ORIGINAL RESEARCH

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Exploration of socio-family and psychological characteristics of young males convicted of murder or attempted murder in the province of Buenos Aires, Argentina

Exploración de las características sociofamiliares y psicológicas en jóvenes con comportamiento homicida de la provincia de Buenos Aires, Argentina

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| Abstract |

Introduction: Different developmental and environmental vulnerability conditions can influence violent behavior in young people.

Objectives: To describe the characteristics of young males who were convicted of murder or attempted murder in the province of Buenos Aires, based on indicators of maturity, impulsivity, and socio-family vulnerability.

Materials and Methods: Descriptive and exploratory study. The sample consisted of 195 young men (mean: 16.8 years) imprisoned in reformatory institutions of the Province of Buenos Aires, Argentina, as they were convicted of murder (n=130), repeated murder (n=15), or attempted murder (n=50). Self and hetero-informed instruments, and professional assessment scales were used, namely: the Consideration of Future Consequences Scale (CFC); the Psychosocial Maturity Inventory (PSM); the Weinberg Adjustment Inventory (WAI); the Resistance to Peer Influence Questionnaire (RPIQ); the Psychopathy Checklist: Youth Version (PCL:YV); the Inventory of Callous Unemotional Traits (ICU), and the Barrat Impulsiveness Scale version 11 (BIS-11).

Results: The distribution of the total BIS 11 and the PSM Individual Adaptation were normal (mean: 62.33 and 6.38, respectively). The mean of the total PCL:YV was 25.87. In 32.8% of the cases a first degree relative was also imprisoned. "Impulsive" and "Non-impulsive" clusters were empirically established.

Conclusions: The participants' profile is characterized by several psychological and socio-family vulnerabilities that should be targeted in preventive interventions aimed at preventing violent recidivism.

Keywords: Homicide; Violence; Impulsive Behavior; Adolescent (MeSH).

| Resumen |

Introducción. Diversas condiciones de vulnerabilidad dependientes del desarrollo y de las influencias medioambientales pueden influir en las conductas violentas juveniles.

Objetivos. Describir las características de jóvenes que cometieron homicidio o intento de homicidio atendiendo a indicadores de madurez, impulsividad y vulnerabilidad sociofamiliar.

Materiales y métodos. Estudio de diseño descriptivo y exploratorio. Los participantes fueron 195 varones jóvenes (media: 16.8 años) institucionalizados en la provincia de Buenos Aires, Argentina, por orden judicial por haber cometido homicidio (n=130), homicidio reiterado (n=15) o tentativa de homicidio (n=50). Se utilizaron instrumentos auto y heteroinformados y las escalas de evaluación profesional Consideration of Future Consequences Scale (CFC), Psychosocial Maturity Inventory (PSM), Weinberg Adjustment Inventory (WAI), Resistance to Peer Influence (RPI), Psychopathy Checklist: Youth Version (PCL:YV), Inventory of Callous Unemotional Traits (ICU) y Barrat Impulsiveness Scale version 11 (BIS 11).

Resultados. La distribución de BIS 11 total y de PSM Adecuación Individual fueron normales, con medias de 62.33 y 6.38, respectivamente; la media de PCL:YV total fue 25.87. El 32.8% de los jóvenes tenía familiares de primer grado presos. Se configuraron empíricamente los clusters "impulsivo" y "no impulsivo".

Conclusiones. El perfil de los participantes se caracteriza por diversas vulnerabilidades psicológicas y sociofamiliares que deberían ser blanco de intervención preventiva de recidiva violenta.

Palabras clave: Homicidio; Violencia; Conducta impulsiva; Adolescente (DeCS).

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Introduction

For years, violence has been an issue of public health concern. (1) Its impact on social life (2) and the effects of preventive intervention on the general population (3), particularly on young people (4) have also been addressed. There are quite a few studies in Latin America that provide relevant data for the implementation of programs aiming at preventing youth violence. (5) Moreover, if the literature search is limited to juvenile homicide, there are only two studies addressing vulnerabilities in young male murderers in Latin America. (6-9)

In one of these studies, a group of Colombian young people (n=83, mean age: 16 years old), both male and female, who had committed murder were compared with a control group matched by several variables. (9) Some of the most relevant findings reported in this study were that most of the subjects had a low level of schooling (mean: 6 years), 38.15% had been raised by only one of their parents, 53% showed moderate or severe impulsivity, and 94% had moderate or severe conduct disorders. (9)

In the second study, a group of Argentine adolescent murderers (n=15, mean age: 17 years old) were compared with a control group made up of young males who were in prison for having committed crimes different than homicide. (7) Regarding the murderers group, in 53% the level of schooling was incomplete primary, and 47% had only lived with their mother before turning 17 years old, while 20% had been raised only by their father before turning this age. In addition, among those who had lived or known both of their parents, 23% reported being exposed to paternal alcohol abuse and 7% to paternal drug abuse. On the other hand, a first-degree relative of 20% of the subjects was also in prison; 40% had self-harm scars and only 1 had gunshot wounds scars. In terms of health care interventions conducted before committing the homicide, 47% had undergone social workers intervention, 33% had been treated by a psychologist, and none of them had a history of psychiatrist intervention. Finally, the whole sample had a history of behavior disorders, with an average of 6 types of disorders ranging from 0 to 11. (6,7)

Evidence and data on psychosocial vulnerabilities affecting young violent people, in particular murderers, might help to design primary and secondary prevention strategies. Unfortunately, current studies in this topic are not enough to give a comprehensive account of family risk background and relevant constructs such as impulsivity, immaturity, conduct disorders and psychopathic traits. The present study inquiry focuses on such constructs.

Impulsivity, immaturity and conduct disorders are constructs that are differently related to violence. They are risk factors for reactive aggression since they can induce aggressive or destructive behaviors in interpersonal conflicts or frustration situations. (10-12) Moreover, they can produce a deleterious effect on interpersonal relationships in such a way that segregation, labeling, and relational tension increase, which promotes greater adaptive difficulties and, consequently, dysfunctional socialization that stimulates conflict and frustration.

Although conduct disorders are phenomenologically described in international classifications (13), impulsivity and immaturity are constructs difficult to manage and measure. In this study indicators on these constructs were obtained using two scales, the Consideration of Future Consequences Scale (CFC Scale) (14) and the version for adolescents of the Barrat Impulsiveness Scale (BIS-11). (15,16) Regarding these indicators, Bushman *et al.* (17) reported an association between low CFC scale values and aggression, while a study conducted on a Latin American student population group reported a normal distribution of the total values [average= 38.9 (SD=6.4, n=120)] (18).

Another study on 166 young criminal offenders from Argentina (19) reported the following BIS 11 scale scores: Total= 68.4 (SD=8.1); Attentional subscale= 26.3 (SD=5.2); Cognitive= 17.5 (SD=2.6), and Motor=24.7 (SD=4). These results provided the local background for the BIS 11 version used in the present study.

On the other hand, immaturity is an elusive construct that consists of biological, psychological, social and legal components, as well as social historical relativity. (20-24) The present study proposed to determine the abilities required to inhibit impulse and aggression, moderate behavioral psychopathic traits, and resist peer influence, since they are variables of empirical support in relation to age and how they influence conduct disorders or crime desisting. (25-26) In this regard, Monahan *et al.* (23), in a study on 1088 young offenders, reported the following mean and standard deviation values: Impulse control= 2.95 (0.95); Suppression of aggression= 2.77 (0.97); Consideration for others= 3.46 (0.88); Personal responsibility= 3.01 (0.47), and Resistance to peer influence= 2.96 (0.58).

Although there is a broad consensus that diagnosing psychopathy in people younger than 18 years is not advisable, evidence shows that various psychopathic features and emotional insensitivity can be detected in childhood and adolescence. (27-29) These traits have been related to violent behaviors (30) and are usually considered prognostic factors, whether measured independently or as part of an evaluation integrated with other instruments. (31-34) These traits also modify social learning (35) and influence the acceptance of preventive or therapeutic programs in different ways. (36-38) Given that information relevant to these traits is affected by several biases (39), some authors have suggested the use of two instruments, the Psychopathy Checklist: Youth Version (PCL:YV) (29) and the Inventory of Callous and Unemotional Trait (ICU) (40), provided that through their administration information from multiple sources can be obtained.

Among the previous studies that used the PCL:YV, the one conducted by Neumann *et al.* on a sample consisting of young people from USA and Canada (n= 505, age range= 11-19 years old), and who reported a mean total score of 27.56 (SD=7.57) stands out. (41) In the case of works using the ICU, Kimonis *et al.* (42) reported the following mean and SD values in a group of imprisoned adolescents (n=98): Uncaring= 9.28 (4.93); Callousness= 6.21 (4.49); Unemotional= 8.08 (2.94); and Total= 26.07 (8.25).

The objective of the present study is to describe the psychological and socio-family factors of a group of young males convicted of murder or attempted murder and who were imprisoned, at the time of conducting the study, in the province of Buenos Aires, Argentina, in order to provide more knowledge on the vulnerabilities to which this population is exposed to, and to explore an empirical typology in order to generate two clusters of emotional and unemotional individuals.

Materials and methods

The present study is part of a larger research project that also includes biological variables. In this article, the findings regarding psychological and socio-family factors are described, and an empirical typology is presented.

Study Population

The study population consisted of young males who had been convicted of murder or attempted murder by the competent authority (Juzgado de Responsabilidad Juvenil), and who were imprisoned in reformatory institutions belonging to the Provincial Youth and Family Agency of the Ministry of Social Development of the Province of Buenos Aires, Argentina, between 2015 and 2017, and who met the following inclusion criteria:

- voluntary acceptance to participate in the study and provide the information required in the interviews to be carried out upon obtaining their informed consent;
- having minimum reading skills in order to understand and answer the questionnaires or minimum communication skills to be informed on the questions and to provide oral replies; and
- absence of mental disorders of psychotic seriousness.

Provided that during the study period (2017) the eligible population was constantly changing due to institutional transfers, releases or readmissions (repeated offenders), the sample could not be either randomly or systematically obtained. Information from 195 participants was obtained; of these, 130 had been convicted of murder, 15 were repeated offenders convicted of murder, and 50 had been convicted of attempted murder (n=50). The sample represented 40.7% of the males who had attempted or committed murder (n=479) and had been imprisoned in the above mentioned reformatory institutions during the study period.

Procedure and instruments

An *ad hoc* questionnaire was designed to obtain information on social and criminological variables. Data were collected from interviews, institutional staff, clinical records, and individual files. In addition, the following instruments, which were translated from English into Spanish, then retranslated and adapted for previous studies by the research team of the Department of Psychiatry of Universidad Nacional de La Plata, were used to obtain information on psychological variables:

- The Consideration of Future Consequences Scale (CFC) (14,18,43-45), in which Cronbach's alpha values in the present study were 0.88, 0.83, and 0.92 for CFC-Immediate, CFC-Future, and CFC-Total, respectively.
- The Psychosocial Maturity Inventory (PSM) (46-48), where Cronbach's alpha values for the study population were 0.42, 0.71, and 0.63 for Self-reliance, Work, and Identity, respectively.
- The Weinberg Adjustment Inventory (WAI) (40,48,49), in which Cronbach's alpha values in the study sample were 0.70, 0.81, 0.90, and .84 for Impulse Control, Suppression of Aggression, Consideration for Others, and Temperance, respectively.
- The Resistance to Peer Influence Questionnaire (RPI) (50), where the Cronbach's alpha value obtained was 0.60, although this value is low in terms of reliability, RPI results are informed here since it was the only instrument used to measure the RPI construct.
- The Psychopathy Checklist: Youth Version (PCL:YV) (29,51-57), in which the following Cronbach's alpha values were obtained: 0.86, 0.85, 0.88, and 0.51 for Interpersonal, Affective, Behavioral, and Antisocial factors, respectively, and a 0.91 value for the total PCL:YV.

Likewise, the Spanish version of the Inventory of Callous Unemotional Traits (ICU) (40,58-61) and a Spanish version for young people of the Barratt Impulsiveness Scale (BIS-11) (16) were used. In this study, Cronbach's alpha values in these instruments were 0.77, 0.63, and 0.70 for the Callousness, Uncaring, and Unemotional ICU subscales, and 0.59 for the total BIS-11.

Analytics strategy

Percentages were used to describe categorical variables, while measures of central tendency were used for interval variables. Normal distribution was checked through the Kolmorogov-Smirnov Test. Spearman correlation was calculated as most variables did not have a normal distribution. Finally, a two-stage cluster analysis was carried out introducing the two variables with normal distribution (Bis-11 and ICU).

Ethical considerations

This is a minimum risk study for it was based on an observational design and the provision of information was made by means of statistical terms, which in turn ensured the participants' anonymity. Moreover, the ethical principles for medical research involving human subjects established by the Declaration of Helsinki and its amendments (64th WMA General Assembly, Fortaleza, 2013) (62), and the provisions of Argentine Law 25.326 regarding the Protection of Personal Data were followed. (63) The project and the consent form were approved by the Advisory Board of the School of Medical Sciences of Universidad Nacional de La Plata, Argentina. Finally, the primary research on which the present work was based was approved by the Biomedical Research Ethics Committee of Instituto Multidisciplinario de Biología Celular - IMBICE (Cell Biology Multidisciplinary Institute), as stated in a certification issued by said institution in January 30, 2019 under code RENIS CE000023.

Results

Participants' average age was 16.8 years (SD=1.4) and in general they had low a schooling level: 4.1% had no schooling at all, 20.5% had an incomplete primary education schooling level, 7.7% had completed primary education, 63.1% had not completed high school education, and only 4.6% had a complete high school education level of schooling.

Table 1 shows the descriptive statistics for each of the self-reported psychological indicators. Normal distribution was only observed in BIS-11 total and PSM Individual Adaptation values.

The scores obtained from the administration of the PCL:YV instrument and the ICU (the latter by the reformatory institutions teachers) are shown in Table 2. None of these variables had a normal distribution.

ICU and PCL:YV scales are particularly relevant since they allow obtaining the assessment of a technician and a professional respectively, that is, the participant's information bias does not have a direct influence on the scores obtained through them, although both sources are expected to vary simultaneously. In order to test the interrelation between ICU and PCL:YV, it was found that in general the correlations calculated were high and statistically significant, except for the Unemotional ICU scale in which a few non-significant correlations were observed (Table 3).

Table 1. Self-reported psychological indicators values.

	$\bar{x}$	SD	Minimum	Maximum	p (1)
CFC proximal (7-35)	15.14	7.31	7	31	0.00
CFC distal (5-25)	13.01	5.99	5	25	0.00
CFC total (12-60)	28.15	12.63	12	56	0.00
WAI Impulse Control (1-5)	2.95	0.85	1	5	0.03
WAI Moderation (1-5)	2.75	0.88	1	4.73	0.003
WAI Aggression Suppression (7-5)	2.52	1.07	1	5	0.003
WAI Consideration for others (7-5)	2.25	1.24	1	5	0.00
BIS-11 Attentional (9-45)	28.49	6.24	11	45	0.03
BIS-11 Cognitive (6-30)	15.75	3.14	6	27	0.00
BIS-11 Motor (8-40)	18.08	4.05	10	36	0.00
BIS-11 Total (23-115)	62.33	9.55	37	99	0.06
PSM Self-confidence (1-4)	1.98	0.37	1	2.80	0.01
PSM Work (1-4)	2.24	0.48	1	3.10	0.01
PSM Identity (1-4)	2.16	0.42	1	3.00	0.01
PSM Individual Adaptation (3-12)	6.38	1.03	3.9	8.70	0.09
RPI Final score (1-4)	3.28	0.57	1	4	0.00

n= 195. $\bar{x}$: mean; SD: standard deviation; p (1): bilateral asymptotic significance, Kolmorogov-Smirnov Test; CFC: Consideration of Future Consequences Scale; WAI: Weinberg Adjustment Inventory; BIS-11: Barrat Impulsiveness Scale 11; PSM: Psychosocial Maturity Inventory; RPI: Resistance to Peer Influence Questionnaire; CFC proximal: Consideration of future consequences in the immediate future; CFC distal: Consideration of future consequences in the long term (i.e. months or years); CFC total: sum of proximal and distal values.
Source: Own elaboration.

Table 2. Psychopathy Checklist: Youth Version and Inventory of Callous-Unemotional Traits scores.

Scale (possible score range)	$\bar{x}$	SD	Minimum	Maximum	p (1)
ICU Callousness (11-44)	13.73	5.013	1	26	<.001
ICU Uncaring (8-32)	15.37	3.013	7	24	<.001
ICU Unemotional (5-20)	7.03	2.29	0	15	<.001
PCL:YV Total (0-40)	25.87	7.62	0	38	<.001
PCL:YV Factor 1 Interpersonal (0-8)	6.32	2.24	0	8	<.001
PCL:YV Factor 2 Affective (0-8)	5.70	2.14	0	8	<.001
PCL:YV Factor 3 Life style (0-10)	8.37	2.30	0	10	<.001
PCL:YV Factor 4 Antisocial (0-10)	4.63	1.90	0	10	<.001

n= 195. $\bar{x}$: mean; SD: standard deviation; p (1): bilateral asymptotic significance, Kolmorogov-Smirnov Test; PCL:YV: Psychopathy Checklist: Youth Version; ICU: Inventory of Callous Unemotional Traits.
Source: Own elaboration.

Table 3. Correlation between the assessment instruments administered by third parties.

	ICU Callousness	ICU Uncaring	ICU Unemotional	PCL:YV Total	PCL:YV Factor 1	PCL:YV Factor 2	PCL:YV Factor 3	PCL:YV Factor 4
ICU Callousness	1.000							
ICU Uncaring	0.356 *	1.000						
ICU Unemotional	-0.012	0.397 *	1.000					
PCL:YV Total	0.655 *	0.395 *	0.174 †	1.000				
PCL:YV Factor 1	0.621 *	0.200 *	0.047	0.779 *	1.000			
PCL:YV Factor 2	0.590 *	0.394 *	0.243 *	0.881 *	0.684 *	1.000		
PCL:YV Factor 3	0.680 *	0.272 *	-0.008	0.847 *	0.697 *	0.744 *	1.000	
PCL:YV Factor 4	0.365 *	0.421 *	0.232 *	0.670 *	0.281 *	0.490 *	0.491 *	1.000

Note: Spearman's rank correlation coefficient was used to estimate the correlation. PCL:YV: Psychopathy Checklist: Youth Version; ICU: Inventory of Callous Unemotional Traits.
* Correlation is significant at the 0.01 level (bilateral).
† Correlation is significant at the 0.05 level (bilateral).
Source: Own elaboration.

The professional PCL:YV assessment instrument includes the evaluation of some constructs that can partially overlap with self-administered instruments. Thus, this eventual mechanism was tested, as well as the presence of collinearity, by calculating the correlations between PCL:YV scores and the psychological indicators obtained through self-administered instruments (Table 4). The fact that moderate correlations were found in general suggests the absence of collinearity and that each instrument partially contributes to describing this population.

The individual history of conduct disorders is another relevant indicator that includes noncriminal related behaviors. For determining if a subject had 1 or more conduct disorder, the 15 types established by the DSM5 (13) were considered; in average 8 types of conduct disorders (SD=3.5, range=0-14) were observed in all the subjects included.

Also, under the assumption that bullet wounds and self-harm scars are general indicators of risk behaviors and risk factors, these were considered when analyzing the sample, finding out that 25.6% of the subjects had bullet wounds and 15.4%, self-harm scars.

In addition, since only participants can provide a quantitative estimate of the number of crimes they have committed, they were asked to make an estimate of the number of robberies, homicides, rapes, and assaults they had been involved in. The sum of the crimes informed by them allowed us to create the "amount of committed crimes" variable (mean: 123; SD=283) and the addition of the number of conduct disorders identified in them allowed generating a numerical indicator of "exteriorizing behaviors" with a mean of 131 (SD=284) and a median of 33. After stratifying the sample by the median, it was transformed into a dichotomous variable named "externalization indicator". Finally, a two-stage cluster analysis was carried out using the 2 variables in which a normal distribution was observed (Total BIS-11 and PSM Individual Adaptation) and the "externalization indicator" dichotomous variable. Thus, subjects were classified into 2 clusters: "Impulsive" (n=99) and "Non-impulsive" (n=96) with a correct measurement of cohesion and separation, and centroids for the instruments according to what was expected considering each score (Table 5).

Table 4. Correlations between PCL:YV and self-administered instruments scores.

Scale	PCL:YV Total	Factor 1	Factor 2	Factor 3	Factor 4
CFC proximal	-0.257 *	-0.201 *	-0.239 *	-0.243 *	-0.185
CFC distal	-0.225 *	-0.167 †	-0.160 †	-0.223 *	-0.179 *
CFC total	-0.255 *	-0.205 *	-0.214 *	-0.252 *	-0.181 †
WAI Impulse Control	-0.451 *	-0.312 *	-0.404 *	-0.497 *	-0.368 †
WAI Moderation	-0.535 *	-0.357 *	-0.457 *	-0.570 *	-0.465 *
WAI Aggression Suppression	-0.534 *	-0.351 *	-0.438 *	-0.556 *	-0.475 *
WAI Consideration for others	-0.434 *	-0.542 *	-0.339 *	-0.538 *	-0.139 *
BIS-11 Attentional	0.289 *	0.324 *	0.211 *	0.351 *	0.048
BIS-11 Cognitive	0.008	-0.002	-0.014	0.045	-0.099
BIS-11 Motor	0.018	-0.071	-0.005	-0.079	0.065
BIS-11 Total	0.180 †	0.172 †	0.108	0.194 *	0.020
PSM Self-confidence	-0.189 *	-0.137	-0.153 †	-0.201 *	-0.074
PSM Work	-0.370 *	-0.294 *	-0.258 *	-0.473 *	-0.247
PSM Identity	-0.326 *	-0.238 *	-0.253 *	-0.329 *	-0.153 *
PSM Individual Adaptation	-0.380 *	-0.284 *	-0.286 *	-0.425 *	-0.212 †
RPI Final score	-0.095	-0.035	-0.024	-0.095	-0.158 *

Note. Spearman's rank correlation coefficient was used to estimate the correlation. Factor 1: Interpersonal Item; Factor 2: Affective Item; Factor 3: Behavioral Item; Factor 4: Antisocial Item; CFC: Consideration of Future Consequences Scale; WAI: Weinberg Adjustment Inventory; BIS-11: Barrat Impulsiveness Scale 11; PSM: Psychosocial Maturity Inventory; RPI: Resistance to Peer Influence Questionnaire; PCL:YV: Psychopathy Checklist: Youth Version. CFC proximal: Consideration of future consequences in the immediate future; CFC distal: Consideration of future consequences in the long term (i.e. months or years); CFC total: sum of proximal and distal values.
* The correlation is significant at the 0.01 level (bilateral).
† The correlation is significant at the 0.05 level (bilateral).
Source: Own elaboration.

Table 5. Impulsive and Non-impulsive centroids and clusters

	PSM Individual Adaptation		BIS-11 Total	
	$\bar{x}$	SD	$\bar{x}$	SD
Non-impulsive	6.6	1	60.8	9.4
Impulsive	6.2	1	63.8	9.5

$\bar{x}$: mean; SD: standard deviation; PSM: Psychosocial Maturity Inventory; BIS-11: Barrat Impulsiveness Scale 11.
Source: Own elaboration.

The distribution of vulnerability factors for the socio-family dimension is shown in Table 6. A high percentage of the subjects had lived with their mother, rather than with their father before turning 16 years old; in addition, 28.7% lived with their partners, 22.6% had children and in 32.8% a first degree relative was also imprisoned. Regarding the work conditions of their parents, 25.1% reported they were unaware of their occupation, while 2.7% informed their father was unemployed.

Table 6. Percentage distribution of social indicators.

Indicator	n	%
Lived with the father until turning 16 years old or the age at the time the interview was made	70	35.9
Lived with the mother until turning 16 years old or the age at the time the interview was made	143	73.3
Abuse of alcohol by the father	27 (a)	13.8
Abuse of alcohol by the mother	5	2.6
Abuse of other substances by the father	8 (a)	4.1
Abuse of other substances by the mother	5	2.6
Living with his partner	56	28.7
Had children	44	22.6
1st degree relative imprisoned	64	32.8
Social worker intervention background	55	28.2
Psychologist intervention background	51	26.2
Psychiatric intervention background	13	6.7

Note: "Intervention background" means a professional intervention performed at some time by Court order.
(a) 5% of the subjects did not provide relevant information.
Source: Own elaboration.

Discussion

Several of the findings of the present study allow making a profile of these young people, who are exposed to multiple vulnerabilities and require to be provided with specific health services. Notably, almost 25% had not received any type of education or had not completed the primary education level. Given their average age (17 years) and the vulnerable conditions they are exposed to, which in turn force them to face different socio-economic hardships that make them experience a relative deprivation (64), their deficient cultural development is a hard obstacle to overcome for their successful adaptation into society. This situation is even worse for those with a history of multiple conduct disorders and violent experiences, as evidenced by the high number of subjects in which bullet wounds, self-harm scars and criminal behaviors were observed. Moreover, several indicators show that this population faces serious deficiencies in their family environments. All these vulnerabilities have also been reported in previous studies on Latin American young offenders. (7,9,56,65,66)

This study provides an innovative source of information regarding young murderers and the different constructs related to immaturity in Argentina. From a theoretical point of view, the association between developmental factors and violence is quite relevant and could become an essential input to plan interventions that stimulate and improve the sense of responsibility or the moderation of impulsivity in this population. The measurement of these factors should be considered not only in the initial evaluations of juvenile offenders, but also in post-intervention tests at individual and intra-group variation levels.

Concerning inter-group variation, there are not enough studies conducted in Latin American to compare the results obtained here through the WAI, PSM, and RPI instruments. On the contrary, there is evidence regarding CFC and BIS-11 instruments. The population studied here showed average values that indicate a greater consideration of future consequences and a lower impulsivity, except

for the attention impulsivity indicator (table 4), than the reported by Campagnolo *et al.* (44) in a sample of high school students. Somehow, the data obtained here might be biased by the social desirability of the subjects. When compared with the findings reported by Monahan *et al.* (23), the WAI (mean: 2.52) and RPI (mean: 3.28) results are almost similar in the case of Impulse Control and Suppression of Aggression measurements; on the other hand, lower scores were obtained for the Consideration for Others (mean: 2.25) and higher values for the Resistance to Peer Influence (mean: 3.28).

These differences can be attributed to multiple factors since the population in the study of Monahan *et al.* (23) comprised young people who had committed other types of crimes.

Although some authors suggest to use the three-factor model for performing a professional evaluation through the PCL:YV instrument (67), the four-factor model was used in the present study, since a South American background for the study population was available. (57,68) Findings were moderately high and similar to those reported by studies on young people convicted of several crimes in USA and Canada. (41) Regarding ICU results, average scores were close to minimum values, especially for Callousness and Uncaring scales. Regarding these findings, these scores were similar to those reported by Kimonis *et al.* (42), although a higher average was obtained in the present study for the Uncaring scale (15.37 vs. 9.28). For the two remaining scales, means were very similar, particularly the group profile defined by the minimum score in the Callousness scale (Minimum=1) and the maximum score in the Uncaring scale (Maximum=24); these values show that Uncaring is much more related to having criminal behaviors. Somehow, these results must be interpreted with the same caution than when interpreting those obtained from self-reported instruments.

In general, aggression is a behavior that is triggered by multiple motivations (69) and its externalization influences the characteristics, circumstances and other social conditions of an individual. (64,70) Although such covariates make taxonomic formulation difficult, an empirical classification can be quite useful for the selection of specific targets for making interventions aimed at preventing violent behaviors and stimulating their personal development. The findings of the present study allowed the classification of the sample into two groups: "Impulsive" and "Non-impulsive". It is worth noting that this classification is not related to the attribution of the impulsive genesis to a specific behavior (in this case the homicidal behavior) but to the personality traits and the individual history of dissocial behavior.

The progressive development towards moderation, responsibility, and consideration of the alter ego is part of the typical development of psychosocial maturity during adolescence. Such changes modify the vision of the adolescent's world, make possible the positive effect of legal sanctions, help them to desist from committing crimes (71), and in general young offenders are influenced by the different types of intervention. (72) Therefore, the findings reported here could be useful for reformatory institutions to promote a more favorable influence in this population.

Information on the victim-victimizer relationship and the homicide characteristics (its classification in instrumental or expressive type categories, or whether it occurred within the context of other criminal or peer-conflict actions) would have allowed a deeper analysis of homicidal behavior of the subjects, as well as its comparison with international studies. (73,74) Therefore, this limitation should be considered in future works.

Besides the recommended precautions on the original versions of the instruments (75), it is important to note that they were introduced in Latin America for the dimensional evaluation. Results should be contrasted with subsequent studies that provide further reliability and validity.

Finally, the findings presented here are expected to be useful for professionals who provide health services to young offenders to achieve a more accurate evaluation of each case, and for preventing recidivism, making reformatory institutions more than just a place of confinement.

Conclusions

The young males convicted of murder or attempted murder analyzed here are characterized by multiple vulnerabilities. The identification of two clusters ("Impulsive" and "Non-impulsive") provides health professionals well-founded bases for establishing treatment targets.

Conflicts of interest

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