# Relationship between expressions of aggression and individual characteristics in correctional settings: A path analysis

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ABSTRACT

*Background:* The reduction of misconduct levels and its prevention are two important objectives in prison settings, for which several strategies and control mechanisms are implemented.
*Objetive:* We explore the relationship between a set of socio-demographic, judicial, affective, and personality characteristics and various expressions of aggression.
*Method:* An Ecuadorian sample of 675 sentenced male prisoners was assessed using the Spanish adaptation of the Personality Assessment Inventory (PAI). Three subscales of the PAI were used as outcome measures: Aggressive Attitude (AGG-A), Verbal Aggression (AGG-V), and Physical Aggression (AGG-P).
*Results:* Using path analysis, three models were obtained, each of which had four indicators. Borderline personality features and antisocial personality features emerged as indicators that were common to the three models. Anxiety-related disorders and non-support were indicators specific to AGG-A, whilst schizophrenia and non-support were indicators of AGG-V, and drug problems and crimes against property were indicators of AGG-P.
*Conclusion:* This study indicates that each expression of aggression has a different structure, which suggests its usefulness for detecting the tendency of an inmate to predominantly express one form of aggression or another.

## 1. Introduction

The reduction of misconduct levels and its prevention are two important objectives in prison settings, for which several strategies and control mechanisms are implemented (Byrne and Hummer, 2007). Thus, management, security and intervention needs within the prison setting have generated interest in identifying the main indicators of misconduct (Sorensen et al., 2011; Wolff et al., 2007). Amongst the main detected indicators, we find age (Cunningham and Sorensen, 2007; Griffin and Hepburn, 2006), education (Berg and DeLisi, 2006; Cunningham et al., 2005), prior prison terms (DeLisi, 2003; DeLisi et al., 2004), type of conviction offense (Cunningham et al., 2005; Sorensen and Cunningham, 2010), personality (Gilbert et al., 2015; Newberry and Shuker, 2012), psychopathology (Baskin et al., 1991; Logan and Johnstone, 2010), social support (Berg and DeLisi, 2006; Colvin et al., 2002), and situational factors (Bosma et al., 2020; Day et al., 2014; Teasdale et al., 2016). Due to this type of information, it has been possible to classify the inmates according to low and high violence risk criteria (see Schenk and Fremouw, 2012 for a review). However, these authors suggest that the

diversity of conceptualizations of misconduct (e.g., hostility, impulsivity, anger, threatening behavior, aggression, disciplinary offenses, and all levels of physical violence) has an impact on its operationalization and, thus, on the evaluation of the results of various studies.

From a psychometric perspective, there have been attempts to explore the structure of aggression as a construct. One of the most relevant studies is that of Riley and Treiber (1989), who analyzed a set of multidimensional measures of anger and hostility. The factor analysis of the scales included in their study yielded three factors: anger experience-hostility, verbal-adaptive anger expression, and maladaptive-physical anger expression. Although the theoretical usefulness of determining this factorial structure is evident, it is necessary to consider the clinical implications of each construct as well its relationship and overlap with other aggressive behaviors (Riley and Treiber, 1989). Indeed, this factorial structure formed the basis of the design of the Aggression scale (AGG), which is part of the Personality Assessment Inventory (PAI; Morey, 1991, 2007). This self-report questionnaire, which measures personality and psychopathology, has been widely used in the forensic context (Archer et al., 2006; Burneo-Garcés et al., 2018,

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2020; Burneo-Garcés and Pérez-García, 2018; Edens and Ruiz, 2005; Lally, 2003; Ruiz and Ochshorn, 2010; Toop et al., 2019). The AGG scale was developed to measure characteristics associated with anger, assertiveness, hostility, and aggression (Ortiz-Tallo et al., 2011), and includes three subscales that allow for the distinct analysis of three expressions of aggression: Aggressive Attitude (AGG-A), Verbal Aggression (AGG-V), and Physical Aggression (AGG-P). The AGG-A subscale evaluates hostility, the lack of anger control, and beliefs about instrumental use of aggression. Further, the AGG-V subscale measures both the tendency to exhibit verbal expressions of anger and the range of such expressions; whereas the AGG-P subscale evaluates the tendency to physically express anger, specific acts of violence, and threats.

The literature includes a wide number of studies concerning the predictive capacity of the AAG scale. In a meta-analysis, Gardner et al. (2015) found that the scores on the AGG scale and their subscales emerged as consistent predictors of misconduct, with small to medium effects. However, there are no studies that have specifically focused on investigating the relationship between sociodemographic, judicial, clinical, and personality variables and AGG-A, AGG-V, and AGG-P subscales in the prison population. Consequently, we do not know which variables are closely related to these subscales and whether they are the same or different for each of them. Considering the common and unique features of AGG-A, AGG-V, and AGG-P subscales, their inclusion as outcome measures in an exploratory study could provide useful information in correctional settings.

Regarding the possible indicators of the expressions of aggression, previous findings suggest a relationship between certain variables and various types of aggressive behavior in forensic environments. For instance, antisocial features and traits appear to be associated with certain violent behaviors (Yu et al., 2012), especially when there is drug abuse (see Fountoulakis et al., 2008 for a review; Abilleira and Rodicio-García, 2018). Other authors suggest that the conjoined presence of the Anti-Social Personality Disorder (ASPD) and the Borderline Personality Disorder (BPD) are strongly related to severe violence (Howard et al., 2014). Moore et al. (2018) found BPD increase risk of psychological aggression and disciplinary offenses during incarceration. Further, it appears that considerable levels of anger and aggression are frequent in individuals with Post-Traumatic Stress Disorder (PTSD) (Calhoun et al., 2002; Crawford et al., 2007), and a similar relationship can be seen between emotional regulation, impulsivity, and anger in patients with Obsessive-Compulsive Disorders (OCD) (Besharat and Dehghani, 2014; Sheys, 2016). In addition, several factors related to schizophrenia (e.g., disorders/psychopathy, mental disabilities, positive psychotic symptoms/first-episode psychosis, substance abuse, and demographics) intervene in the genesis and development of several types of misconduct (see Bo et al., 2011 for a review). Other relevant results refer to the roles played by the specific correctional setting and social support. Thus, contextual factors can have a considerable impact on the inmates and hence prison violence (see Gadon et al., 2006 for a review) whilst social support could help to prevent misconduct (Colvin et al., 2002; Edens and Ruiz, 2009).

Thus, the aim of this study was to explore, using path analysis, the relationship between a set of sociodemographic, judicial, clinical, and personality variables and three expressions of aggression, according to the model of aggression assumed by the PAI (Morey, 1991, 2007), using as outcome measures the subscales AGG-A, AGG-V, and AGG-P in a Spanish-speaking prison population. The importance of conducting a study with such features is based on several assumptions: (1) given that the potential of these scores for predicting misconduct (AGG-A, AGG-V, and AGG-P subscales) has been well established, as Gardner et al. (2015) reported, it makes sense to analyze their main indicators using a set of relevant variables in the penitentiary environment (Schenk and Fremouw, 2012); (2) path analysis allows us to verify the interaction between independent variables and their influence on a dependent variable, without necessarily implying the demonstration of causal relationships (Aron and Aron, 2001; Batista-Foguet and Coenders Gallart,

2000); (3) the psychometric characteristics of the subscales AGG-A, AGG-V, and AGG-P suggest the existence of indicators that are common to the three expressions of aggression, as well as those that are unique to each of these expressions; (4) if certain individual features are related to a specific expression of aggression, we might expect that the inmates possessing such features would have a higher tendency to express these types of aggressive behaviors; (5) identifying indicators of specific expressions of aggression and their interaction could provide a useful resource for prevention and intervention strategies; and (6) given that previous studies on this topic have been carried out primarily in English-speaking correctional settings, it is of interest to extend this work to the Spanish-speaking prison population. Based on the most consistent findings described, we expect that antisocial and borderline personality features (Howard et al., 2014; Yu et al., 2012), schizophrenia symptoms (Bo et al., 2011), problems related to drugs (Fountoulakis et al., 2008), and situational factors (Gadon et al., 2006) will all have a relevant presence in the resulting theoretical path models.

## 2. Method

### 2.1. Participants

The study included initially 675 male sentenced prisoners aged 18–75 years ($M = 35.58$; $SD = 10.57$) from the Regional Guayas Social Rehabilitation Center (CRSRG) and the Guayaquil Social Rehabilitation Center (CRSG). These adult male prisons, which house approximately 9000 inmates, are located in Guayaquil, Ecuador. The prison population in this country is estimated to be around 39,000 (ICPR, 2020). According to the characteristics of the centers, we can distinguish five strata. For the CRSRG, these strata are Minimum Security (MIS), Medium Security (MES), Maximum Security (MAS), and Priority (PRI), which is a specific area for those individuals who meet vulnerable situations criteria (e.g., being a senior adult, having a critical illness, disability, or severe physical or mental illness). Finally, the fifth stratum is the CRSG considered as a whole. A stratified sampling procedure with proportional affixation was conducted. The distribution and proportion of the sample strata, related to the reference population, were MIS = 152 (21.2%), MES = 178 (21.2%), MAS = 72 (21.1%), PRI = 51 (21.3%), and CRSG = 222 (21.2%).

The inclusion criteria were: (1) serving a sentence in either CRSRG or CRSG, and (2) participating voluntarily in the study. The exclusion criteria were: (1) having insufficient knowledge of the Spanish language, (2) being in an inadequate physical or mental state to complete the questionnaires, and (3) having an attitude that precludes the development of evaluation. The exclusion criteria were considered from the first contact with the inmate until the end of the evaluation. Thus, the proportion of excluded participants (5%) was composed of individuals that did not declare interest in the study, had difficulties with language understanding, or, upon beginning the evaluation, showed misconduct or lack of motivation to continue the study. For those cases, the information provided by the participants was deleted immediately. The excluded participants had the same characteristics as the 675 individuals who had satisfactorily completed the evaluation.

After applying the validity criteria to the 675 protocols of the PAI (see Instruments and measures), the study sample was finally composed of 538 participants aged 18–75 years ($M = 35.90$; $SD = 10.58$) (see Table 1). The distribution and proportion of this sample strata, related to the reference population, were MIS = 124 (17.3%), MES = 140 (16.7%), MAS = 55 (16.1%), PRI = 44 (18.4%), and CRSG = 175 (16.7%).

### 2.2. Instruments and measures

The measures included in this study were from three types of source: (1) an *ad-hoc* questionnaire to gather socio-demographic and judicial information, (2) the criminal justice records of both prisons, and (3) the Spanish adaptation of de PAI (Ortiz-Tallo et al., 2011).

**Table 1**
Socio-demographic characteristics.

| Variable | Sample ($N = 538$) |
|---|---|
| | n (%) |
| Age range: | |
| 18–25 years | 63 (11.7) |
| 26–35 years | 258 (48.0) |
| 36–45 years | 127 (23.6) |
| 46–55 years | 59 (11.0) |
| 56–75 years | 31 (5.7) |
| Country of origin: | |
| Ecuador | 504 (93.7) |
| American countries | 25 (4.6) |
| European countries | 9 (1.7) |
| Current marital status: | |
| Single/Widowed | 138 (25.7) |
| Married | 76 (14.1) |
| Common law | 270 (50.2) |
| Separated/Divorced | 54 (10.0) |
| Level of education: | |
| None[a] | 94 (17.5) |
| Primary | 310 (57.6) |
| Secondary | 116 (21.6) |
| Superior | 18 (3.3) |
| Total years of study: M (SD) | 8.70 (4.02) |
| Employment status | |
| Employed | 465 (86.4) |
| Unemployed | 73 (13.6) |
| Prior prison terms: | |
| 0 | 290 (53.9) |
| 1 | 102 (19.0) |
| $\geq 2$ | 146 (27.1) |
| Category of criminal offenses[b] | |
| AP | 152 (28.3) |
| AIL | 137 (25.5) |
| IPTS | 99 (18.4) |
| ASRI | 92 (17.1) |
| Other | 58 (10.7) |

*Notes*: AP = Against property; AIL = Against the inviolability of life; IPTS= Illegal production or trafficking of substances; ASRI = Against sexual and reproductive integrity. aThis condition does not imply illiteracy. bAccording to Organic Integral Criminal Code of the Republic of Ecuador (2014).

***Personality Assessment Inventory (PAI;*** Morey, 1991, 2007***).*** The PAI is a self-report that measures the effect of thoughts, attitudes, behaviors, facts, and past and present circumstances on the development of symptoms, the characteristics of personality, and the individual's behavior at the time of evaluation. It is composed of 4 validity scales, 11 clinical scales, 5 scales for treatment consideration, 2 scales of interpersonal relations, and 10 complementary indexes (the content of the 22 scales is non-overlapping). Moreover, 9 clinical scales and 1 treatment scale have subscales. The clinical scales represent the clinical syndromes of the highest significance in diagnostic practice, whereas the scales related to the treatment provide complementary information that could be relevant to a possible intervention. Finally, the interpersonal scales measure the interpersonal relationship style, whereas the complementary indexes can be used to obtain a more precise interpretation of some of the scores. This tool is composed of 344 items that use a Likert scale with four response alternatives: 1 = False, 2 = Slightly True, 3 = Mainly True, and 4 = Very True. Completion of the questionnaire requires fourth-grade reading level and takes between 50 and 60 min.

The Spanish adaptation of the PAI has adequate psychometric properties (Ortiz-Tallo et al., 2011). The median Cronbach's alpha coefficients of the scales and subscales were 0.78 and 0.70 in the normative sample, and 0.83 and 0.74 in the clinical sample, respectively. The median of the test-retest coefficients of the scales was 0.84, while for the subscales this was 0.79. In addition, Ortiz-Tallo et al. (2011) compared the average T scores of the typical sample of the Spanish adaptation with the American scale of the PAI and found differences in effect sizes that were non-significant for 17 of the 21 scales, and small for the remaining

four scales. They concluded that the results obtained were consistent with those found in the original studies (Morey, 1991, 2007). Finally, the PAI has revealed acceptable psychometric properties in the Ecuadorian prison population (Burneo-Garcés et al., 2018). These authors reported that the internal structure of the Spanish version of this instrument was consistent with the three invariant component structure described by Hoelzle and Meyer (2009), with Cronbach's alpha coefficients ranging from 0.49 to 0.89.

Given the lack of specific norms for Spanish-speaking Latin American populations at the time of evaluation, the Spanish norms were used in the present study. With respect to validity criteria, Ortiz-Tallo et al. (2011) have indicated two strategies with high sensitivity and specificity to detect random response in general and clinical populations using two validity scales: (1) Inconsistency (ICN) $\geq$ 75T or Infrequency (INF) $\geq$ 75T, and (2) ICN $\geq$ 64T and INF $\geq$ 60T. However, they also highlighted the limited usefulness of the INF scale in correctional settings since the high scores on this scale appear to be more related to situational characteristics than to a random response pattern. Given these considerations, we preferred to apply the ICN $\geq$75T cut-off point. For the Negative impression (NIM) and Positive impression (PIM) validity scales, the $\geq$101T and $\geq$65T cut-off points were considered, respectively.

***Outcome measures.*** We proposed Aggressive Attitude, Verbal Aggression, and Physical Aggression subscales as a measure of three different expressions of aggression, according to the model of aggression assumed by the PAI (Morey, 1991, 2007).

***Independent variables.*** Several variables were considered for the path analysis: (1) Age, (2) Single/Widowed, (3) Married, (4) Common law, (5) Separated/Divorced, (6) Total years of study, (7) Employment status prior to entering prison (including any job or professional activity, formal or informal, with a stable and regular income), (8) Number of prior prison terms, (9) Crimes against property, (10) Crimes against the inviolability of life, (11) Crimes of illegal production or trafficking of substances, and (12) Crimes against sexual and reproductive integrity. The crime categories were established in accordance with the Organic Integral Criminal Code of the Republic of Ecuador (2014). These crimes belong to the crime categories (Property crimes, Intentional homicide, Other violent crimes, and Drug-related crimes) most reported in the international prison population (UNODC, 2016). The classification strategy assumed in the current study allows analyzing categories of crimes rather than specific crimes, regardless of the presence of some type of violence in them. Moreover, 11 clinical (Somatic Complaints, SOM; Anxiety, ANX; Anxiety-Related Disorders, ARD; Depression, DEP; Mania, MAN; Paranoia, PAR; Schizophrenia, SCZ; Borderline Features, BOR; Antisocial Features, ANT; Alcohol Problems, ALC; and Drug Problems, DRG) and 4 treatment consideration (Suicidal Ideation, SUI; Stress, STR; Non-Support, NON; and Treatment Rejection, RXR) PAI scales were included.

### 2.3. Procedure

The Undersecretariat of Rehabilitation, Reintegration, and Precautionary Measures for Adults (Ministry of Justice, Human Rights, and Cults of Ecuador) granted the necessary permits. Statistical information and coordination of the study in the centers according to the required security rules were requested from the directors of the two prisons. A team of nine psychologists from the Ministry of Public Health of Ecuador (MSP) conducted the fieldwork between February and April 2015, none of which had any authority or connections within the prison context. In addition, they received training in forensic psychopathology, mental health research, application of the research protocol, and recording the information. The *ad-hoc* questionnaire was administered immediately after the PAI. In total, the individual evaluation took between 70 and 90 min. The participants received the necessary assistance to solve any difficulty caused by the linguistic differences between the Spanish used in Ecuador and that used in the PAI. In terms of the frequency and

characteristics of the difficulties encountered during the evaluations, it can be said that there were no major drawbacks in this area. The present study is part of and uses data from a broader project entitled "Study of the Prevalence of Mental Disorders in Prison Population of Guayaquil".

*2.4. Ethics statement*

The National Directorate of Primary Healthcare (MSP) reviewed the technical aspects of the study. The Health Coordination Zone 8 (CZ8-S, MSP) managed both the ethics revision and the project approval. The inmates selected by the sampling method were contacted in their pavilion or their security level, where they were given, both individually and in a group, information regarding the characteristics of the study whereupon they could freely decide whether or not to participate in the study. The lack of any kind of benefit in the short, medium, or long-term for their participation in the study was explained, as well as their freedom to leave the study at any time. All individuals signed the Informed Consent Form after listening and reading about the characteristics of the study and the Rights guaranteed to research participants, established by the Constitution of the Republic of Ecuador (2008). This study followed the ethical principles of the Declaration of Helsinki.

*2.5. Data analysis*

Analyses were conducted using the T scores. We carried out Pearson's *r* test to analyze the correlation between the independent variables and each expression of aggression proposed. Once we had verified the necessary assumptions for the path analysis, we analyzed all the possible combinations between the 27 independent variables and the 3 outcome measures using the maximum-likelihood method, in order to find the most parsimonious theoretical model with the best fit. To obtain the most consistent models, a robust selection criterion was applied to the statistical relationships of all the variables studied (p < .001). To analyze the direct and indirect effects, we considered the standardized path coefficients. The goodness-of-fit was assessed with measures and criteria frequently suggested in the literature (Bentler, 1990; Bentler and Bonett, 1980; Browne and Cudeck, 1993; Jöreskog and Sörbom, 1982; Raftery, 1995; Schwarz, 1978): $\chi^2$, $\chi^2$ test *p*-value, Adjusted goodness-of-fit index (AGFI), Tucker–Lewis index (TLI), Comparative fit index (CFI), Standardized root mean square residual (SRMR), Root mean square error of approximation (RMSEA), and Bayes information criterion (BIC). All data gathered were processed using the statistical packages IBM®SPSS.22 (IBM, 2013) and Amos 23.0 (Arbuckle, 2014) for Windows.

## 3. Results

***Socio-demographic characteristics.*** Given that we failed to find any significant statistical differences between the two centers in terms of socio-demographic variables, the data were processed as a single sample. Three out of five participants were under 36 years of age, most of the sample was composed of Ecuadorians, three out of five participants were living with a partner, one in every five participants did not have any level of studies (this does not imply illiteracy), and the average years of completed education was 8.70. Moreover, 13.6% of the sample had not engaged in any work-related activity prior to entering prison, the recidivist percentage was around 50% (one or more prior prison terms), and the crimes against property and life were the most frequent (see Table 1).

***Correlations and fit indices for path analysis.*** The scales BOR and ANT showed the highest and significant (*p* < .01) correlations with the three outcome measures analyzed (see Table 2). The three final path models included four indicators, two of which were common endogenous indicators (the ANT and BOR scales) and two of which were exogenous and specific to each of the outcome measures (Aggressive Attitude: the ARD and NON scales; Verbal Aggression: the SCZ and NON scales; and Physical Aggression: the DRG scale and Crimes against

**Table 2**
Correlations between independent variables and outcome measures.

| Variable | Sample (N = 538) | | | | | |
|---|---|---|---|---|---|---|
| | AGG-A | | AGG-V | | AGG-P | |
| Age | -.157 | ** | -.116 | ** | -.221 | ** |
| Single/Widowed | .020 | | .045 | | .047 | |
| Married | -.034 | | -.053 | | -.141 | ** |
| Common law | -.020 | | -.033 | | .007 | |
| Separated/Divorced | .044 | | .051 | | .082 | |
| Total years of study | -.006 | | .001 | | -.124 | ** |
| Employment status | -.050 | | -.024 | | -.117 | ** |
| Prior prison terms | .156 | ** | .132 | ** | .253 | ** |
| CAP[a] | .152 | ** | .129 | ** | .174 | ** |
| CAIL[a] | -.021 | | -.026 | | .022 | |
| CIPTS[a] | -.044 | | -.080 | | -.126 | ** |
| CASRI[a] | -.075 | | -.026 | | -.074 | |
| Somatic Complaints (SOM) | .204 | ** | .107 | * | .198 | ** |
| Anxiety (ANX) | .451 | ** | .290 | ** | .439 | ** |
| Anxiety-Related Disorders (ARD) | .346 | ** | .181 | ** | .344 | ** |
| Depression (DEP) | .372 | ** | .272 | ** | .388 | ** |
| Mania (MAN) | .461 | ** | .413 | ** | .458 | ** |
| Paranoia (PAR) | .420 | ** | .333 | ** | .418 | ** |
| Schizophrenia (SCZ) | .463 | ** | .339 | ** | .494 | ** |
| Borderline Features (BOR) | .619 | ** | .511 | ** | .653 | ** |
| Antisocial Features (ANT) | .513 | ** | .507 | ** | .639 | ** |
| Alcohol Problems (ALC) | .348 | ** | .323 | ** | .394 | ** |
| Drug Problems (DRG) | .425 | ** | .375 | ** | .547 | ** |
| Suicidal Ideation (SUI) | .269 | ** | .172 | ** | .323 | ** |
| Stress (STR) | .293 | ** | .246 | ** | .334 | ** |
| Non-Support (NON) | .266 | ** | .241 | ** | .260 | ** |
| Treatment Rejection (RXR) | -.235 | ** | -.160 | ** | -.216 | ** |

*Notes:* AGG-A = Aggressive attitude subscale; AGG V= Verbal aggression subscale; AGG-P= Physical aggression subscale; CAP= Crimes against property; CAIL= Crimes against the inviolability of life; CIPTS= Crimes of illegal production or trafficking of substances; CASRI= Crimes against sexual and reproductive integrity. aAccording to Organic Integral Criminal Code of the Republic of Ecuador (2014). *p < .05, **p < .01.

property) (see Table 3).

***Path analysis for Aggressive Attitude.*** Fig. 1 shows the path model with the best fit (Chi-square/df ratio = 0.048; *p* = .953; AGFI = 0.999; TLI = 1.011; CFI = 1.000; SRMR = 0.0022; RMSEA = 0.000) and the highest explained variance ($R^2$ = 0.41) of all models tested. The BOR scale explains a higher percentage of the variance ($R^2$ = 0.56) compared with the ANT scale ($R^2$ = 0.15). Regarding the Aggressive Attitude, the BOR scale has a direct and medium impact ($\beta$ = 0.49), whereas the ANT scale has a small and direct impact ($\beta$ = 0.21) and a small and indirect impact ($\beta'$ = 0.22). The scales ARD and NON are both exogenous variables (*r* = 0.30). The ARD scale has a medium and direct impact ($\beta$ = 0.37) on the BOR scale, a direct and small impact ($\beta$ = 0.23) on the ANT

**Table 3**
Fit indices for final path models of three expressions of aggression.

| | Sample (N = 538) | | |
|---|---|---|---|
| | AGG-A | AGG-V | AGG-P |
| $R^2$ | .41 | .32 | .55 |
| $\chi^2$ | .097 | .644 | .479 |
| df | 2 | 2 | 2 |
| p | .953 | .725 | .787 |
| AGFI | .999 | .996 | .997 |
| TLI | 1.011 | 1.007 | 1.008 |
| CFI | 1.000 | 1.000 | 1.000 |
| SRMR | .0022 | .0051 | .0065 |
| RMSEA | .000 | .000 | .000 |
| BIC | 81.839 | 82.386 | 82.221 |

*Notes:* AGG-A = Aggressive Attitude subscale; AGG-V= Verbal Aggression subscale; AGG-P= Physical Aggression subscale; df = Degrees of freedom; AGFI = Adjusted goodness of fit index; TLI = Tucker-Lewis coefficient; CFI= Comparative fit index; SRMR= Standardized root mean square residual; RMSEA = Root mean square error of approximation; BIC= Bayes information criterion.
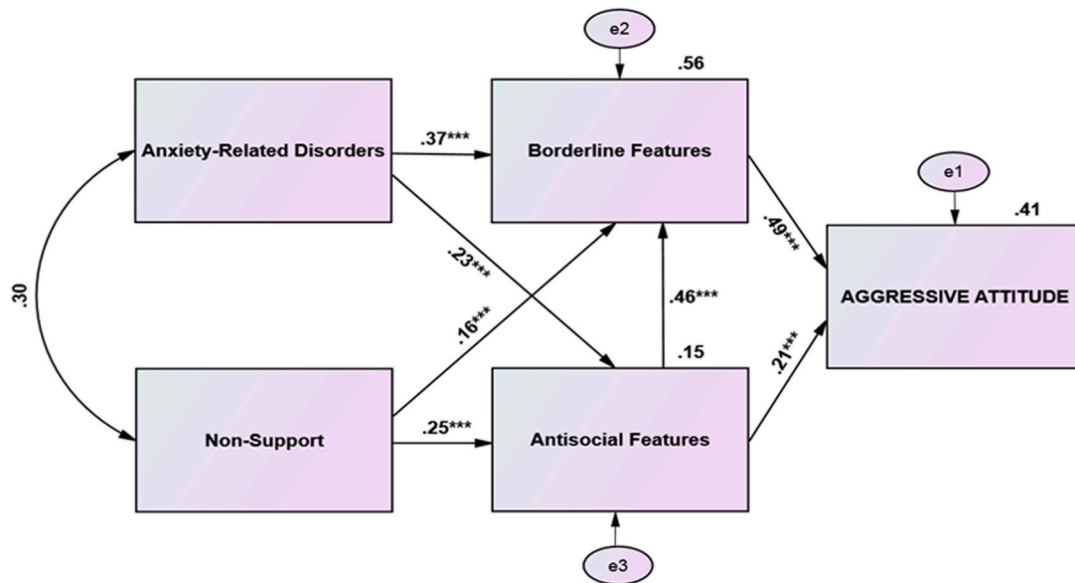
**Fig. 1.** Final path model for Aggressive Attitude subscale (AGG-A). *Notes*: $N = 538$; Estimates of variance explained, standardized regression weights, and correlation are reported; Model fit: Chi-square/df ratio = 0.048; $p = .953$; AGFI = 0.999; TLI = 1.011; CFI = 1.000; SRMR = 0.0022; RMSEA = 0.000; ***$p < .001$.

scale, and an indirect and small impact ($\beta' = 0.28$) on the Aggressive Attitude. Finally, the NON scale has direct and small effects on the scales ANT ($\beta = 0.25$) and BOR ($\beta = 0.16$), and an indirect and small effect on Aggressive Attitude ($\beta' = 0.19$).

***Path analysis for Verbal Aggression.*** Fig. 2 represents the path model with the best fit (Chi-square/df ratio = 0.322; $p = .725$; AGFI = 0.996; TLI = 1.007; CFI = 1.000; SRMR = 0.0051; RMSEA = 0.000) and the highest explained variance ($R^2 = 0.32$) of all models tested. The scale BOR explains the highest percentage of the variance ($R^2 = 0.58$) compared with the scale ANT ($R^2 = 0.23$). The scale BOR has a medium and direct impact ($\beta = 0.32$) on Verbal Aggression, identical to that for the scale ANT ($\beta = 0.31$). The ANT scale also shows an indirect and small effect on Verbal Aggression ($\beta' = 0.12$). The scales SCZ and NON are both exogenous variables ($r = 0.44$). The former revealed direct and moderate effects on the BOR ($\beta = 0.45$) and ANT ($\beta = 0.40$) scales, and an indirect and medium effect ($\beta' = 0.32$) on the Verbal Aggression. The

latter, however, showed direct and small effects on the BOR ($\beta = 0.10$) and ANT ($\beta = 0.14$) scales, and an indirect and negligible effect on Verbal Aggression ($\beta' = 0.09$).

***Path analysis for Physical Aggression.*** Fig. 3 shows the path model with the best fit (Chi-square/df ratio = 0.240; $p = .787$; AGFI = 0.997; TLI = 1.008; CFI = 1.000; SRMR = 0.0065; RMSEA = 0.000) and the highest explained variance ($R^2 = 0.55$) of all models tested. The BOR scale explains the higher percentage of the variance ($R^2 = 0.41$) compared with the scale ANT ($R^2 = 0.32$). In addition, this scale shows a direct and medium effect on Physical Aggression ($\beta = 0.37$), whereas for the ANT scale the direct effect ($\beta = 0.29$) and indirect effect ($\beta' = 0.20$) are small. The scale DGR and Crimes against property are exogenous variables ($r = 0.14$). The DRG scale has a small and direct impact ($\beta = 0.22$) and an indirect and medium impact on Physical Aggression ($\beta' = 0.32$), a direct and small impact ($\beta = 0.17$) on the BOR scale, and a direct and large impact on the ANT scale ($\beta = 0.52$). Finally, Crimes against
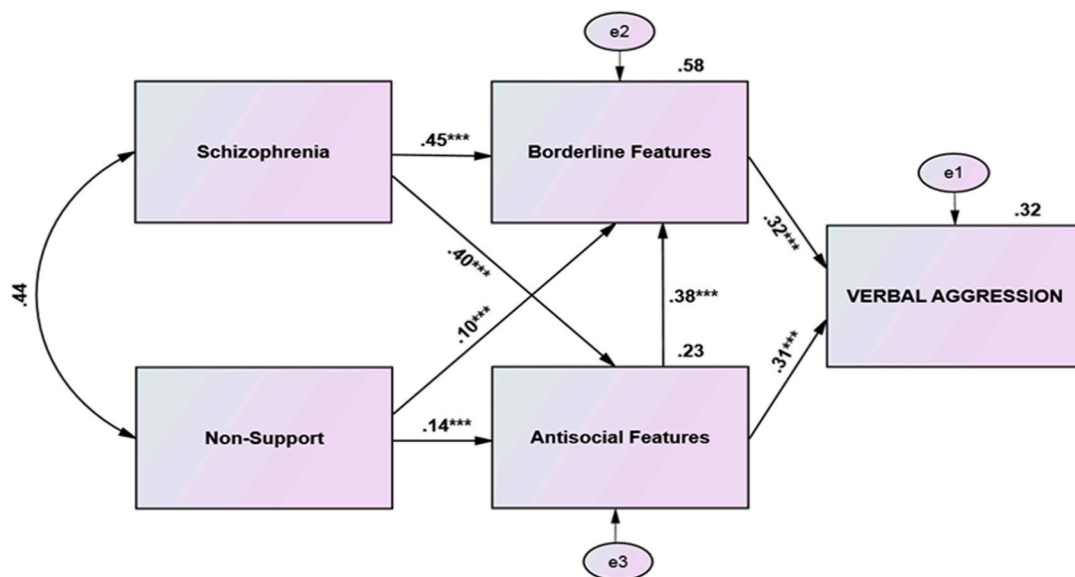


**Fig. 2.** Final path model for Verbal Aggression subscale (AGG-V). *Notes*: $N = 538$; Estimates of variance explained, standardized regression weights, and correlation are reported; Model fit: Chi-square/df ratio = 0.322; $p = .725$; AGFI = 0.996; TLI = 1.007; CFI = 1.000; SRMR = 0.0051; RMSEA = 0.000; ***$p < .001$.
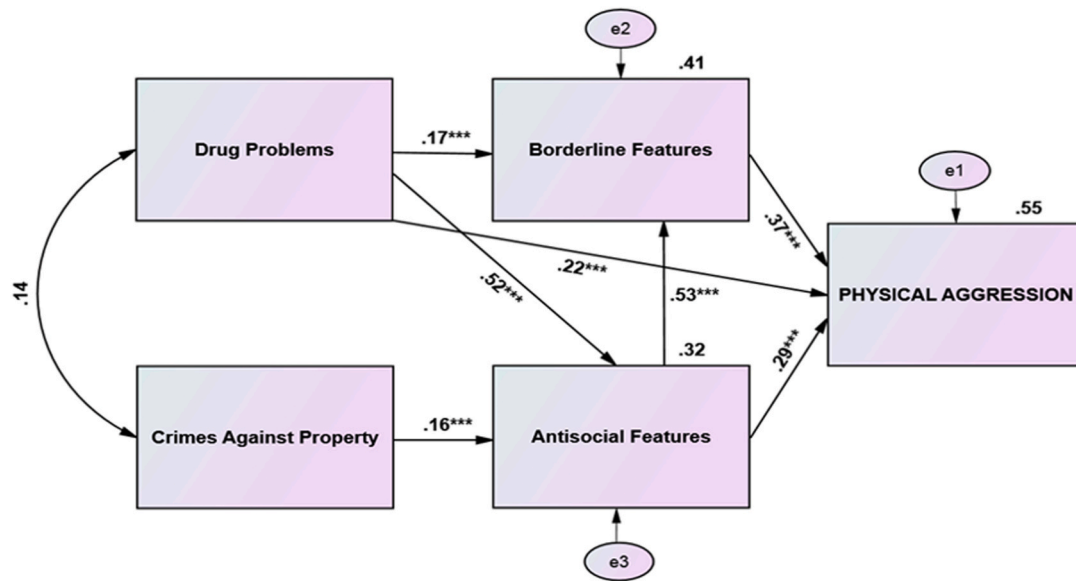
**Fig. 3.** Final path model for Physical Aggression subscale (AGG-P). *Notes: N* = 538; Estimates of variance explained, standardized regression weights, and correlation are reported; Model fit: Chi-square/df ratio = 0.240; *p* = .787; AGFI = 0.997; TLI = 1.008; CFI = 1.000; SRMR = 0.0065; RMSEA = 0.000; ***p* < .001.

property has a direct and small effect on the ANT scale ($\beta = 0.16$) and a negligible and indirect effect on Physical Aggression ($\beta' = 0.08$).

## 4. Discussion

The aim of this study was to explore, using path analysis, the relationship between a set of sociodemographic, judicial, clinical, and personality variables and three expressions of aggression, using AGG-A, AGG-V, and AGG-P subscales of the PAI as outcome measures in a Spanish-speaking prison population. We expected to obtain three structures composed of indicators that are both common and unique to the three expressions of aggression. We succeeded in achieving this objective in the three resulting models, which meet the higher parsimony and fit criteria. Aggressive Attitude, Verbal Aggression, and Physical Aggression showed four indicators each, two of which are common and two specifics. From the three models, Physical Aggression and Verbal Aggression presented the highest and lowest variance respectively, which indicates the existence of differences in their explanatory power. Due to the aim of this study, the following interpretations focus on the configuration of indicators for each model and their clinical implications.

### 4.1. Common indicators of the theoretical models

The scales BOR and ANT appear as endogenous variables and showed a direct effect on three expressions of aggression (see Figs. 1–3). These results confirm the contribution of personality disorders to the study of violence and criminal behavior (Burneo-Garcés et al., 2018, 2020; Loinaz et al., 2011; Martin et al., 2019; Yu et al., 2012). Therefore, depending on the level of variance explained by both endogenous variables and the extent to which they directly affect each outcome measure, the impact of the BOR scale is higher for the three models, showing the highest impact on Aggressive Attitude and the lowest impact on Physical Aggression. The direct effects of both indicators are only similar for the Verbal Aggression model. With respect to the contribution of the ANT scale to the models, the explained variance is higher for Physical Aggression and lower for Aggressive Attitude, whereas the direct effect on each outcome is similar for Verbal Aggression and Physical Aggression, and lower for Aggressive Attitude. The predominance of the BOR scale and the moderate presence of the ANT scale in the three models suggest that the problems of impulsivity, emotional regulation, and

anger control — which are also components of the antisocial personality style — are closely related to the three expressions of aggression. Moreover, we can clearly identify a higher and lower incidence of the antisocial personality style on Physical Aggression and Aggressive Attitude, respectively. This tendency can also be observed in the strength of the paths that link the ANT scale with the BOR scale.

In general, these results are consistent with previous findings. For instance, Wang and Diamond (1999) found that anger, impulsivity, and antisocial personality style are strongly related to institutional aggression. In particular, these authors suggested that anger and antisocial personality style are directly related to physical aggression. Moreover, anger showed a considerably stronger path coefficient, whereas impulsivity was directly related to verbal aggression. However, other authors failed to find relevant results when studying anger as a predictor of institutional misconduct and recidivism (Mills and Kroner, 2003). Other studies highlight the possibility that contextual and situational factors inflict higher levels of stress on people with BDP, thus generating or potentiating violent behaviors of different nature (Black et al., 2007). Moreover, in a state of extreme emotional deregulation, some contextual stimuli that are perceived as aversive can operate as triggers of violent behaviors (Logan and Johnstone, 2010). The high presence of traits and symptoms of BDP and ASPD in prison population (Black et al., 2007; Rotter et al., 2002), considered as predictors of aggression, provides support for this suggestion. With respect to ASPD, the link between this disorder and a higher risk of violent behavior has been well documented (Yu et al., 2012). Although the analysis of the two endogenous variables has revealed some important characteristics, the exogenous variables provide complementary information that allows us to identify the specificity of each model.

### 4.2. Specific indicators of the theoretical models

*Aggressive Attitude theoretical model.* The ARD and NON scales are described as exogenous indicators that are specific to this model. Both the direct and indirect effects of the ARD scale on the BOR and ANT scales, and the Aggressive Attitude, suggest a higher impact in the model than the NON scale. Moreover, the strongest association established is that between the ARD scale and the BOR scale. The relationship between both indicators is unsurprising given that the PTSD is also one of the mental disorders with the highest prevalence in correctional settings (Wood and Buttaro, 2013). Further, the frequent presence of anger and

aggression in people with PTSD (Calhoun et al., 2002; Crawford et al., 2007) could explain why they show a high risk of becoming victims of aggression and, at the same time, aggressors (Wood and Buttaro, 2013). There is a strong likelihood that crime-related experiences and their consequences, particularly for recidivists (around 50% of the participants in our study), could contribute to the development of these types of symptoms. It is understandable that obsessive-compulsive symptoms have a strong presence in correctional settings, where contextual conditions, coercion, and victimization operate as risk factors (Boxer et al., 2009; Listwan et al., 2010). In addition, along with the limitations in emotional regulation and impulsivity, anger has been observed as a predictor of obsessive-compulsive symptoms (Besharat and Dehghani, 2014). In particular, anger reaches high levels in patients with OCD, and its relation with obsessive-compulsive beliefs appears to be mediated by anxiety (Sheys, 2016).

The presence of the NON scale in the model, although weaker than that of the other indicators, reveals the impact of both individual factors and the context on aggressive attitude. These variables should be analyzed in studies of violence in prison (Colvin et al., 2002; Lahm, 2008) for a number of reasons, but particularly because poor living conditions can be reflected in increased rates of violence (Bierie, 2012). In this regard, coercion and victimization have specifically been studied (Colvin et al., 2002; Teasdale et al., 2016). Coercion favors violent behavior, whereas social support helps to prevent such behavior (Colvin et al., 2002). Thus, coercive experiences could decrease the beneficial effect of social support sources (Day et al., 2014), of which rehabilitation programs and activities are the most relevant (Colvin, 2007). This negative association between the NON scale and aggressive behaviors was confirmed by Edens and Ruiz (2009). One possible interpretation of the model is that the presence of emotional regulation difficulties, emphasized by posttraumatic stress and obsessive-compulsive symptoms in living conditions perceived as deficient, could explain aggressive attitude. This expression of aggression, according to the obtained results, is comprised more of attitudinal elements that predispose individuals towards other forms of aggression, rather than specific expressions of violence.

*Verbal Aggression theoretical model.* The scales SCZ and NON appear to be exogenous and specific indicators of this model, although the NON scale is also present in the previous model. This could be due to the fact that the contextual factors have a direct impact on the quality of life of the individual. Thus, coexistence in a hostile context can generate psychosocial adaptation problems that can emerge as aggressive behaviors, anger, anxiety, and depression (Boxer et al., 2009; Listwan et al., 2010). This suggests the importance of detecting potentiation and inhibition factors of aggression. A first step could be to evaluate the impact of contextual factors (e.g., center structure, quality of living space, overcrowding, and attention from staff) on the inmates and institutional violence (Gadon et al., 2006). Second, it is necessary to appropriately measure both available and perceived social support, and the attitude of the individual towards the source of support (Day et al., 2014).

From the information above, we can observe that the impact of the SCZ scale is a distinctive feature of this model compared with that described previously. There are several factors that intervene in the relationship between schizophrenia and violence. Some of these factors include personality disorders/psychopathy, mental disabilities, positive psychotic symptoms/first-episode psychosis, substance abuse, and demographics (Bo et al., 2011). The latter authors suggest that violent behavior in schizophrenia follows two different paths. The first is the lack of antecedents of violence or criminal behavior, in which positive symptoms appear to explain violent behavior, whereas in the second, the presence of personality disorders can predict violent behavior regardless of the symptoms. This could account for the contradictory data found in the literature with respect to this matter. Whilst schizophrenia — with or without the use of substances — is related to violence, only a minority of patients are involved in violent episodes towards others (see Joyal et al., 2007 for a review). We can also find subgroups within the population

with schizophrenia that show different expressions of violent behavior and different levels of psychopathy and impulsivity (Joyal et al., 2011).

Although the nature of this study does not allow us to make such a distinction, these findings do permit us to make some sense of the role played by the SCZ scale in the model, especially given the strength of the paths that link it to the BOR and ANT scales, which show effects of a similar magnitude. We could suggest that the impact of this scale allows us to detect an aggression episode with attitudinal hostile elements, and aggressive expressions that are non-physical. Moreover, it is important to note that the correctional setting can play a role in exacerbating psychotic symptoms (Jarrett et al., 2012), which is sometimes a consequence of the stress suffered by inmates with schizophrenia and the perception of vulnerability when they are victims of abuse from other inmates (Nastasi, 2005). Thus, treating these symptoms correctly can help to decrease aggressive behavior in these patients (Keers et al., 2014). It appears then, that verbal aggression could be explained by the emotional regulation difficulties that are exacerbated by the presence of psychotic symptoms within deficient living conditions.

*Physical Aggression theoretical model.* The presence of the DRG scale as the third direct indicator modifies the configuration observed in the previous models, where none of the exogenous indicators showed a direct impact on the outcome measure. This variable (which measures the negative consequences of drug abuse and the indicators of drug addiction), whilst having a lower direct impact on Physical Aggression than the endogenous indicators, shows a stronger association with the ANT scale than with the BOR scale. These data are consistent with those reported in previous studies, where ASPD has been linked to violence (Wormith et al., 2007), particularly when drug abuse is present (Fountoulakis et al., 2008). Similarly, and in contrast with the two previous models, the effect of the context and perception of social support do not appear to be determinant factors, unlike drug abuse.

However, some authors have questioned the reliability of psychological measures (e.g., ANT scale, impulsivity, and the use of alcohol and drugs) to predict severe violence in prison (e.g., Cunningham et al., 2005). It is possible that methodological differences, such as conceptualization and measurement of the violence construct, might have an impact on these results (Schenk and Fremouw, 2012). Thus, it is important to note that the ANT scale measures not only the severe or extreme violent behaviors that are relatively infrequent within the prison context (Cunningham and Reidy, 2002), but also the tendency to physically express anger. Finally, Crimes against property emerges as a fourth indicator of the path model, showing a small impact on the ANT scale and a negligible indirect impact on Physical Aggression. This variable is associated exclusively with the ANT scale. This result appears logical given that it is reasonable to find an affinity between this scale (due to its psychometric features) and certain crimes, particularly those against property. Moreover, the presence of Crimes against property in this model is consistent with the findings of Cunningham et al. (2005) with respect to its capacity to predict violence over other types of offenses. One possible interpretation of the model is that the presence of an antisocial living style and poor anger control, influenced by the consequences of drug abuse, can explain physical aggression, particularly for people serving sentences for crimes against property.

Finally, several complementary reflections will help to interpret both the scope and usefulness of the findings discussed. First, the exploratory approach of the present study is a good starting point for the development of more methodologically complex investigations that provide conclusive data on predictors of various aggressive behaviors. Second, the PAI has shown psychometric advantages over other analogous self-report questionnaires (Seijo et al., 2014), as well as descriptive, clinical, and predictive utility in the prison population: forensic psychiatry (Battaglia et al., 2020), offenders with serious mental illness (Matlasz et al., 2017), homicide offenders (Sea et al., 2020), sexual offenders (Jung et al., 2018), batterers (Chambers et al., 2007; Nguyen et al., 2014), etc. Third, the findings suggest structures composed of factors that are associated with three expressions of aggression, as well as the

usefulness of these indicators of aggressive tendencies within the framework of prevention and intervention strategies in prison settings. For the correct application of the findings, it is necessary to highlight that these expressions of aggression are not mutually exclusive, being able to present jointly but with different intensity, as well as differing in terms of the function and incidence they have on the development and expression of aggressive behavior. Furthermore, the final path models reveal the strongest relationships among all the variables studied, but do not exclude other less strong relationships among all of them. The strength of the path analysis lies in the configuration of the most parsimonious model possible that groups the fewest predictors with the highest statistical power. This explains why the final path models do not include clinical and actuarial variables that the literature associates with aggressive behaviors. In this sense, the use of categories that include crimes with and without the use of violence, instead of specific crimes with and without the use of violence, could justify the absence of other categories of crimes in the final path models. Fourth, rigorous analysis of the PAI data and other sources of information about the criminological profile and behavior of the offender will provide a better approximation of the strength of their relationship and the accuracy of the identified path models. In this regard, the joint use of psychological and actuarial variables as well as more complex statistical analyses is recommended to refine the criminological profiles and measure the predictive capacity of aggressive behavior of each one of them (Burneo-Garcés et al., 2018). The final objective of this strategy should be the development of predictive models of aggressive behavior for each crime. These comments suggest the challenge of implementing comprehensive studies on specific crimes, for which a large sample size is required. Finally, the possible effect of response biases and other factors on the validity of data from self-reports must be analyzed (Davis et al., 2014). In a meta-analysis, Hildebrand et al. (2018) found that the use of self-report measures to assess dynamic risk factors in correctional/forensic settings is not inevitably compromised by response biases (Hildebrand et al., 2018). Regarding the PAI, several scales and indices allow discriminating the protocols whose data do not provide sufficient guarantees of validity (Morey, 1991, 2007; Ortiz-Tallo et al., 2011).

### 4.3. Strengths, limitations, and conclusions

This is the first study to employ the Spanish adaptation of the PAI to analyze the association between indicators of various expressions of aggression in correctional settings. Given that previous studies on this topic have been carried out primarily in the English-speaking population, it is enlightening to have information available from a Spanish-speaking sample (Latin American prison population). In addition, it is reasonable to raise some concerns regarding the degree of understanding of Spanish used in the PAI questionnaire by the South American population. This supposed limitation was analyzed in the studies of linguistic adaptation of the Argentinian version of the PAI (Stover et al., 2015), where the content of only 4 of the 344 items that compose the PAI had to be modified to improve its comprehension. In any case, it is convenient to emphasize the need to have instruments that are sensitive to the cultural factors of each population (Alamilla y Wojcik, 2013; Benuto, 2013; Puente et al., 2013).

There are also some limitations in this study. One of these limitations is that we simultaneously used, as dependent and independent variables, several scales and subscales from the same instrument, which can suggest a lack of independence of the variances (Shadish et al., 2002). However, it is worth noting that the PAI is composed of non-overlapping scales (Morey, 1991, 2007). Moreover, this assumption could not be confirmed in previous studies when the incremental validity of the ANT scale was analyzed, which is one of the most robust predictors of misconduct (Caperton et al., 2004; Skopp et al., 2007). In any case, we suggest using more indicators and sources to improve the quality and usefulness of the data (Walters et al., 2007). We were also unable to increase the number of judicial, disciplinary, and clinical measures,

since it was impossible to access this type of information. To some extent, the use of categories that include crimes with and without the use of violence, instead of specific crimes with and without the use of violence, can be considered a limitation. Another characteristic of this study is that it does not include other correctional samples, which can limit the generalization of the results.

In conclusion, the results of this study indicate that the three subscales of the PAI can measure distinct expressions of aggression. Each of the expressions of aggression that we analyzed has a structure of indicators that are associated in a specific way within the correctional population when the sociodemographic, judicial, clinical, and personality characteristics are analyzed. These structures are composed of two common endogenous indicators (Borderline Features and Antisocial Features scales) and two exogenous indicators that are specific to each of the scales: the Anxiety-Related Disorders and Non-Support scales, for Aggressive Attitude; the Schizophrenia and Non-Support scales, for Verbal Aggression; and the Drug Problems scale and Crimes against property, for Physical Aggression. Further studies should test the predictive validity of these three theoretical models, using objective measures for each expression of aggression and integrating a range of different instruments that measure analogous constructs.

### Contributors

CBG and MPG designed and performed the experiment. CBG analyzed the data. AMM wrote the manuscript with support from CBG.

### Declaration of competing interest

The authors declare not having competing financial interests in the work described.

policy or position of any of these institutions.

# References

Abilleira, M.P., Rodicio-García, M.L., 2018. Personality characteristics associated with different criminal typologies in a sample of Spanish inmates. J. Police Crim. Psychol. 1–9 https://doi.org/10.1007/s11896-018-9296-7.

Alamilla, S.G., Wojcik, J.V., 2013. Assessing for personality disorders in the hispanic client. In: Benuto, L.T. (Ed.), Guide to Psychological Assessment with Hispanics. Springer US, pp. 215–241.

Arbuckle, J.L., 2014. Amos 23.0 User's Guide. IBM SPSS, Chicago.

Archer, R.P., Buffington-Vollum, J.K., Stredny, R.V., Handel, R.W., 2006. A survey of psychological test use patterns among forensic psychologists. J. Pers. Assess. 87, 84–94. https://doi.org/10.1207/s15327752jpa8701_07.

Aron, A., Aron, E., 2001. Estadística para Psicología. Pearson Education, Buenos Aires.

Baskin, D.R., Sommers, I., Steadman, H.J., 1991. Assessing the impact of psychiatric impairment on prison violence. J. Crim. Justice 19, 271–280. https://doi.org/10.1016/0047-2352(91)90006-H.

Batista-Foguet, J.M., Coenders, G., 2000. Modelos de Ecuaciones Estructurales. La Muralla, Madrid.

Battaglia, A.M., Gicas, K.M., Rose, A.L., Mamak, M., Goldberg, J.O., 2020. Aggressive personality and aggressive incidents: a pilot investigation of the personality assessment inventory within forensic psychiatry. J. Forensic Psychiatr. Psychol. 1–15. https://doi.org/10.1080/14789949.2020.1867225.

Bentler, P.M., 1990. Comparative fit indexes in structural models. Psychol. Bull. 107, 238. https://doi.org/10.1037/0033-2909.107.2.238.

Bentler, P.M., Bonett, D.G., 1980. Significance tests and goodness of fit in the analysis of covariance structures. Psychol. Bull. 88, 588–606. https://doi.org/10.1037/0033-2909.88.3.588.

Berg, M.T., DeLisi, M., 2006. The correctional melting pot: race, ethnicity, citizenship, and prison violence. J. Crim. Justice 34, 631–642. https://doi.org/10.1016/j.jcrimjus.2006.09.016.

Besharat, M.A., Dehghani, S., 2014. P54: predicting obsessive-compulsive disorder symptoms on the basis of difficulties in emotion regulation, impulsivity and anger. The Neuroscience Journal of Shefaye Khatam 2, 78-78.

Bierie, D.M., 2012. Is tougher better? The impact of physical prison conditions on inmate violence. Int. J. Offender Ther. Comp. Criminol. 56, 338–355. https://doi.org/10.1177/0306624X11405157.

Black, D.W., Gunter, T., Allen, J., Blum, N., Arndt, S., Wenman, G., Sieleni, B., 2007. Borderline personality disorder in male and female offenders newly committed to prison. Compr. Psychiatr. 48, 400–405. https://doi.org/10.1016/j.comppsych.2007.04.006.

Bo, S., Abu-Akel, A., Kongerslev, M., Haahr, U.H., Simonsen, E., 2011. Risk factors for violence among patients with schizophrenia. Clin. Psychol. Rev. 31, 711–726. https://doi.org/10.1016/j.cpr.2011.03.002.

Bosma, A.Q., van Ginneken, C., EF, Sentse, M., Palmen, H., 2020. Examining prisoner misconduct: a multilevel test using personal characteristics, prison climate, and prison environment. Crime Delinquen. 66, 451–484.

Boxer, P., Middlemass, K., Delorenzo, T., 2009. Exposure to violent crime during incarceration: effects on psychological adjustment following release. Crim. Justice Behav. 36, 793–807. https://doi.org/10.1177/0093854809336453.

Browne, M.W., Cudeck, R., 1993. Alternative ways of assessing model fit. In: Bollen, K.A., Long, J.S. (Eds.), Testing Structural Equation Models. Sage Publications, Newbury Park, CA, pp. 136–162.

Burneo-Garcés, C., Pérez-García, M., 2018. Prevalence of psychopathological features in South American prisons using the personality assessment inventory. Behavioral Psychology/Psicología Conductual 26, 177–195.

Burneo-Garcés, C., Fernández-Alcántara, M., Marín-Morales, A., Pérez-García, M., 2018. Are psychological measures and actuarial data equally effective in discriminating among the prison population? Analysis by crimes. PloS One 13, e0198251. https://doi.org/10.1371/journal.pone.0198251.

Burneo-Garcés, C., Fernández-Alcántara, M., Aguayo-Estremera, R., Pérez-García, M., 2020. Psychometric properties of the Spanish adaptation of the Personality Assessment Inventory in correctional settings: an ESEM study. J. Pers. Assess. 102 (1), 75–87.

Byrne, J.M., Hummer, D., 2007. Myths and realities of prison violence: a review of the evidence. Vict. Offenders: An International Journal of Evidence-Based Research, Policy, and Practice 2, 77–90. https://doi.org/10.1080/15564880601087241.

Calhoun, P.S., Beckham, J.C., Feldman, M.E., Barefoot, J.C., Haney, T., Bosworth, H.B., 2002. Partners' ratings of combat veterans' anger. J. Trauma Stress 15, 133–136. https://doi.org/10.1023/A:1014808008142.

Caperton, J.D., Edens, J.F., Johnson, J.K., 2004. Predicting sex offender institutional adjustment and treatment compliance using the Personality Assessment Inventory. Psychol. Assess. 16, 187–191. https://doi.org/10.1037/1040-3590.16.2.187.

Chambers, A.L., Wilson, M.N., 2007. Assessing male batterers with the personality assessment inventory. J. Pers. Assess. 88, 57–65. https://doi.org/10.1080/00223890709336835.

Colvin, M., 2007. Applying differential coercion and social support theory to prison organizations the case of the penitentiary of New Mexico. Prison J. 87, 367–387. https://doi.org/10.1177/0032885507304774.

Colvin, M., Cullen, F.T., Vander Ven, T., 2002. Coercion, social support, and crime: an emerging theoretical consensus. Criminology 40, 19–42. https://doi.org/10.1111/j.1745-9125.2002.tb00948.x.

Constitution of the Republic of Ecuador, 2008. Registro Oficial Nº 449. Retrieved from. http://www.corteconstitucional.gob.ec/images/contenidos/quienessomos/Constitucion_politica.pdf.

Crawford, E.F., Calhoun, P.S., Braxton, L.E., Beckham, J.C., 2007. Validity of the Personality Assessment Inventory aggression scales and violence potential index in veterans with PTSD. J. Pers. Assess. 88, 90–98. https://doi.org/10.1080/00223890709336839.

Cunningham, M.D., Reidy, T.J., 2002. Violence risk assessment at federal capital sentencing: individualization, generalization, relevance, and scientific standards. Crim. Justice Behav. 29, 512–537. https://doi.org/10.1177/009385402236731.

Cunningham, M.D., Sorensen, J.R., 2007. Predictive factors for close custody. Prison J. 87, 241–253. https://doi.org/10.1177/0032885507303752.

Cunningham, M.D., Sorensen, J.R., Reidy, T.J., 2005. An actuarial model for assessment of prison violence risk among maximum security inmates. Assessment 12, 40–49. https://doi.org/10.1177/1073191104272815.

Davis, C.G., Doherty, S., Moser, A.E., 2014. Social desirability and change following substance abuse treatment in male offenders. Psychol. Addict. Behav. 28, 872. https://doi.org/10.1177/0093854814546352.

Day, J.C., Brauer, J.R., Butler, H.D., 2014. Coercion and social support behind bars testing an integrated theory of misconduct and resistance in US prisons. Crim. Justice Behav. 42, 133–155.

DeLisi, M., 2003. Criminal careers behind bars. Behav. Sci. Law 21, 653–669. https://doi.org/10.1002/bsl.531.

DeLisi, M., Berg, M.T., Hochstetler, A., 2004. Gang members, career criminals and prison violence: further specification of the importation model of inmate behavior. Crim. Justice Stud. Crit. J. Crime Law Soc. 17, 369–383.

Edens, J.F., Ruiz, M.A., 2005. PAI Interpretive Report for Correctional Settings (PAI-CS) – Professional Manual. Psychological Assessment Resources, Lutz, Florida.

Edens, J.F., Ruiz, M.A., 2009. Predicting institutional aggression by defensive prison inmates: an examination of the Personality Assessment Inventory treatment consideration scales. Int. J. Forensic Ment. Health 8, 178–185. https://doi.org/10.1080/14999010903358771.

Fountoulakis, K.N., Leucht, S., Kaprinis, G.S., 2008. Personality disorders and violence. Curr. Opin. Psychiatr. 21, 84–92. https://doi.org/10.1097/YCO.0b013e3282f31137.

Gadon, L., Johnstone, L., Cooke, D., 2006. Situational variables and institutional violence: a systematic review of the literature. Clin. Psychol. Rev. 26, 515–534. https://doi.org/10.1016/j.cpr.2006.02.002.

Gardner, B.O., Boccaccini, M.T., Bitting, B.S., Edens, J.F., 2015. Personality Assessment Inventory scores as predictors of misconduct, recidivism, and violence: a meta-analytic meta-analytic review. Psychol. Assess. 27, 534–544. https://doi.org/10.1037/pas0000065.

Gilbert, F., Daffern, M., Talevski, D., Ogloff, J.R., 2015. Understanding the personality disorder and aggression relationship: an investigation using contemporary aggression theory. J. Pers. Disord. 29, 100–114. https://doi.org/10.1521/pedi_2013_27_077.

Griffin, M.L., Hepburn, J.R., 2006. The effect of gang affiliation on violent misconduct among inmates during the early years of confinement. Crim. Justice Behav. 33, 419–466.

Hildebrand, M., Wibbelink, C.J., Verschuere, B., 2018. Do impression management and self-deception distort self-report measures with content of dynamic risk factors in offender samples? A meta-analytic review. Int. J. Law Psychiatry 58, 157–170. https://doi.org/10.1177/0093854806288038.

Hoelzle, J.B., Meyer, G.J., 2009. The invariant component structure of the Personality Assessment Inventory (PAI) full scales. J. Pers. Assess. 91, 175–186 doi.org/10.1080/00223890802634316 PMID:19205938.

Howard, R., Khalifa, N., Duggan, C., 2014. Antisocial personality disorder comorbid with borderline pathology and psychopathy is associated with severe violence in a forensic sample. J. Forensic Psychiatr. Psychol. 25, 658–672. https://doi.org/10.1080/14789949.2014.943797.

Institute for Criminal Policy Research ICPR, 2020. World prison brief database. Available at. http://www.prisonstudies.org/world-prison-brief-data.

Jarrett, M., Craig, T., Parrott, J., Forrester, A., Winton-Brown, T., Maguire, H., McGuire, P., Valmaggia, L., 2012. Identifying men at ultra high risk of psychosis in a prison population. Schizophr. Res. 136, 1–6. https://doi.org/10.1016/j.schres.2012.01.025.

Jöreskog, K.G., Sörbom, D., 1982. Recent developments in structural equation modeling. J. Market. Res. 19, 404–416. https://doi.org/10.2307/3151714.

Joyal, C.C., Dubreucq, J.L., Gendron, C., Millaud, F., 2007. Major mental disorders and violence: a critical update. Curr. Psychiatr. Rev. 3, 33–50. https://doi.org/10.2174/157340007779815628.

Joyal, C.C., Côté, G., Meloche, J., Hodgins, S., 2011. Severe mental illness and aggressive behavior: on the importance of considering subgroups. Int. J. Forensic Ment. Health 10, 107–117. https://doi.org/10.1080/14999013.2011.577136.

Jung, S., Toop, C., Ennis, L., 2018. Identifying criminogenic needs using the personality assessment inventory with males who have sexually offended. Sexual Abuse 30, 992–1009. https://doi.org/10.1177/1079063217715018.

Keers, R., Ullrich, S., DeStavola, B.L., Coid, J.W., 2014. Association of violence with emergence of persecutory delusions in untreated schizophrenia. Am. J. Psychiatr. 171, 332–339. https://doi.org/10.1176/appi.ajp.2013.13010134.

Lahm, K.F., 2008. Inmate-on-inmate assault. A multilevel examination of prison violence. Crim. Justice Behav. 35, 120–137. https://doi.org/10.1177/0093854807308730.

Lally, S.J., 2003. What tests are acceptable for use in forensic evaluations? A survey of experts. Prof. Psychol. Res. Pract. 34, 491–498. https://doi.org/10.1037/0735-7028.34.5.491.

Listwan, S.J., Colvin, M., Hanley, D., Flannery, D., 2010. Victimization, social support, and psychological well-being: a study of recently released prisoners. Crim. Justice Behav. 37, 1140–1159. https://doi.org/10.1177/0093854810376338.

Logan, C., Johnstone, L., 2010. Personality disorder and violence: making the link through risk formulation. J. Pers. Disord. 24, 610–633. https://doi.org/10.1521/pedi.2010.24.5.610.

Loinaz, I., Echeburúa, E., Irureta, M., 2011. Mental disorders as a violent victimization risk factor. Behavioral Psychology/Psicología Conductual 19, 421–438.

Martin, S., Zabala, C., Del-Monte, J., Graziani, P., Aizpurua, E., Barry, T.J., Ricarte, J., 2019. Examining the relationships between impulsivity, aggression, and recidivism for prisoners with antisocial personality disorder. Aggress. Violent Behav. 49 https://doi.org/10.1016/j.avb.2019.07.009.

Matlasz, T.M., Brylski, J.L., Leidenfrost, C.M., Scalco, M., Sinclair, S.J., Schoelerman, R. M., Tsang, V., Antonius, D., Antonius, D., 2017. Cognitive status and profile validity on the Personality Assessment Inventory (PAI) in offenders with serious mental illness. Int. J. Law Psychiatr. 50, 38–44. https://doi.org/10.1016/j.ijlp.2016.10.003.

Mills, J.F., Kroner, D.G., 2003. Anger as a predictor of institutional misconduct and recidivism in a sample of violent offenders. J. Interpers Violence 18, 282–294. https://doi.org/10.1177/0886260502250085.

Moore, K.E., Gobin, R.L., McCauley, H.L., Kao, C.W., Anthony, S.M., Kubiak, S., Johnson, J.E., 2018. The relation of borderline personality disorder to aggression, victimization, and institutional misconduct among prisoners. Compr. Psychiatr. 84, 15–21.

Morey, L.C., 1991. Personality Assessment Inventory Professional Manual. Odessa, FL.

Morey, L.C., 2007. Personality Assessment Inventory Professional Manual, second ed. Psychological Assessment Resources, Lutz, FL.

Nastasi, T.E., 2005. Prison Inmates with Schizophrenia: A Phenomenological Investigation (Doctoral Dissertation. Pacific University. Retrieved from. http://commons.pacificu.edu/spp/545.

Newberry, M., Shuker, R., 2012. Personality Assessment Inventory (PAI) profiles of offenders and their relationship to institutional misconduct and risk of reconviction. J. Pers. Assess. 94, 586–592. https://doi.org/10.1080/00223891.2012.669220.

Nguyen, T., Catena, A., Frierich, N., Iturbe, N., Civit, N., Muro, A., 2014. Personality profiles of intimate partner violence offenders assessed with the personality assessment inventory. Pers. Indiv. Differ. 60, S64. https://doi.org/10.1016/j.paid.2013.07.280.

Organic Integral Criminal Code of the Republic of Ecuador, 2014. Registro oficial. Suplemento. Año I, Nº 180. Retrieved from. http://www.registroficial.gob.ec.

Ortiz-Tallo, M., Santamaría, P., Cardenal, V., Sánchez, M.P., 2011. Adaptación española del Inventario de Evaluación de la Personalidad (PAI). TEA Ediciones, Madrid.

Puente, A.E., Zink, D., Hernandez, M., Jackman-Venanzi, T., Ardila, A., 2013. Bilingualism and its impact on psychological assessment. In: Benuto, L.T. (Ed.), Guide to Psychological Assessment with Hispanics. Springer US, pp. 15–31.

Raftery, A.E., 1995. Bayesian model selection in social research. Socio. Methodol. 25, 111–163. https://doi.org/10.2307/271063.

IBM Corp Released, 2013. IBM SPSS Statistics for Windows, Version 22.0. IMB Corp, Armonk, NY.

Riley, W.T., Treiber, F.A., 1989. The validity of multidimensional self-report anger and hostility measures. J. Clin. Psychol. 45, 397–404 dx.doi.org/10.1002/1097-4679 (198905)45:3<397::AID-JCLP2270450308>3.0.CO;2-4.

Rotter, M., Way, B., Steinbacher, M., Sawyer, D., Smith, H., 2002. Personality disorders in prison: Aren't they all antisocial? Psychiatr. Q. 73, 337–349. https://doi.org/10.1023/A:1020468117930.

Ruiz, M.A., Ochshorn, E., 2010. Clinical applications of the PAI in criminal justice settings. In: Blais, M.A., Baity, M.R., Hopwood, C.J. (Eds.), Clinical Applications of the Personality Assessment Inventory. Routledge, New York, pp. 113–134.

Schenk, A.M., Fremouw, W.J., 2012. Individual characteristics related to prison violence: a critical review of the literature. Aggress. Violent Behav. 17, 430–442. https://doi.org/10.1016/j.avb.2012.05.005.

Schwarz, G., 1978. Estimating the dimension of a model. Ann. Stat. 6, 461–464. https://doi.org/10.1214/aos/1176344136.

Sea, J., Beauregard, E., Youngs, D., 2020. Behavioural profiles and offender characteristics: typology based on the Personality Assessment Inventory (PAI) in homicide cases. J. Investigative Psychol. Offender Profiling 17, 310–331. https://doi.org/10.1002/jip.1559.

Seijo, D., Fariña, F., Vilariño, M., 2014. Procedimientos y técnicas para la evaluación psicológica forense. En S. Souto (dir.), A. Souto (dir.), & F. Fariña (dir.), Salud y Bienestar. GEU Editorial, Granada, Spain, pp. 25–54.

Shadish, W.R., Cook, T.D., Campbell, D.T., 2002. Experimental and Quasi-Experimental Designs for Generalized Causal Inference. Houghton Mifflin, Boston.

Sheys, K., 2016. Path Analysis of Elevated Anger in Obsessive-Compulsive Disorder: the Mediating Role of Perfectionism and Psychological Distress, vol. 169. Honors Theses. Retrieved from. http://digital.kenyon.edu/honorstheses/169.

Skopp, N.A., Edens, J.F., Ruiz, M.A., 2007. Risk factors for institutional misconduct among incarcerated women: an examination of the criterion-related validity of the Personality Assessment Inventory. J. Pers. Assess. 88, 106–117. https://doi.org/10.1080/00223890709336841.

Sorensen, J., Cunningham, M.D., 2010. Conviction offense and prison violence. A comparative study of murderers and other offenders. Crime Delinquen. 56, 103–125. https://doi.org/10.1177/0011128707307175.

Sorensen, J., Cunningham, M.D., Vigen, M.P., Woods, S.O., 2011. Serious assaults on prison staff: a descriptive analysis. J. Crim. Justice 39, 143–150. https://doi.org/10.1016/j.jcrimjus.2011.01.002.

Stover, J.B., Castro, A., Fernández, M., 2015. Personality assessment inventory: psychometric analyses of its Argentinian version. Psychol. Rep.: Measures & Statistics 117, 799–823. https://doi.org/10.2466/08.03.PR0.117c27z2.

Teasdale, B., Daigle, L.E., Hawk, S.R., Daquin, J.C., 2016. Violent victimization in the prison context an examination of the gendered contexts of prison. Int. J. Offender Ther. Comp. Criminol. 60, 995–1015. https://doi.org/10.1177/0306624X15572351.

Toop, C., Olver, M.E., Jung, S., 2019. Forensic assessment with the PAI in correctional samples: implications for RNR. Crim. Justice Behav. 46 (6), 866–883.

United Nations Office on Drugs and Crime UNODC, 2016. World Drug Report 2016. United Nations Publications. Available at. http://www.unodc.org/wdr2016/.

Walters, G.D., Diamond, P.M., Magaletta, P.R., Geyer, M.D., Duncan, S.A., 2007. Taxometric analysis of the antisocial features scale of the personality assessment inventory in federal prison inmates. Assessment 14, 351–360. https://doi.org/10.1177/1073191107304353.

Wang, E.W., Diamond, P.M., 1999. Empirically identifying factors related to violence risk in corrections. Behav. Sci. Law 17, 377–389. https://doi.org/10.1002/(SICI)1099-0798(199907/09)17:3<377::AID-BSL351>3.0.CO;2-M.

Wolff, N., Blitz, C.L., Shi, J., Siegel, J., Bachman, R., 2007. Physical violence inside prisons: rates of victimization. Crim. Justice Behav. 34, 588–599. https://doi.org/10.1177/0093854806296830.

Wood, S.R., Buttaro, A., 2013. Co-occurring severe mental illnesses and substance abuse disorders as predictors of state prison inmate assaults. Crime Delinquen. 59, 510–535. https://doi.org/10.1177/0011128712470318.

Wormith, J.S., Olver, M.E., Stevenson, H.E., Girard, L., 2007. The long-term prediction of offender recidivism using diagnostic, personality, and risk/need approaches to offender assessment. Psychol. Serv. 4, 287–305. https://doi.org/10.1037/1541-1559.4.4.287.

Yu, R., Geddes, J.R., Fazel, S., 2012. Personality disorders, violence, and antisocial behavior: a systematic review and meta-regression analysis. J. Pers. Disord. 26, 775–792. https://doi.org/10.1521/pedi.2012.26.5.775.