b_4) / -0.002 (a_2 \times b_6)$, indicating that there is a weak but statistically significant correlation. The confidence interval $(-0.041; -0.0009) / (-0.003; -0.001)$ does not include zero, which confirms that this relationship is significant (Figs. 3 and 4).

Discussion
The effect of self-efficacy

The analysis of the self-efficacy of individuals in the context of deprivation of liberty is important because, on one hand, it could help the person adapt better to this environment, but, on the other hand, according to the results of this study, as the level of self-efficacy increases, so does the level of Machiavellianism. These data are similar to what Szabó et al.⁴⁸ found in a sample of 130 detainees held at the Oradea prison in Romania. Additionally, the authors' conclusions indicated that high levels of Machiavellianism and self-efficacy are significant predictors of the use of deception. Similar data have also been found in research on criminal populations in other countries (United States of America, Canada, Poland), which investigated the role of high levels of self-efficacy in the manifestation of criminal behavior^{23,49–51}. Wright et al.⁵² found that a high level of self-efficacy not only helps offenders learn from their own mistakes but also enables them to be Machiavellian in planning their personal strategies. Additionally, Láng⁵³ found that in the relationship between self-efficacy and Machiavellianism, the

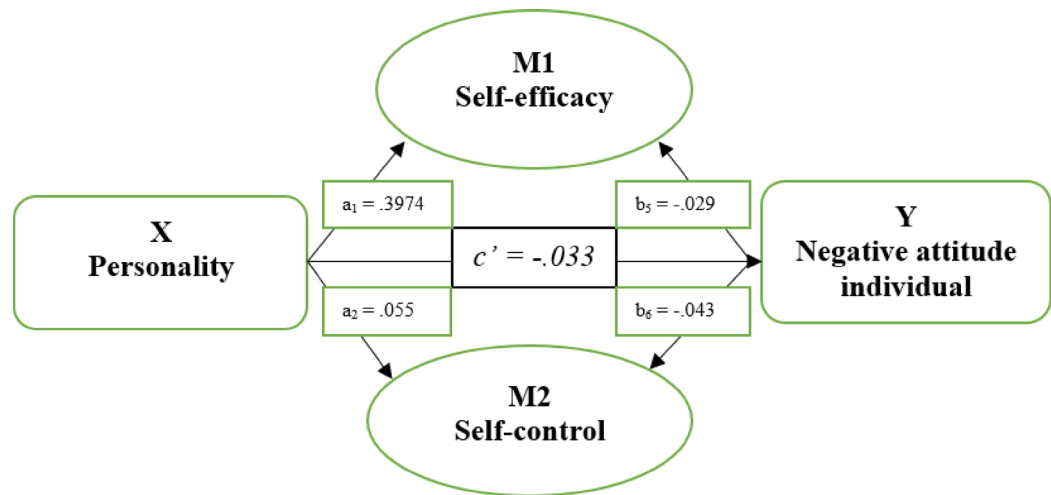


Fig. 4. Mediation model Personality → Self-efficacy/Self-control → Negative attitude toward the individual.

role of imprisonment is also significant. Thus, during the execution of the sentence, the offender experiences negative feelings and believes that only the perfection of this dysfunctional behavior will help them achieve the desired state of well-being. This need for immediate gratification and the strong sense of entitlement experienced even outside the prison environment contribute to the enhancement of criminal skills^{15,54}. Based on empirical observations, Driessen et al.⁵⁵ suggest that detention through the restriction of the right to personal choice can provide valuable insights into the level of self-efficacy. If first-time offenders consider themselves capable of influencing their actions and environment, persistent delinquents tend to see themselves as relatively powerless in the face of potential change¹⁵.

In the same vein, from the perspective of the obtained results (the increase in the score for self-efficacy significantly concomitant with the score for the negative attitude toward the individual), the current study reveals that despite detention and previous convictions, many offenders maintain a strong sense of criminal efficacy. According to self-efficacy theory, “failure can, paradoxically, increase efficacy through the belief that better strategies will lead to future successes”¹⁹ (p. 82), this finding complements studies that have argued that offenders transform punishment experiences into opportunities to improve and become more effective at criminality^{56,57}.

Other studies, however, have indicated that high self-efficacy scores have positive effects on reducing recidivism. According to Cuevas et al.⁵⁸, juvenile delinquents who recorded high scores of prosocial self-efficacy had lower rates of recidivism. Moreover, incarcerated adult offenders who had a high level of self-efficacy exhibited fewer future convictions, in contrast to those who recorded low scores⁵⁹. Similar results were indicated by Walters⁶⁰, emphasizing that self-efficacy successfully mediates the relationship between criminal antecedents and criminal recidivism.

A possible explanation for this situation is provided by Bahr et al.⁶¹, who highlighted the major role of the inmate’s relationship with the authority staff. According to them, low self-efficacy has been associated with a negative attitude toward authorities and implicitly with a refusal to fulfill specific detention tasks.

Another perspective on the relationship between the offender and authority is provided by Trinkner and Tyler⁶². The authors argue that to improve this aspect, legislation should focus on values that include respect for treatment, participation in decision-making, and setting boundaries. When authorities respect these values, they contribute to building trust and legitimacy, promoting a relationship based on common values and the acceptance of legal authority by the people. Even though these observations have been made, it is debatable whether a method based on agreements and collaboration should be used instead of a forced one, both in legal and illegal situations⁶³.

The effect of self-control

In the present study, a connection was identified between self-control and Machiavellianism on one hand and a negative attitude toward authority/the individual on the other.

Numerous studies have found that the relationship between Machiavellianism and self-control is a substantial and predictive model on delinquency^{52,64–67}. Moreover, studies have found that Machiavellianism and the use of manipulative scenarios increase with age⁶⁴ and that these vary depending on the type of offense⁵².

However, there are also contradictory data. Thus, DeLisi et al.⁶⁸ found that self-control does not affect Machiavellianism. Regarding the severity of the consequences for the victim, Hirschi and Gottfredson⁶⁹ argue that these are directly proportional to the level of self-control of the offender and explain the mediating effect of self-control also through the negative attitude toward the individual. Thus⁷⁰, the offender sees the offense as an exciting act that can bring him benefits in a short time, without showing empathy toward the victim.

Similar data regarding the relationship between self-control and criminality have also been found in the meta-analysis by Piquero et al.⁷¹. Based on a global sample of 41 eligible studies, it was identified that higher self-control is a good mediator in reducing criminality. A possible explanation in this regard is provided by Tangney et al.⁷². According to them, a higher level of self-control correlates with fewer reports of psychopathology, lower

alcohol abuse, higher self-esteem, and more optimal emotional responses. In contrast, a low level is a significant risk factor for a wide range of personal and interpersonal problems. Meijers et al.⁷³ support this idea, having found that, only after three months of imprisonment without rehabilitation programs, self-control is affected and consequently may increase the risk of recidivism. Additionally, Vazsonyi et al.⁷⁴ highlight the importance and also the effect of the level of self-control on the reduction of criminality through a meta-analysis that summed over 700 articles in the field.

Thus, the present study shows, as do others^{75,76}, that to reduce recidivism, it is necessary to act on changing the negative attitude toward authority and individuals. In addition, action on the variables of self-control and self-efficacy is necessary for building a prosocial identity.

Furthermore, considering the study by Kaya and Odaci⁷⁷ on 1091 undergraduate students who found that self-forgiveness, coping self-efficacy, mindfulness and resilience contribute to subjective well-being, it is necessary to consider these variables in the counselling and re-education process of prisoners. This would help to better adapt to the prison environment and on this basis, interventions would be more effective.

At the same time, starting from the results of Diotaiuti⁷⁸, who tested the metric goodness and invariance of the Italian short version of the Interpersonal Reactivity Index in a sample of young adults, who found a significant relationship between the presence of outward-oriented thinking and a low level of empathy, it becomes clearer that an approach to increasing prosociality in the general population as well as in the incarcerated population could lead to a decrease in delinquency and infractionality.

Our results align with previous studies that highlight the mediating effect of emotional balance on proactive behavior⁷⁹. Thus, interventions should aim to enable prisoners to learn better, adaptive responses to stress and anxiety that arise inherently during incarceration.

Personality traits

According to the results of this study, as the personality score increases, the score for negative attitudes towards authority/individuals decreases. Therefore, individuals with stable positive personality traits can better manage difficult situations, thereby reducing the risk of exhibiting behaviors contrary to societal norms.

The information obtained complements studies that have shown that certain personality traits, such as conscientiousness, agreeableness, and self-control, are associated with a lower risk of criminal recidivism. For example, Tharshini³⁷ emphasized that individuals with a high degree of conscientiousness are more likely to adopt prosocial behaviors, given their respect for social norms and legislation. Conscientiousness may help reduce recidivism, as inmates are likely to adhere more effectively and authentically to the rules and educational programs during their incarceration, thereby understanding the consequences of their actions. However, there are differing opinions suggesting that levels of conscientiousness cannot be used to predict a potential new conviction³⁰.

Regarding agreeableness, it seems that an optimal level can enhance the chances of reintegration into society by fostering lasting and constructive social relationships⁸⁰. Concerning emotional stability, numerous studies have demonstrated the role of self-control in criminal behavior, suggesting that individuals who struggle to manage their impulses are more likely to engage in risky and harmful behaviors, such as substance abuse, theft, and acts of violence^{81,82}. However, there has been discussion about the self-control of criminals.

In 1990, Gottfredson and Hirschi⁸³ highlighted self-control theory in their work “A General Theory of Crime”, discussing the high level of self-control among offenders when planning and committing their offenses. Subsequent studies outside of criminology have indicated that self-control is a malleable trait⁸⁴. Consequently, the analysis of self-control concerning criminality conducted in this study underscores the necessity of examining self-control both as an individual score and in correlation with emotional stability, low neuroticism, agreeableness, and conscientiousness as a global score.

From the perspective of extraversion, the information is quite contradictory. While some authors argue that a low level of extraversion is particularly characteristic of inmates who have committed violent crimes³⁷ according to Shimotsukasa³¹, offenders convicted of violent crimes scored higher on the extraversion scale compared to the control group.

Regarding the trait of autonomy, Eski and Lampkin⁸⁵ found that offenders may exercise a higher level of autonomy in the decision-making process that leads to illegal behaviors, particularly in the absence of adequate social support⁸⁶.

Also, characteristics such as reduced empathy and the inability to form healthy social relationships may contribute to the recurrence of criminal behavior. A landmark study conducted by Benda et al.⁸⁷ confirms that specific personality traits can significantly influence delinquent behaviors, and their assessment should be a central element in strategies for preventing criminal recidivism. As can be observed, this study complements strategies for preventing criminal risk based on changing offenders' motivations and predispositions, including identifying problematic personality elements.

Conclusions

This study aimed to identify the effect of two parallel mediators, self-efficacy and self-control, in the relationship between personality and three variables in the criminogenic framework, namely, Machiavellianism, the negative attitude toward individuals, and the negative attitude toward authority. The results have indicated that self-efficacy and self-control parallelly mediate the relationship between personality and the negative attitude toward individuals/authority, but not the one between personality and Machiavellianism. The study supports research that attests to the importance of personality in committing criminal acts. It demonstrates that personality score explains over a quarter of the variance in self-efficacy score and 7.2% of the variance in self-control score. At the same time, the present study supports the idea that certain personality traits can reduce the risk of committing

criminal acts, highlighting the inverse relationship between personality score and the negative attitude toward the individual/authority.

Because a high level of self-efficacy positively correlates with the Machiavellianism score and the negative attitude toward the individual, the study suggests that a high level of self-efficacy directed toward undesirable behaviors contributes to persistence in criminal activities. A possible explanation is that offenders with a high level of self-efficacy consider the illegal acts committed, arrest, and even incarceration as “mistakes”, “errors” from which they must learn to ensure the success of a new crime in the future. Therefore, even if it may seem irrational, some offenders do not respond to prison sentences by “obeying the law” but strive to become better offenders, with their efficacy beliefs influencing the meanings that offenders attribute to punishments. This finding also explains situations where some offenders imagine themselves as talented and successful at crime, even though this is a fact not based on reality. False confidence arises from fantasy, from an irrational model of criminogenic cognition (forgetting failures, remembering successes), thus becoming a means of reinforcing self-esteem. Moreover, the findings are consistent with research on non-criminal contexts and support the notion that one’s self-efficacy is primarily the result of personal and vicarious experiences, as well as contextual characteristics.

Therefore, self-efficacy can have real consequences on making decisions with criminal implications, making it extremely important to develop strategies to disrupt such beliefs, as well as to direct toward behaviors that align with social norms.

Regarding the effect of self-control, the results support the Theory of Criminal Self-Control, namely that offenders have a low level of control. According to the data obtained in this study, an increase in self-control decreases Machiavellianism, the criminal attitude toward the individual and authority. It is recommended to use programs aimed at contributing to the development of self-control, starting from adolescence and especially during detention. At the same time, this study raises a warning about the effects of imprisonment, demonstrating that mere isolation from society does not produce positive changes in criminal personality, even if long-term sentences are applied. This study emphasizes the true role of self-control in reducing criminality, namely, to be effective and balanced in contexts lacking social or legal supervision.

This study finds that although it can be considered that offenders commit illegal acts and even persist in exhibiting this behavior due to having a low level of self-efficacy, which leads them to perceive themselves as less effective and successful compared to others, they benefit from a high level of self-efficacy, albeit one that is directed toward illegal behaviors.

In conclusion, the study analyzed the influence of self-efficacy and self-control as mediators in the relationship between personality and negative attitudes toward individuals and authority, as well as Machiavellianism. The results suggest that self-efficacy and self-control mediate the aforementioned relationship, but not the one with Machiavellianism. A high level of self-efficacy may contribute to the persistence of criminal behavior, with offenders tending to perceive punishment as a learning opportunity. Additionally, low self-control is correlated with negative behaviors, and interventions to develop it are recommended, particularly in adolescence and detention. The study highlights that isolation does not change criminal personality and emphasizes the importance of self-control and personality in crime prevention.

Therefore, it is recommended that specialized interventions in the field of social reintegration prioritize directing the psychological resources available to the individual toward desirable behaviors.

Theoretical implications

The study contributes to the understanding of the complexity of the relationship between personality traits (such as Machiavellianism) and negative behaviors. The results suggest that self-efficacy and self-control are important mediating variables, indicating that the way individuals perceive themselves and their ability to control their impulses plays a significant role in determining attitudes toward authority and criminal behavior.

The study highlights that Machiavellianism is not mediated by self-efficacy or self-control, which could open new avenues for research in understanding this construct. This suggests that individuals with Machiavellian traits may act in ways that are not influenced by their perception of personal abilities or behavioral control, which could require different interventions compared to those aimed at individuals with low self-efficacy.

In the case of Machiavellian offenders, one of the three traits of the dark triad of personality (alongside narcissism and psychopathy) should be explored and addressed in relation to self-efficacy, as the combination of these traits could be a barrier to reintegration. A future direction could involve exploring the dark triad of personality in opposition to the bright personality traits (emotional stability, agreeableness, and conscientiousness), both for each factor and for composite scores, to observe which factor has a greater predictive power regarding reintegration/criminality.

Practical implications

In an educational context, the results of the study suggest that programs aimed at developing self-efficacy and self-control among young people may be effective in preventing negative attitudes toward authority.

In clinical or correctional settings, the study suggests that programs focused on increasing self-control could reduce recurring criminal behaviors.

At the public policy level, the results of the study could influence crime prevention strategies, emphasizing the importance of early intervention programs aimed at developing personality and self-control among young people. These could include community initiatives, awareness campaigns, and resources for parents and educators aimed at preventing the formation of negative personality traits associated with criminal behaviors.

These findings have direct implications for rehabilitation programs in correctional facilities, suggesting that interventions focusing on developing self-control and increasing confidence in one’s ability to cope with challenges could significantly reduce the risk of recidivism. For example, programs that include self-efficacy training and

impulse control techniques can support incarcerated individuals in the process of social reintegration, providing them with the tools needed to handle stressful situations without resorting to criminal behaviors. These interventions not only help reduce recidivism but also promote a more sustainable and personalized approach to rehabilitation, taking into account the unique characteristics of each individual. Thus, a rehabilitation model based on developing these traits could significantly contribute to reducing the number of repeat offenders.

Limits and future research directions

The results of the study enrich the opinions on the psychological characteristics of offenders, which are important for improving the specialized interventions provided at the level of security structures. However, additional research is necessary to identify the sources underlying the creation of self-efficacy involved in decisions with criminal risk.

The main limitation of the study is that it is based on self-report, with the possibility of some desirable answers from the inmates, even if the anonymity of the prisoners' identity has been preserved.

Another limitation of the research is the representativeness of the sample of participants concerning age categories. Although the age of the subjects ranged from 21 to 71 years, there is a significant disproportion due to the majority concentration of values in the 21–60 age range, while only 18 subjects belong to the 61–80 age category. A more balanced distribution across age groups could allow for highlighting the stability/fragility of personality and other psychological factors in the context of criminality.

Additionally, the discrepancy related to gender distribution constitutes a notable issue, considering that over 90% of the participants are male. It is recommended that future studies analyse the data more inclusively, taking into account both gender and age categories.

Another future study may investigate whether the level of self-control changes depending on the duration of imprisonment and what factors may promote real growth even under conditions of total supervision.

As a result, in the case of offenders, Machiavellianism, one of the three traits of the dark triad of personality (alongside narcissism and psychopathy), should be explored and addressed with self-efficacy.

A longitudinal study would allow for tracking the evolution of personality traits, self-efficacy, and self-control over a longer period of time, observing how these traits influence long-term criminal behaviors and whether rehabilitation interventions have sustainable effects.

At the same time, a study that includes a control group consisting of individuals who are not involved in rehabilitation programs or who do not exhibit the same personality traits could provide valuable information about the effectiveness of psychological interventions. By comparing groups of subjects with and without interventions, researchers could more precisely determine to what extent personality traits and self-control abilities mediate criminogenic behaviors.

Data availability

The entire database is available upon request from the corresponding author.

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Author contributions

C.R. and M-M.D. conceived the present study. M-M.D. collected the data. C.R. was responsible for statistics. C.R. and M-M.D. analyzed the results, wrote the manuscript. All authors including R-A.L. reviewed and edited the manuscript.

Competing interests

The authors declare no competing interests.

Additional information

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