

## Sociodemographic variables, risk factors, and protective factors contributing to youth recidivism

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### Abstract

**Background:** This study explores the predictive capabilities of sociodemographic characteristics and risk and protective factors for youth recidivism while comparing two analytical methodologies; logistic prediction models and qualitative comparative analysis models. **Methods:** Information from the judicial files of 389 young offenders (14-19.03 years) were gathered from the Juvenile Court and risk and protective factors were extracted from the administration of the Youth Level Service/Case Management Inventory. Recidivism data was also obtained for a follow-up period of two years for each young person. **Results:** The results showed two different profiles of reoffenders. Most were young boys with high risk scores and low protective factors, but a minority were young foreign girls with crimes against persons and low protective factors. **Conclusions:** Being able to detect the different variables that contribute to recidivism can help implement prevention programs tailored to the criminogenic needs of each specific profile.

**Keywords:** Youth, recidivism, risk factors, protective factors, QCA models.

### Resumen

**Variables sociodemográficas, factores de riesgo y factores de protección determinantes en la reincidencia juvenil. Introducción:** este estudio tiene como objetivo explorar las capacidades predictivas de las variables sociodemográficas, los factores de riesgo y los de protección en la reincidencia de menores infractores, comparando dos metodologías analíticas: modelos de regresión logística y modelos de análisis cualitativos comparativos. **Método:** los participantes fueron 389 menores infractores (14-19,3 años) del Juzgado de Menores, a los cuales se les administró el Youth Level Service/Case Management Inventory. Se obtuvieron datos sobre la reincidencia en un período de seguimiento de dos años para cada participante. **Resultados:** se encontraron dos perfiles diferentes de reincidentes, la mayoría eran varones jóvenes con puntuaciones altas en factores de riesgo y bajas en factores de protección. Por el contrario, se halló una minoría de jóvenes extranjeras con delitos contra las personas y escasos factores de protección. **Conclusiones:** detectar las diferentes variables que contribuyen a la reincidencia puede ayudar a implementar programas de prevención adaptados a las necesidades criminógenas de cada perfil específico.

**Palabras clave:** joven, reincidencia, factores de riesgo, factores de protección, modelos QCA.

The most common profile of young offenders has been established as a sporadic relationship with the justice system that ends when adolescence ends (Cuervo & Villanueva, 2013; Moffitt, 2006). According to Moffitt's Dual Taxonomy theory, this is an adolescence-limited antisocial trajectory. Indeed, it is a kind of normative social activity in this age group. However, a small percentage of minors commit a large proportion of crimes and continue to do so in adulthood, showing a life-course persistent trajectory. This type of trajectory is mainly composed of boys who mostly commit crimes against persons (Moffitt & Caspi, 2001). The prevalence of life-course persistent offenders may vary by between 1-29% across different studies (Jolliffe, Farrington, Piquero, MacLeod, & van de Weijer, 2017). Despite

the low-moderate prevalence of the life-course persistent trajectory, this subgroup remains a challenge in the fight against continuing criminal activity. Moreover, albeit more occasionally, the adolescence-limited antisocial group usually commits more than one criminal act in their trajectory (Cuervo, Villanueva, & Pérez, 2017). Determining the different factors associated with this continuance/recidivism may therefore help in the design of specific and tailored intervention programs, as some policies may be more effective for some type of offenders than others.

In the search for these different factors associated to recidivism, some authors have pointed out the importance of including both sociodemographic variables and risk and protective factors in the prediction study (Campbell, Papp, Barnes, Onifade, & Anderson, 2018; Piquero, Jennings, Diamond, & Reingle, 2015), as in this study.

The most extensively analyzed sociodemographic variables to date have been the gender, age and nationality of the youth offender. As regards gender, the classic result of boys committing more criminal and recidivist acts is still widely found (Ortega-Campos, García-García, & Frías, 2014). Nevertheless, this gender

gap in crime has begun to narrow in recent years (Pusch & Holtfreter, 2018).

A commonly accepted phenomenon is the age-crime curve (Farrington, 1987), in which violent crime increases in each successive year from age 12, peaks at age 17, and then drops from ages 18 to 27. If we focus specifically in the commission of new reoffences, younger offenders were also found to be at increased risk of recidivism (Cuervo & Villanueva, 2015). As regards the youth offenders' nationalities, most studies have pointed out the over-representation of non-national youths in the recidivism group (Campbell et al., 2018; Piquero et al., 2015).

The last sociodemographic variable included in this study is related to the criminal typology. Numerous studies have highlighted the slightly higher percentage of crimes against property versus those against persons, at 54% to 46%, respectively (Alcázar, Bouso, & Verdejo, 2015). The most common are robbery, robbery with violence and intimidation, and burglary with forced entry (Alcázar et al., 2015). Within this classification, the offender in property-related offences is more likely to be male, whereas crimes against persons are committed mostly by girls (Cuervo, Villanueva, González, Carrión, & Busquets, 2015). In general, crimes against property are associated with a higher rate of recidivism, followed by crimes against persons and sexual crimes (Cuervo & Villanueva, 2013; Serentill et al., 2017).

This study includes not only sociodemographic variables but also dynamic factors influencing recidivism which are modifiable by intervention, i.e. risk and protective factors (Li, Chu, Xu, Zeng, & Ruby, 2018; Viljoen, Bhanwer, Shaffer, & Douglas, 2018).

Risk factors are a series of individual, social and environmental factors that make criminal behavior possible (Andrews, Bonta, & Wormith, 2006). Protective factors have been related to desistance in various prospective longitudinal studies (Tofi, Farrington, Piquero, & DeLisi, 2016). Most studies have focused on the negative aspects in the minor's life (risk factors), but very few have analyzed how the lack of positive factors in their lives influences the likelihood of future recidivism. Although some studies have found that protective factors do not provide incremental validity for risk factors (Viljoen et al., 2018), they have proved essential in prediction models, as well as main factors for implementing intervention in youth (Shepherd, Strand, Viljoen, & Daffern, 2018).

The most predictive risk and protective factors for recidivism are compiled in the Youth Level of Service/Case Management Inventory (YLS/CMI), based on Hoge and Andrews (2006), which is used in this study. These factors are anti-social attitudes and personality pattern, anti-social peers, and a history of previous offences, poor family circumstances, education and employment, substance abuse, and leisure and recreation. Taken together, these factors are referred to as "the Central Eight", and have shown a strong capacity to distinguish between youth recidivists and non-recidivists (Anderson et al., 2016; Cuervo & Villanueva, 2015). A high risk score in these factors, and some of the previous variables (being male and black), were all significantly related to a youth's likelihood of recidivating (Campbell et al., 2018).

An inclusive methodological approach is needed to establish a complete profile of the youth offender with all these variables. As a widespread analytical strategy in criminology, logistic regression has been used in the 73% of the studies analyzing predictors of crime desistance in juvenile offenders (Basto-Pereira, Começanha, Ribeiro, & Maia, 2015). Given that traditional regression models do not account for the interaction or combination of the different

variables under study, we decided to combine two differential strategies in this study: logistic regression and fuzzy-set qualitative comparative analysis (fsQCA) (Giménez-Espert & Prado-Gascó, 2018). The different factors in the minor's life associated with recidivism can thereby be analyzed both individually and in combination, creating a profile that can be useful for designing intervention programmes. As Piquero et al. (2015) suggested, research should not prioritize one type of risk factor over another, but instead consider the effects of multiple types of risk factors.

A study including both types of analytical strategies would therefore help to enrich the current scenario in the debate on youth offender's profiles and trajectories. Moreover, the use of a valid and reliable inventory including a wide range of youth risk and protective factors (YLS/CMI), the collection of judicial records (rather than self-report offending), and a Spanish population of youth offenders are the most significant contributions of this prospective study.

The aim of this study was to create a complete and differential profile based on demographic variables and risk and protective factors for offenders who continue on their criminal trajectory and for offenders that desist from it. We hypothesized that the following profile would be associated with continuing to reoffend: being a young foreign male, mainly committing crimes against persons, and having high risk scores and few protective factors. We also expected that the qualitative comparative analysis (QCA) versus regression models would provide a complementary and more detailed prediction model for recidivism.

## Method

### Participants

All the juveniles with a disciplinary record in the Juvenile Court of a Spanish province in the period from March 2008 to December 2010 participated in the study. A total of 389 records were compiled. The age of the participants ranges from 14.03 to 19.03 years, with an average age of 16.08 ( $SD=1.20$ ). The distribution by sex was 81% male ( $n=315$ ) and 19% female ( $n=74$ ). 76.9% were Spanish compared to 23.1% ( $n=90$ ) who were foreign. As for their recidivism in a follow-up period of 2 years, 75.6% ( $n=294$ ) have not recidivated and 24.4% ( $n=95$ ) have reoffended. Finally, 51% ( $n=199$ ) of the crimes were committed against persons, and 48.8% ( $n=190$ ) were crimes committed against property.

### Instruments

The Youth Level of Service/Case Management Inventory (YLS/CMI) (Hoge & Andrews, 2006), translated into Spanish by Garrido et al. (2006), is an inventory which predicts youth recidivism. It is completed by a member of the technical team in the Juvenile Court using data from different information sources, including interviews with the juvenile and his or her family, previous court records and information from other social centres.

The Inventory consists of 42 items grouped into eight risk factors. Each item can be marked as present (1 point) or absent (0 point). The eight factors are as follows: (1) Prior and current offences/adjudications, (2) Family circumstances/parenting, (3) Education/employment, (4) Peer relations, (5) Substance abuse, (6) Leisure/recreation, (7) Personality/behaviour, and (8) Attitudes/orientation. The sum score of the eight factors provides a total risk

score for each juvenile. The total risk level is obtained as follows: low risk (0-8 points); moderate risk (9-22); high risk (23-32); and very high risk (33-42).

The Inventory also allows factors of strength (protective factors) to be recorded. The assessor can indicate whether one specific factor might be considered as one of the juvenile's strengths. Protective factors are considered to be not merely the absence of risk in a factor, but the explicit presence of a positive circumstance.

The internal consistency of the Inventory was analysed using Cronbach's alpha coefficient, which gave values ranging from .62 to .80, except for the factor of Prior and current offences (.48) (Cuervo & Villanueva, 2015). In this study, the reliability of the total risk score was .92, while for the protective factors was  $\alpha=.84$ .

### Procedure

The study was a correlational and prospective design, for which data were obtained from the analysis of the files in the Juvenile Court. When a minor is charged with committing a crime, he or she is assessed by the technical team of the Juvenile Court. These professionals interview both the minor and his or her legal representatives about the individual, educational, familial, and social aspects present in the youth's environment. Besides the administration of the YLS/CMI Inventory, some socio-demographic variables (gender, age, nationality), and type of crime were compiled from the files.

For the purposes of this study, minors who had another file in the follow-up period were considered as reoffenders. To that end, the follow-up period was 24 months for each juvenile.

### Data analysis

First, descriptive analyses of the participants were estimated; calibration values for QCA were then calculated, and afterwards, binary logistic regression (LRM), area under the curve (AUC) analysis, and a fuzzy-set qualitative comparative analysis (fsQCA) were performed. When performing the fuzzy-set qualitative comparative analysis, all the missing data were deleted, and all the constructs (variables) were recalibrated. These were: Nationality (Spanish=0) (Foreign=1); Recidivism in a follow-up period of two years (no-recidivism=0) (recidivism=1); Sex (female=0; male=1); Type of crime (property crime=0) (crime against the person=1). The values of age, protective factors and risk factors were recalibrated considering three thresholds (Woodside, 2013): 10% (low level or fully outside the set), 50% (intermediate level, neither inside nor outside the set), and 90% (high level or fully in the set). After the responses had been transformed, necessary and sufficient condition tests were used to evaluate the effect of demographics and crime-related aspects on the recidivism of child offenders. The IBM SPSS Statistics 24 software package (IBM Corporation) was used to perform the logistic regression model, AUC analysis and ROC curve, and fsQCA 3.0 software (Claude & Christopher, 2014) was used to perform QCA.

### Results

First, the main descriptors and calibration values for the variables studied are presented (Table 1).

### Logistic regression model (LRM)

The predictive power of the variables under study was then analysed using a binary logistic regression model, with the criterion variable being two-year recidivism and the predictor variables of gender, age, nationality, type of crime and risk and protective factors. In the follow-up period, the variables significantly explained 35% of the recidivism variance ( $R^2=.35$ ,  $p\leq.001$ ). In this model, the risk factors yielded a significant positive beta coefficient ( $B=.11$ ,  $p\leq.001$ ), the protective factors a significant negative beta coefficient ( $B=-.37$ ,  $p=.04$ ) and age a significant negative beta coefficient ( $B=-.57$ ,  $p\leq.001$ ). Therefore, the higher the risk factors and the lower the protective factors, the greater the recidivism in a follow-up period of 2 years. The area under the curve (AUC) for a two-year recidivism period was .80 for risk factors (confidence interval lay between .75 and .84) and .34 for protective factors (confidence interval lay between .28 and .39). The ROC curve is shown in Figure 1.

### Comparative qualitative analysis of fuzzy sets (fsQCA)

#### Necessary analysis

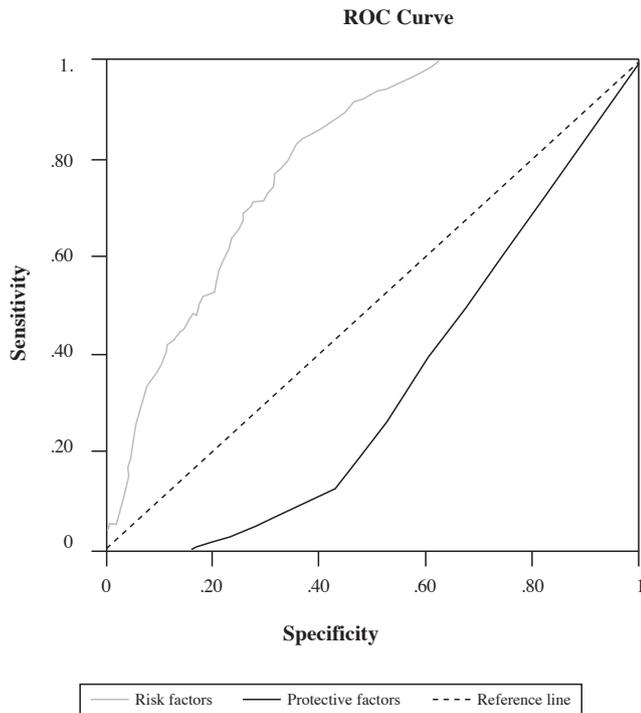
Based on the results obtained, two conditions were necessary for recidivism in a follow-up period of 2 years in juvenile offenders: a lack of protective factors and the presence of risk factors (Table 3), but not necessary conditions were found for non-recidivism.

Table 1  
Main descriptors and calibration values

	Age	Risk factors	Protective factors
<i>M</i>	16.06	10.20	1.06
<i>SD</i>	1.20	8.60	1.81
Min.	14.03	0	0
Max	19.03	35	7
Calibration values			
P10	14.09	1	1
P50	16.07	8	2.5
P90	18	23	5
Note: <i>M</i> : mean; <i>SD</i> : standard deviation; min: minimum; max: maximum; P10=:10th percentile; =P50=50th percentile; P90=:90th percentile			

Table 2  
Binary logistic regression with the variable "recidivism in a follow-up period of 2 years"

Step	B	SE	X <sup>2</sup> Wald B	Exp(B)
Age	-.57***	.12	20.99	.57
Gender	.29	.39	.55	1.34
Nationality	.39	.32	1.50	1.48
Type of crime	-.36	.28	1.67	.70
Risk factors	.11***	.02	32.30	1.12
Protective factors	-.37*	.18	4.36	.69
Constant	6.64***	1.95	11.60	760.07
N= 389; Log likelihood = 327.52 R2 Cox & Snell=.24; Nagelkerke R2= .35 * $p\leq.05$ ; ** $p\leq.01$ ; *** $p\leq.001$ ; SE= standard error				



**Figure 1.** Graphical representation of the Area Under the Curve (AUC) for risk and protective factors

*Table 3*  
Necessary analysis for recidivism

	~ Recidivism in a follow-up period of 2 years		Recidivism in a follow-up period of 2 years	
	Cons	Cov	Cons	Cov
Male	.79	.74	.87	.26
Female	.21	.84	.12	.16
Foreign	.21	.70	.28	.30
Spanish	.79	.78	.72	.23
Crimes against persons	.53	.78	.46	.22
Crimes against property	.47	.73	.54	.27
Older	.54	.81	.40	.19
Young	.46	.70	.60	.30
Many risk factors	.39	.61	1	.02
Few risk factors	.61	.89	.25	.11
Many protective factors	.23	.95	.04	.05
Few protective factors	.77	.71	.96	.29

*Sufficiency analysis*

Based on the premise that a model in QCA is informative when the consistency is around or above .74 (Eng & Woodside, 2012), the resulting models for each condition that are shown below, seem to be adequate.

In relation to the prediction of recidivism in a follow-up period of 2 years, seven pathways or interactions were observed that accounted for 47% of cases with low levels of recidivism (overall consistency=.91; overall coverage=.47). The three most relevant

pathways for predicting low recidivism were the result of few risk factors, having committed property crimes, being Spanish and male (raw coverage=.20; explaining 20% of cases). Other pathways included many protective factors, few risk factors and being Spanish (raw coverage=.20; explaining 20% of cases). The third pathway contained many protective factors, low risk factors and being older (raw coverage=.13 explaining 13% of cases).

For the prediction of high levels of recidivism, only one pathway was observed, which explained 1% of the cases. This route was as follows: the result of the interaction of low protection factors, being young, having committed personal crimes, being a foreigner and female (raw coverage=.01; overall consistency=.82; overall coverage=.01).

Discussion

This study examines the predictive capabilities of sociodemographic characteristics and risk and protective factors over youth recidivism comparing two analytical methodologies, logistic prediction models and QCA models. The main aim was to establish a complete and differential profile for offenders who continue on their criminal trajectories and for the offenders who desist from it. We hypothesized that the following profile would be associated with a continuance of reoffending: being a young foreign boy, mainly committing crimes against persons and presenting high risk scores and a low number of protective factors.

First, the results obtained from the traditional regression model partly supported the hypothesis mentioned above. A young boy, presenting high risk scores and a low number of protective factors is more likely to reoffend in the follow-up period of two years. This result is consistent with previous studies of youth recidivism (Campbell et al., 2018; Cuervo & Villanueva, 2015; Piquero et al., 2015). However, nationality, type of crime and gender were not significant predictors according to logistic regression, or at least they were no longer valid predictors when risk or protective factors were taken into account in the regression models.

Besides this classical profile of youth reoffending, this study also supports new specific profiles of youth reoffenders and non-

*Table 4*  
Summary of the three main sufficient conditions for the intermediate solution of recidivism

Frequency cutoff: 1;	~ Recidivism in a follow-up period of 2 years			Recidivism in a follow-up period of 2 years		
	Consistency cutoff: .82			Consistency cutoff: .83		
	1	2	3	1	2	3
Protective factors		●	●	○		
Risk factors	○	○	○			
Older				○		
Personal crimes	○			●		
Foreign	○	○		●		
Male	●			○		
Raw coverage	.20	.20	.13	.01		
Unique coverage	.13	.01	.01	.00		
Consistency	.91	.96	.94	.83		
<b>Overall solution consistency</b>						<b>.82</b>
<b>Overall solution coverage</b>			<b>.47</b>			<b>.01</b>

reoffenders, mainly due to the new methodology carried out (QCA). Two specific profiles for the absence of recidivism and one for the presence of recidivism are yielded with this strategy.

When explaining a majority profile of non-reoffender (47 % of the cases), it seems that the most important interactions in predicting low recidivism were as follows: being a Spanish boy, having low risk factors and high protective factors. As seen above, these results are consistent with the previous classic results found by the regression models in this study. Both results again maintain the importance of protective and risk factors in the modulation of juvenile offenders' future recidivism. Both variables were necessary conditions for the occurrence of recidivism in the QCA models.

A minority and new profile of reoffenders (only accounting for 1% of the cases) was also found by the QCA methodology. The most important interactions in the prediction of high recidivism were those for the following conditions: being a young and foreign girl, having committed crimes against persons and presenting a low number of protective factors. This profile, with high severity but low occurrence, is of a vulnerable girl, with an absence of protective factors. Protective factors (such as a positive peer relationship, a change of neighbourhood or group of friends, etc.), have been regarded as important turning points and promoters of desistance from crime (Farrington & McGee, 2017). Accordingly, the protective models present in a young girl's life may counteract negative effects such as traumatic experiences. Not surprisingly, some studies have related the experience of traumatic events in girls with an increasing likelihood of being involved in the juvenile justice system (Campbell et al., 2018). In the absence of these positive factors, the vulnerability of these girls is exacerbated and creates an opportunity for the commission of criminal acts. This specific profile is therefore at particular risk of recidivating, even if risk factors are not taken into account. Nevertheless, future research must deeply study this possible profile as it only accounts for 1% of the cases in this study.

The variable of nationality is significant in both the profiles - absence and presence of recidivism - even within the Spanish culture, and supports previous studies (Ortega-Campos et al., 2014; Piquero et al., 2015). The variable gender also proved to be a significant variable in both profiles. Several studies have proven valid predictive values for both boys and girls in risk assessment tools such as the YLS/CMI Inventory (Bonta & Andrews, 2016), but this does not mean that the pathways to recidivism are the same. In fact, the risk for girls is higher in some studies (Anderson et al., 2016), whereas other studies find higher risk scores for boys and differ in the predictive risk factors (Pusch & Holtfreter, 2018). Additionally, it should be noted that protective factors are present in both recidivism profiles - presence and absence. These factors therefore appear to play an important causal role in reducing recidivism (Viljoen et al., 2018), despite the primacy of risk factors in the recidivism prediction literature.

The second hypothesis predicted that the qualitative comparative analysis (QCA) versus regression models would provide a

complementary and more detailed prediction model of recidivism. When the two methodologies are compared, QCA models have a greater predictive value than LRM; they also include variables that despite their importance, go unnoticed if we focus only on LRM (type of crime, nationality), and are important predictors when interacting with other conditions. Moreover, in the first methodology, risk factors showed a better prediction of recidivism (AUC = .80), than protective factors (AUC = .34). However, in QCA models, both types of factors (risk and protective) showed a similar and significant presence. With both methodologies, two different reoffending patterns emerged for youths: a young boy with high risk scores and low protective factors, as well as a young foreign girl with crimes against persons and low protective factors.

A further advantage of QCA models over traditional regression models is known as "equifinality", or the possibility of achieving the same results via different paths (Giménez-Espert & Prado-Gascó, 2018). Although numerous studies have supported some of these profile's characteristics, e.g. girls committing more crimes against persons (Cuervo et al., 2015); or young foreign offenders being more likely to recidivate (Piquero et al., 2015), it is also true that most do not consider the interaction between these individual characteristics. Using this methodology, we can analyse the complete set of conditions.

These overall results may be interesting in relation to the risk-need-responsivity (RNR) model (Andrews, Bonta, & Hoge, 1990), and the fact that only a small proportion of identified criminogenic needs are commonly addressed in youth offenders (Kapoor, Peterson-Badali, & Skilling, 2018). Knowledge of the specific profiles associated with recidivism gives us the opportunity to determine the risk and dynamic criminogenic needs for each offender, and to provide treatment so that it is successful and the offender is responsive to it (Campbell et al., 2018). For example, in the case of reoffending girls, the social aspect of relationships is really important and linked to the commission of crimes. The intervention programmes must therefore work on this aspect of their lives in depth. Moreover, there is a pressing need to promote positive factors in their life (e.g. those related to family and peer relationships) in order to protect them from traumatic experiences.

Finally, some limitations of this study must be mentioned. One of the main limitations is the sample, in terms of both the sampling procedures, which were not probabilistic, and its geographical location. In the future, a stratified probability sampling considering different geographical areas would improve the possible generalization of the data. Moreover, the follow-up period for minors should be extended and the recidivism pathways for boys and girls should be explored separately and in depth. Despite these limitations, this study shows different pathways to committing criminal acts, in which not only risk factors, but gender and protective factors play a major role. These results may be useful in designing crime prevention and offender intervention programmes tailored to the criminogenic needs of each specific profile.

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