

Psychometric prediction of penitentiary recidivism

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Abstract

Background: Attempts to predict prison recidivism based on the personality have not been very successful. This study aims to provide data on recidivism prediction based on the scores on a personality questionnaire. For this purpose, a predictive model combining the actuarial procedure with a posteriori probability was developed, consisting of the probabilistic calculation of the effective verification of the event once it has already occurred. **Method:** Cuestionario de Personalidad Situacional (CPS; Fernández, Seisdedos, & Mielgo, 1998) was applied to 978 male inmates classified as recidivists or non-recidivists. **Results:** High predictive power was achieved, with the area under the curve (AUC) of 0.85 ($p < .001$; $Se = 0.012$; 95% CI [0.826, 0.873]). The answers to the CPS items made it possible to properly discriminate 77.3% of the participants. **Conclusions:** These data indicate the important role of the personality as a key factor in understanding delinquency and predicting recidivism.

Keywords: Delinquency, penitentiary recidivism, prediction, personality.

Resumen

Predicción psicométrica de la reincidencia penitenciaria. **Antecedentes:** los intentos para predecir la reincidencia penitenciaria basándose en la personalidad no han tenido mucho éxito. Este trabajo tiene como objetivo ofrecer datos sobre la predicción de la reincidencia a partir de las puntuaciones en un cuestionario de personalidad. **Método:** se aplicó el Cuestionario de Personalidad Situacional (CPS; Fernández, Seisdedos y Mielgo, 1998) a 978 reclusos varones clasificados como reincidentes o no reincidentes y se elaboró un modelo predictivo combinando el procedimiento actuarial con el concepto de probabilidad a posteriori, consistente en realizar cálculo probabilístico a partir de la constatación efectiva del suceso una vez ya se ha producido. **Resultados:** se logró un elevado poder predictivo, siendo el área bajo la curva (AUC) de 0.85 ($p < 0.001$; $Se = 0.012$; 95% IC [0.826, 0.873]). Las respuestas a los ítems del CPS permitieron discriminar adecuadamente al 77,3% de los participantes. **Conclusiones:** estos datos indican el papel importante de la personalidad como factor clave para entender la delincuencia y predecir la reincidencia.

Palabras clave: delincuencia, reincidencia penitenciaria, predicción, personalidad.

Rehabilitative interventions performed in prison settings are designed to reduce criminal incidence rates, but results so far have been disappointing (Medina, 2013). Criminal behavior is complex, has multiple causes, and is subject to legislative changes. With the exception of some general intelligence and personality characteristics (e.g., Chico, 1997; Pelechano, 2008; Sánchez-Teruel & Robles-Bello, 2013), it has not been possible to identify the profile of the delinquent. Personality scales have failed to make highly accurate predictions about recidivism. Hence, for the past few decades, actuarial scales have been used, based on a mechanical combination of empirically validated risk factors (Andrés & Echeburúa, 2010; Brouillette-Alarie, Proulx, & Benbouriche, 2013). Thus, Luque, Ferrer, and Capdevila (2005), after a 4.5 year follow-up of a sample of former prisoners in 1997, elaborated a logistic regression equation with criminal and sociodemographic variables. However, the predictive power of the

true positives (the people who actually relapsed), was 23.4%, a percentage below the level of accuracy by chance (37.4%).

Currently, there are more than 100 actuarial prediction scales, most of them referring to violent contexts and specific behaviors. They assign a risk factor weight, both "static" (e.g., unmodifiable) and "dynamic" (e.g., changeable), that correlates with repeated entry in prison (e.g., age, impulsivity, hostility, etc.). As limitations, it should be pointed out that these scales require specific training, they take a long time to be completed, and they have a predominance of items related to non-modifiable variables (e.g., gender). Several scales can be highlighted, among them: the *Sexual Violence Risk-20* (Boer, Hart, Kropp, & Webster, 1997) scale for sex offenders; *The Spousal Assault Risk Assessment* (Kropp & Hart, 2000); the *Escala de Predicción del Riesgo de Violencia Grave (Scale for Predicting the Risk of Serious Violence against the Partner - Reviewed)*; Echeburúa, Amor, Loinaz, & De Corral, 2010), which tries to predict recidivism against the partner; and the *Assessing Risk for Violence* (Webster, Douglas, Eaves, & Hart, 1997), used to predict generalized violence. The meta-analysis by Singh, Grann, and Fazel (2011) showed that the greatest predictive power reached by one of these scales, and measured by the Area Under the Curve (AUC), was 0.78 for the median and 0.71 - 0.83 for the interquartile range. A more recent meta-analysis by these authors

(Fazel, Singh, Dol, & Grann, 2012) found a median of AUC = 0.72 for violent crimes and an interquartile range of 0.68-0.78. The values for “general recidivism” were lower, 0.66 and 0.58-0.67, respectively.

In Spain, Graña et al. (2012) used the *Inventario de Factores de Riesgo e Intervención en Prisiones (Inventory of Risk Factors and Intervention in Prisons)*; an adaption of *Level of Service Inventory Revised*, Andrews & Bonta, 1995) to predict recidivism in retrospect ($N = 811$). The AUC values for violent and general recidivism were 0.81 and 0.77, respectively.

The most recent attempt is the *RISCANVI* scale, implemented in Catalonia (Spain) in 2009. A retrospective study by Nguyen, Arbach, and Andrés-Pueyo (2011) achieved an AUC value of 0.64 for violent penitentiary recidivism, commonly found in other studies (Fazel et al., 2012; Singh et al., 2011), but too low to make individual prognoses (Martínez, 2014). In another prospective study by Capdevila et al. (2015), the *RISCANVI* was applied to predict violent recidivism in 684 former prisoners in 2010. Although reaching a sensitivity of 77% and a specificity of 57.26%, the authors did not offer the AUC or the positive predictive value (percentage of real violent recidivists predicted compared to the total number of violent recidivists predicted). However, this percentage was obtained from table 38 (Capdevila et al., 2015; p.151): 17.94%, compared to a base violent crime rate of 29.4%, that is, 11.46% below chance. In addition, the data point out that for every 2 future violent recidivists correctly identified, another 9 will be erroneously classified who would not be. Despite these data, the authors concluded that “the tool performed quite well in predicting risk in individuals who would actually relapse (77.15%), and it was acceptable in classifying as low risk the subjects who actually would not relapse (57.26%).” (Capdevila et al., 2015, p. 237).

The violent criminal typology shows a low frequency with regard to general recidivism. For example, in Catalonia (Spain), this frequency ranges between 16.5% and 29.4% (Capdevila et al., 2015; Luque et al., 2005). For this reason, sensitivity is usually good, but not specificity, and the probability of including fake positives is a serious and unresolved problem. Indeed, authors such as Martínez (2014), after carrying out an excellent review, indicated the dangers of trusting actuarial scales too much.

Considering these criticisms and limitations of actuarial scales, the objective of this study is to prove that the evaluation of the personality traits can be useful to predict delinquent recidivism, without the need for other risk factors, “ad hoc” constructs (e.g., “criminogenic needs” of Andrews & Bonta, 1995), or other specific scales, such as actuarial scales. To achieve this, instead of using the usual personality trait subscales, elaborated on the basis of general or clinical populations, this study starts from the basic information provided by the items that make up the psychometric instrument. Specifically, it is hypothesized that the items that make up the *Cuestionario de Personalidad Situacional (CPS; Inventory of Risk Factors and Intervention in Prisons; Fernández, Seisdedos, & Mielgo, 1998)* will make it possible to predict penitentiary recidivism in a broad sample of male inmates.

Method

Participants

The sample was composed of two groups of males: inmates ($n = 1116$) and general population ($n = 1700$). The inmates ($M = 36.27$

years old; $SD = 9.64$) were from 4 prisons in Catalonia (Spain) (97% from the Tarragona Prison). In the total sample, 138 participants had no prison records and were serving their sentences at the time of the study. The rest of the sample ($n = 978$) was divided into two groups according to the following definitions:

- a) Recidivist ($n = 568$) ($M = 35.96$ years old; $SD = 9.24$). People who have served a sentence because of committing a crime and re-enter prison again for some other reason. This includes committing a new crime while the inmate is serving the sentence, escapes, and remand prisoners, who are released and re-enter again for another criminal case subsequent to the initial entry in prison.
- b) Non-recidivist ($n = 410$) ($M = 36.72$ years old; $SD = 10.16$). People who enter prison because of some crime, are released, and do not re-enter prison due to a criminal case different from the initial one.

The control group was composed of a sample of male participants from different selection processes between 2007 and 2014, provided by TEA editions. They were randomly chosen and stratified by age ($M = 29.9$ years old; $SD = 9.35$) and nationality, Spain ($n = 1200$) and 14 Latin American countries ($n = 500$). There was no information about their educational level, but the different selection processes ensured the inclusion of different educational levels, from primary to university levels.

Instruments

Cuestionario de Personalidad Situacional (CPS; Fernández et al., 1998). It is composed of 223 dichotomous items typified in a sample of 39,641 Spanish people and grouped in 15 personality variables (emotional stability, anxiety, self-concept, effectiveness, confidence, independence, dominance, cognitive control, sociability, social adjustment, aggressiveness, tolerance, social intelligence, integrity and leadership), 3 measures of validity (sincerity, social desirability, and control of answers), and 5 second-order factors (adjustment, leadership, independence, consensus and extraversion). The interquartile range and the median of the reliability of the scales were: coefficient alpha (0.587; 0.83) and 0.725, respectively; test-retest (0.89; 0.91) median: 0.89. Regarding validity, there is a wide range of correlations, according to the contrasted scales of two psychometric instruments: *Questionnaire of Personality (Eysenck & Eysenck, 1994)* with a range: 0.77; -0.76, and *the Clinical Analysis Questionnaire (Krug, 1994)*, with a range: 0.64; -0.58. The CPS questionnaire was chosen for its ability to identify conflictive inmates and predict regression in the penitentiary treatment (Raya, Villacorta, & Medina, 2008), and its double typification, in a Spanish general population and a penitentiary population (Medina, 2013).

In addition, measurements were obtained for the following variables (see Table 1): age (in years), educational level (elementary, secondary, mid-level, and higher), 8 criminal categories, and nationality (Spanish and non-Spanish). Penitentiary trajectory was added because it is strongly associated with recidivism, and it is the variation of the penitentiary treatment degree in the initial classification. It was dichotomous, operationalized in two categories, no antecedents of degree regression or antecedents of degree regression.

Table 1

Frequencies distribution by educational level, criminal category, nationality and variation in the penitentiary treatment degree (regression of degree)

	Recidivists		Non-recidivists		Total	
	N	%	N	%	N	%
Educational level						
Elementary	227	40.0	137	33.4	364	37.2
Secondary	304	53.5	197	48.0	501	51.2
Mid-level	13	2.3	32	7.8	45	4.6
Higher	18	3.2	21	5.1	39	4.0
No data	6	1.1	23	5.6	29	3.0
Criminal Category						
Against people	106	18.7	68	16.6	174	17.8
Sexual assault	27	4.8	33	8.0	60	6.1
Domestic violence	62	10.9	63	15.4	125	12.8
Theft	282	49.6	81	19.8	363	37.1
Economic crimes	22	3.9	24	5.9	46	4.7
Against public health	45	7.9	99	24.1	144	14.7
Against traffic safety	16	2.8	31	7.6	47	4.8
Others	8	1.4	11	2.7	19	1.9
Nationality						
Spanish	496	87.3	324	79.0	820	83.8
Non-Spanish	72	12.7	86	21.0	158	16.2
Regression of degree						
Regression of degree	248	43.7	56	13.7	304	31.1
Non-regression of degree	320	56.3	354	86.3	674	68.9
Total	568	100.0	410	100.0	978	100.0

Note: The total sum of rates varies one decimal point due to the approximation error

Procedure

The inmates filled out the CPS in the real context of the prison over a period of 11 years (from 30/04/2004 to 31/06/2015). Regarding the recidivist inmates, the assessment was carried out before and after the crime was committed. Regarding the non-recidivist inmates, after checking the absence of a criminal record, the follow-up was carried out at least one year after the final release ($M = 1529$ days; $SD = 695$; range 368-3882). In Catalonia, the majority of prisoners who served a first conviction did not relapse, but it was noted that the ones who did so relapsed in an average of 359.25 and 637.8 days (Capdevila et al., 2015; Luque et al., 2005).

Data analysis

The statistical analyses were performed using SPSS 15.0 in the following sequence:

- 1) Selection of the CPS items with a discriminative index > 0.1 in the penitentiary population (N = 1116). 209 items were obtained.
- 2) These items were introduced together as predictor variables in a logistic regression equation.
- 3) A score for each participant was calculated using the weighting coefficients of the logistic regression equation.

This new synthetic variable, called “recidivism209”, was used to predict recidivism in an actuarial way. It means that an a posteriori probability calculation was made, once it had been verified which participants were recidivist and non-recidivist.

- 4) An ANOVA was performed to validate the hypothesis of the predicted model: the predictor variable (“recidivism209”) should discriminate between the recidivist and non-recidivist inmates. Simultaneously, there should be no differences between the non-recidivists (rehabilitated) and the control group (general population), or within the control group based on relevant characteristics, such as being Spanish or not.
- 5) The score on the new predictor variable, using the coordinates of the ROC curve, makes it possible to individually calculate the sensitivity and specificity. These were summarized using percentiles.

Results

The indicators of the logistic regression equation were: $\chi^2(209, 978) = 409.51, p < .001$; test of Hosmer and Lemeshow: $\chi^2_{(8)} = 2.907, p = .93$; Nagelkerke’s $R^2 = 0.46$. The match-accuracy is shown in Table 2, and the B coefficients in Table 3.

The discriminative capacity of the ROC curve of the predictor variable is shown in Figure 1. The corresponding statistics are: $AUC = 0.85, p < .001, Se = 0.012, 95\% CI [0.826, 0.873]$.

An example of the process for calculating the score for “recivism209” using a participant’s CPS answers (e.g., item1: true; item2: false, (...), item233: false) is shown: 1) Score of the new variable using the coefficients from Table 3 is calculated. The “true” answer weight 1 and the “false” answer weight 2: $-0.478.1 + 0.313.2 + (...) + 0.258.2 = 2.116$. The values of the ROC curve coordinates. The value 2.116 is close to the percentile distribution (see Table 4). The closest score is Percentile = 77, which means that 77% of the participants have a score equal to or below 2.116 on “recidivism209”. The sensitivity is 0.359, which means that 35.9% of the recidivist participants have a value above 2.116. The probability of obtaining a false positive is shown in column “1-specificity” of Table 4. The value is 0.034, and it is the probability of being recidivist when this is not true. In this example, this participant is probably going to be a recidivist inmate.

Validation of the predictive model. All the analyses supported the expected predictions: recidivist vs. non-recidivist, $F(1, 976) = 496.14, p < .001; \eta^2 = 0.34$; non-recidivist vs. control group, $F(1, 2108) = 1.22, p = .269; \eta^2 = 0.001$. The non-significant difference between Spanish and non-Spanish participants within the control group was also supported, $F(1, 1698) = 0.52; p = .47; \eta^2 = 0.001$. The descriptive statistics for the variable “recidivism209” are shown in Table 5.

Table 2
Classification of the logistic regression equation

	Predicted recidivism		Match-accuracy	
	No	Yes		
Observed recidivism	No	325	85	79.3 %
	Yes	137	431	75.9 %
Global match-accuracy				77.3 %

Table 3
B Weighting coefficients of the scores on the CPS

Variable	B	Variable	B	Variable	B	Variable	B	Variable	B
Item1	-0.478	Item51	0.012	Item101	-0.428	Item145	0.3	Item195	0.284
Item2	0.313	Item52	0.149	Item102	-0.549	Item146	0.144	Item196	-0.184
Item3	-0.537	Item53	0.257	Item103	0.574	Item147	0.365	Item197	-0.009
Item4	0.083	Item54	-0.236	Item104	-0.32	Item148	0.217	Item198	0.131
Item5	-0.304	Item55	-0.072	Item105	0.137	Item150	0.234	Item199	-0.36
Item6	-0.321	Item56	0.122	Item106	0.516	Item151	0.366	Item200	0.189
Item7	-0.213	Item57	0.412	Item107	0.117	Item152	-0.337	Item202	-0.492
Item8	-0.084	Item58	0.404	Item108	0.137	Item153	-0.403	Item203	-0.153
Item9	0.233	Item59	-0.25	Item109	0.069	Item154	-0.502	Item204	0.18
Item10	0.132	Item61	-0.728	Item110	0.359	Item155	-0.47	Item205	0.157
Item11	0.186	Item62	-0.23	Item111	-0.297	Item156	0.739	Item207	0.084
Item12	-0.051	Item63	-0.016	Item112	0.085	Item157	1.117	Item208	0.236
Item13	0.171	Item64	-0.85	Item113	0.057	Item158	-0.061	Item209	-0.145
Item14	0.396	Item66	0.544	Item114	0.573	Item159	-0.531	Item210	-0.047
Item18	0.221	Item67	0.312	Item115	0.353	Item160	-0.203	Item211	0.025
Item19	-0.04	Item68	-0.198	Item117	-0.158	Item161	-0.008	Item212	-0.261
Item21	-0.142	Item69	0.191	Item118	-0.611	Item162	0.24	Item213	-0.303
Item22	0.138	Item70	-0.305	Item119	-0.313	Item165	-0.383	Item214	0.193
Item23	-0.061	Item71	-0.449	Item120	-0.061	Item166	-0.246	Item215	0.288
Item24	0.192	Item72	0.804	Item121	-0.439	Item167	0.427	Item216	-0.027
Item25	0.012	Item74	0.2	Item122	0.341	Item169	-0.334	Item217	0.689
Item26	0.258	Item77	0.491	Item123	-0.414	Item170	0.123	Item218	0.073
Item27	0.159	Item79	-0.417	Item124	-0.798	Item171	0.084	Item219	-0.197
Item28	-0.45	Item80	0.135	Item125	-0.605	Item172	0.405	Item220	0.806
Item29	-0.194	Item82	0.257	Item126	0.438	Item174	-0.096	Item221	-0.068
Item30	-0.031	Item83	0.235	Item127	-0.095	Item175	0.209	Item222	0.299
Item31	0.21	Item84	-0.012	Item128	-0.266	Item176	0.415	Item223	-0.255
Item33	-0.306	Item85	0.058	Item129	-0.265	Item177	-0.575	Item224	-0.001
Item34	0.373	Item86	0.066	Item130	-0.376	Item178	-0.077	Item225	-0.604
Item35	-0.008	Item87	-0.023	Item131	-0.361	Item179	-0.413	Item226	-0.291
Item36	0.064	Item88	-0.25	Item132	0.282	Item180	-0.699	Item227	0.486
Item37	-0.135	Item89	0.137	Item133	0.011	Item181	-0.269	Item228	-0.153
Item38	-0.618	Item90	-0.306	Item134	0.173	Item182	0.427	Item229	0.619
Item39	-0.391	Item91	-0.003	Item135	0.098	Item183	0.77	Item230	0.042
Item40	0.162	Item92	-0.073	Item136	-0.618	Item186	-0.053	Item231	0.276
Item41	-0.374	Item93	-0.332	Item137	0.24	Item187	0.2	Item232	-0.038
Item42	0.099	Item94	-0.181	Item138	0.523	Item188	0.517	Item233	0.258
Item43	0.128	Item95	0.397	Item139	-0.005	Item189	-0.034		
Item44	-0.216	Item96	0.239	Item140	0.012	Item190	0.125		
Item46	0.008	Item97	0.174	Item141	-0.309	Item191	0.046		
Item47	-0.092	Item98	0.373	Item142	0.352	Item192	0.06		
Item48	-0.075	Item99	-0.205	Item143	0.18	Item193	-0.569		
Item49	0.502	Item100	-0.422	Item144	0.375	Item194	-0.29		

Discussion

This study demonstrates that a “general” personality questionnaire may help to predict something as complex as penitentiary recidivism. The selected items only meet a minimum requirement: having a discrimination index > 0.1 . More than 99% of them are dynamic (e.g., they refer to editable variables), and they do not make a direct reference to any risk behavior (e.g., drug addiction) or criminal behavior. Furthermore, a broad, heterogeneous sample was used, higher than the scale average

of any study included in the cited meta-analysis. The predictive precision level found has not often been surpassed by other scales in their respective specific areas. Some items have a weight that is as much as 1100 times greater than others, which would help to group them based on factors or traits, in order to achieve a more efficient predictive scale.

The indicators of static or unmodifiable risks of the current actuarial scales reduce the scope of action of prison rehabilitation. Thus, criminal records and age have great predictive power (Molleda, Rodríguez, Pérez, Sánchez, & Ovejero, 2013), especially

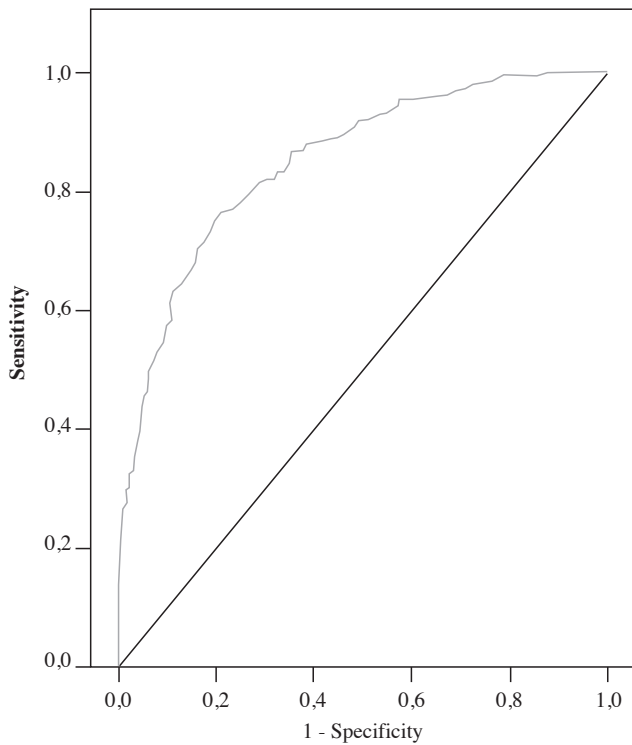


Figure 1. ROC Curve of the scores on “recidivism209” predicting penitentiary recidivism. Note: Area Under the Curve: 0.85

in violent recidivism (Graña et al., 2012; Nguyen et al., 2011), but not many possible actions exist to change them. This study points out the relevance of variables that are susceptible to change.

Another important problem is that the predictive studies of recidivism often confuse *penitentiary recidivism* (return to prison for committing a new crime) with *criminal withdrawal* (abandonment of the criminal career throughout the life cycle). Therefore, some inmates are considered “non-recidivist” when they are not, because although they have not entered prison again during the follow-up period established, they have a criminal record. Although recidivism and withdrawal are related, they are not equal constructs: a person does not cease to be a recidivist because he/she spends a period of time without returning to crime. This confusion interferes in the study of psychological dimensions that explain criminal behavior. Undoubtedly, the intimidating value of sending recidivists to prison again is lower than in the case of non-recidivists. What this study shows is that their personality profiles are probably different, providing greater predictive and rehabilitative ability.

Personality scales are constructed by grouping characteristics of items that are applied to standard or clinical samples. Thus, the alleged patterns of a possible “criminal personality” are hard to detect under the specific weight of the prison population compared to the general population. These factors would reflect personal and social functioning, as a midpoint between the static and dynamic factors (Graña et al., 2013), to explain and predict recidivism and criminal withdrawal. These variables would indicate a balance between the intimidating values of imprisonment (sensitivity to punishment) and the incentive to achieve objectives by breaching the penal code (sensitivity to reward).

Table 4
ROC curve coordinates for “recidivism209”

Score	Percentile	Sensitivity	1-Specificity	Score	Percentile	Sensitivity	1-Specificity
-3.600	1	1.000	0.978	0.687	51	0.715	0.173
-3.190	2	0.998	0.961	0.743	52	0.704	0.166
-2.844	3	0.998	0.939	0.773	53	0.688	0.159
-2.502	4	0.998	0.917	0.817	54	0.676	0.154
-2.379	5	0.998	0.895	0.896	55	0.662	0.139
-2.206	6	0.998	0.871	0.927	56	0.653	0.129
-2.074	7	0.995	0.854	0.971	57	0.639	0.124
-1.925	8	0.995	0.832	1.017	58	0.627	0.112
-1.801	9	0.995	0.807	1.113	59	0.614	0.107
-1.728	10	0.995	0.785	1.147	60	0.599	0.107
-1.608	11	0.989	0.768	1.209	61	0.585	0.102
-1.509	12	0.984	0.754	1.268	62	0.572	0.098
-1.445	13	0.981	0.734	1.339	63	0.555	0.095
-1.301	14	0.975	0.717	1.399	64	0.540	0.088
-1.219	15	0.972	0.695	1.453	65	0.528	0.080
-1.158	16	0.967	0.678	1.491	66	0.518	0.073
-1.075	17	0.961	0.663	1.520	67	0.505	0.068
-0.989	18	0.958	0.646	1.579	68	0.493	0.063
-0.926	19	0.956	0.622	1.633	69	0.479	0.061
-0.876	20	0.952	0.600	1.679	70	0.463	0.056
-0.834	21	0.952	0.578	1.753	71	0.451	0.051
-0.803	22	0.942	0.571	1.809	72	0.437	0.044
-0.725	23	0.935	0.556	1.877	73	0.421	0.044
-0.689	24	0.928	0.532	1.937	74	0.405	0.044
-0.631	25	0.923	0.515	1.975	75	0.393	0.039
-0.550	26	0.919	0.498	2.052	76	0.375	0.037
-0.482	27	0.910	0.488	2.104	77	0.359	0.034
-0.403	28	0.903	0.473	2.171	78	0.345	0.032
-0.339	29	0.898	0.459	2.261	79	0.329	0.029
-0.302	30	0.891	0.446	2.326	80	0.315	0.024
-0.243	31	0.887	0.424	2.369	81	0.301	0.022
-0.217	32	0.882	0.410	2.442	82	0.287	0.017
-0.178	33	0.879	0.388	2.562	83	0.273	0.012
-0.133	34	0.870	0.378	2.650	84	0.254	0.010
-0.103	35	0.864	0.359	2.785	85	0.238	0.007
-0.074	36	0.850	0.354	2.848	86	0.222	0.007
-0.008	37	0.840	0.346	3.013	87	0.208	0.005
0.053	38	0.833	0.334	3.185	88	0.192	0.005
0.114	39	0.820	0.322	3.282	89	0.176	0.005
0.185	40	0.820	0.298	3.420	90	0.157	0.005
0.221	41	0.810	0.285	3.539	91	0.141	0.005
0.256	42	0.801	0.276	3.603	92	0.129	0.000
0.302	43	0.792	0.263	3.721	93	0.113	0.000
0.357	44	0.783	0.251	3.965	94	0.093	0.000
0.392	45	0.775	0.241	4.114	95	0.077	0.000
0.422	46	0.768	0.227	4.229	96	0.062	0.000
0.473	47	0.761	0.210	4.456	97	0.046	0.000
0.513	48	0.750	0.200	4.755	98	0.030	0.000
0.596	49	0.738	0.190	5.159	99	0.014	0.000
0.624	50	0.725	0.183				

Studies that attempt to analyze and predict criminal recidivism have to deal with multiple biases (e.g., offenses and imprisonment backgrounds not registered in the database used as a source)

because detecting all the crimes is impossible. Penitentiary recidivism as an indicator of delinquency is quite restrictive, in contrast to other possibilities (e.g., police and judicial recidivism), but it is also the most visible, easy to measure, and modifiable.

Moreover, another limitation of this study is that the minimum follow-up period was limited to one year, in order to not excessively reduce the sample. Future studies could use minimum follow-up periods of two years or more. In addition, this study has been limited to the territorial scope of Catalonia (Spain). It would be necessary to perform replications in other geographical areas,

	n	M	SD	95% CI	
Inmate group					
Non-Recidivists	410	-0.576	1.434	-0.715	-0.436
Recidivists	568	1.636	1.600	1.504	1.768
Control group					
Spanish	1200	-0.657	1.700		
Non-Spanish	500	-0.723	1.729		
Total	1700	-0.677	1.708		

which would reduce many sources of error in the detection of itinerant criminal recidivism throughout the national territory.

Another weakness is that the prison sample used was not selected randomly, but rather based on its accessibility. Nonetheless, the reader can evaluate its representativeness by contrasting the relations between recidivism and the descriptive variables (penitentiary trajectory, education level, and nationality), and comparing the estimations obtained in other studies.

In conclusion, this study indicates that the CPS is a useful instrument for making predictions about penitentiary recidivism. The broad scope of implementation achieved in the male population (any criminal category, age, education level and nationality) facilitates its replicability in future studies and gives an important role to the personality construct in explaining criminal behavior, beyond other factors, both static and dynamic, contemplated in different criminological theories (e.g., Andrews & Bonta, 1995) and rehabilitation programs.

In the future, in addition to replicating the predictive capacity of the proposed items, it would be interesting to define their content, which traits are grouped together and which ones are the best predictors, and their psychometric characteristics. All of this information is important in designing more effective prison rehabilitation strategies.

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