

# Adverse childhood experiences and delinquent behaviour: Predictors and mediating variables

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## ABSTRACT

**Background:** Adverse childhood experiences (ACEs) have been identified as a risk factor for the development of mental health and behavioural outcomes throughout life, including delinquent behaviours. This article focuses on the relationship between ACEs and delinquent behaviour (DB), seeking to identify predictors and mediating variables. **Methods:** The quantitative study comprised 175 Portuguese adolescents, aged 12 and 17 years of age ( $M = 14.99$ ,  $SD = 2.26$ ). **Results:** ACEs and exposure to traumatic events (ETE) are predictive of DB. Antisocial traits (AT) was found to be mediating the relationship between ACEs and DB, as well as the relation between ETE and DB. **Conclusion:** The results indicate that it is necessary that professionals in health behaviour field prevent and intervene in ACEs and in ETE, both predictors of DB. The results of this study allow to understand the role of ACEs in DB and its mediating variables, which must be considered to mitigate the harmful impact of ACEs in DB.

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**Keywords:** Adverse childhood experiences (ACEs), exposure to traumatic events (ETE), delinquent behaviour (DB), antisocial traits (AT), mediating variables.

## Introduction

Adverse childhood experiences (ACEs) are understood as the experience or early exposure to potentially traumatic events, such as abuse and maltreatment as well as living or growing in an environment that is harmful to the development<sup>1</sup>. The Center of Disease Control and Prevention (CDC)<sup>2</sup> conceptualizes and illustrates the ACEs model through a pyramid, in which the adverse experiences in childhood are represented at the base level, leading to social, emotional and cognitive impairments associated with the increased risk of adopting health risk behaviours and which include delinquent behaviour (DB) and substance use. At the top of the pyramid are illnesses, disabilities and social problems, late in life.

ACEs are highly prevalent between adolescents and young people, with a potential negative impact on their adaptive development and functioning<sup>3,4</sup>. The study of the relationship between ACEs and the health of individuals has shown that ACEs are associated with negative consequences in different dimensions,

including physical, psychological, cognitive, behavioural, social and emotional problems<sup>5-10</sup>. Exposure to traumatic events (ETE) and ACEs also seem to be associated with increased use of health care, substance abuse, psychopathology, lower life satisfaction and risk of suicide<sup>11</sup>.

The literature has been identifying several types of ACEs, from experiencing physical abuse, neglect, exposure to interparental or other violence, family dysfunction, such as parents' mental illness or substance abuse<sup>12</sup>, which tend to co-occur<sup>13</sup>. In this sense, ACEs are considered a cumulative stressor<sup>14</sup> and it has been argued that the unique experience of abuse is often the exception and not the rule<sup>15</sup>. In addition, it has been shown that prior victimization is a strong predictor of continued victimization throughout life<sup>13</sup>.

Juvenile delinquency has also been identified as a common behavioural response to ACEs<sup>14,16</sup>. Although there are several studies that prove the risk of ACEs in the development of various physical, psychological and behavioural problems in adolescence

and adulthood, there is little research that focuses on the potential central role of ACEs in DB<sup>16</sup>. DB can be classified as "acts that violate legal norms and are consensually considered as antisocial and non-social behaviours", being the result of an escalation of antisocial behaviour<sup>17</sup>. The Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> edition<sup>18</sup> (DSM-V) included DB as a Behaviour Disorder (BD). There is empirical evidence connecting aspects of early development such as attachment quality, parental hostility, maternal depression, maltreatment and family conflicts with predisposition to develop DB patterns<sup>19-21</sup>. Emotional problems, sexual abuse and/or physical abuse prevent a healthy development and may trigger negative and adverse feelings, which may promote DB<sup>22</sup>. DB has been considered as a psychosocial developmental disorder, involving biological, behavioural and cognitive variables of the subjects, and contextual, such as family, social and negative adverse experiences, and should be understood in its complexity<sup>23,24</sup>. Although juvenile delinquency may be related to antisocial behaviour, the former can be differentiated from antisocial behaviour considering that antisocial behaviour encompasses behaviours disrespecting others and violating the norms of a given society, without necessarily infringing the current laws<sup>25</sup>. The consumption of psychoactive substances (CPS), namely the illicit drugs (e.g., amphetamines, cannabis, cocaine, heroin, ecstasy, LSD (*Lysergsäurediethylamid*) and hallucinogens)<sup>26</sup>, constituting a very prevalent DB among adolescents, highly vulnerable to substance abuse. CPS is high<sup>27</sup> and abused children tend to develop drug abuse problems<sup>28</sup>. A Portuguese study by Caridade, Martins & Nunes<sup>29</sup> identified a significant percentage of young people (58%) who took on various types of substance use (e.g., tobacco, alcohol and cannabis) very early, coexisting with certain less adequate and functional parenting practices, such as reduced parental supervision and control. A relationship between ACEs and CPS dependence during adolescence and later adulthood is also reported<sup>30,31</sup>. CPS can influence the occurrence of psychopathologies, with greater occurrence in the groups of individuals with multiple CPS<sup>32</sup>.

Research has also shown the capacity for positive integration and normative adjustment of individuals, despite the highly adverse experiences that occurred at an early age<sup>33</sup>. The impact of ACEs is mediated by the individual's way of overcoming or succumbing to adversity, which in turn is influenced by a set of variables inherent to the individual, the characteristics of the household in which it is inserted and the interaction with the surrounding environment<sup>34</sup>. Understanding the role of ACEs in DB thus requires the identification of predictors, as well as the variables that may mediate this relationship.

### Adverse childhood experiences and mediating variables

The literature has shown that the effects of ACEs on the well-being and behavioural outcomes of young people are mediated by several risk and protective factors<sup>35,36</sup>. Among the various variables that have been associated with the multi-causality of ACEs, the age of occurrence of ACEs is identified<sup>3</sup>, but also Social Support (SS)<sup>37-39</sup> or even Antisocial Traits (AT), analysed in the present study.

SS refers to the emotional or practical support given by the family and/or friends in the form of affection, company, care and information contributing to reduce the impact of ACEs<sup>40</sup>. It implies long-lasting patterns of attachment, essential to the physical and psychological integrity of individuals<sup>41</sup>. There is a negative relationship between ACEs and SS, a higher number of ACEs may be associated with less protection and SS<sup>42</sup>. The absence of SS or its reduced effectiveness is still considered a risk factor for CPS and DB<sup>43</sup>. ACEs inflicted by people close to children, such as parents and caregivers, may affect the way the quality of how SS is interpreted in adulthood. Empirical evidence reveals that recall associated with ACEs tends to be connected with a less positive

perception of SS<sup>41-43</sup>. Another study by Brown & Shillington<sup>44</sup> developed from the National Survey of Child and Adolescent Well-Being, with 1054 adolescents, aged 11-17, concluded that protective adult relationships moderated the relationship between ACEs and substance use, but not delinquency. The hypothesis that lower levels of adult protective relationships and the presence of ACEs would be associated with increased substance use was thus confirmed by the authors.

AT is in line with the disruptive BDs<sup>45</sup> characterized by a persistent pattern of difficulty in accepting and complying with rules. AT relate antisocial behaviours such as robberies, lies, fugues, destruction of properties, aggression to people and animals, with school-age prevalence, where hetero-aggressive behaviours predominate and, in turn, during adolescence, where antisocial behaviours predominate<sup>21</sup>. Children or young people with this disorder have little concern for the feelings, wishes, needs and well-being of those around them, with a low tolerance for frustration, high levels of irritability, recklessness and explosive temperament<sup>18</sup>. There are two possible developmental trajectories in AT, the "early onset trajectory", which may arise with the appearance at preschool age, of behaviour problems (disobedience, scream, beat), and may progress in school age for more aggressive and non-aggressive behaviours (stealing, lying, cheating), and for aggravated adolescence symptoms (interpersonal violence and crimes against property), which may encompass wider contexts such as the community. The "late-onset trajectory" relates behaviours only arising during adolescence. When behaviours arise according to the first trajectory, frequency and severity tend to worsen over time, whereas when behaviours appear according to the second trajectory, there seems to be a more favourable prognosis<sup>46</sup>.

Studies have pointed out that some of the conditions contributing to the AT etiology are related to ineffective parental practices, deficits in family dynamics, influences of deviant peers, and low school connection or poor school performance<sup>47,48</sup>. Parental involvement in school activities is identified as a promising strategy for increasing students' educational results and social functioning, as demonstrated by the Portuguese study developed by Caridade, Dinis, Sani, Nunes & Azevedo<sup>49</sup> with 333 Portuguese school personnel. The authors found that 80% of the professionals rating student's general behaviour as bad, also rated parental involvement as poor.

Another explanation to AT is given by the theory of social learning, expressing that subjects who have been victims of abuse and/or exposure to violence are more likely to develop aggressive behaviour in the future, reproducing the experiences of family violence during child abuse, thus contributing in order that maltreatment in childhood will perpetuate abuse in adult life<sup>50</sup>.

### Current study

The relationship between ACEs and subsequent DB has been understudied in Portugal. The mechanisms by which ACEs confer risk for specific problems are also largely unknown. The analysis and understanding of the mediating variables of the relationship between ACEs and DB is extremely important to mitigate the negative effects associated with ACEs and to better sustain intervention practices in this area. This study aims to understand if ACEs are related to DB (including CPS), seeking to identify predictors and explore the role of AT and SS as possible mediating variables, in Portuguese adolescents. The following hypotheses are investigated:

**Hypothesis 1:** Adolescents who experience any individual ACEs will be more likely to report DB (including CPS).

**Hypothesis 2:** ACEs are expected to be a predictor of DB (including CPS) in adolescence, with AT and SS as mediating variables.

**Hypothesis 3:** ETE is expected to be a predictor of DB (including CPS), with AT and SS as mediating variables.

## Methods

### Participants

The sample size was determined using Software G\*Power 3.1.9. The sample consisted of 175 participants, 60 (34.3%) were students of two different grouping of schools of Portugal, and 115 (65.7%) attended two professional schools of the same municipality. Of the total number of young people, 97 (55.4%) are males and 78 (44.6%) are females. The mean age of the sample is 15 years old and age varies between 12 and 17 years old. With regard to schooling, the average is 9.19 years, corresponding to the 9<sup>th</sup> grade ( $SD = 1.34$ ), between the 6<sup>th</sup> and the 11<sup>th</sup> grades. 123 (70.3%) live at home with both parents, 27 (15.4%) live at home with the mother, 16 (3.0%) are in another situation, corresponding to living at home with grandparents or close relatives, 4 (2.3%) reside with the father and 5 (2.9%) live in a host institution. Relating the father's schooling, 81 (46.8%) reported primary education, 62 (35.8%) reported 4<sup>th</sup> grade or less, 19 (11.0%) secondary or professional education, and 11 (6.4%) higher education. Concerning the mother's schooling, 76 (43.4%) indicated elementary education, 50 (28.6%) the 4<sup>th</sup> grade or less, 28 (16%) secondary or professional education, and 21 (12%) higher education.

### Procedures

As inclusion criteria, adolescents, aged between 12 and 17 years old, of both genders, attending regular or professional education in the district of Porto, Portugal, were selected and, as exclusion criteria the selection included all participants under CPS, unable to complete the instruments, as well as children or young people presenting some type of cognitive deficit, or other disorder or physical condition preventing the proper understanding and/or correct completion of the questionnaires.

For the accomplishment of this study and data collection, authorization was requested from the Education Guardians/Legal Representatives, previously collecting informed consent as a means of obtaining permission for the child/youth to participate in the study, respecting the anonymity and confidentiality of the data, in accordance with the ethical procedures for the proper conduct of the research. The study has been conducted in accordance with the Declaration of Helsinki and its latest revision.

Data collection was performed in a single time date between April and June 2018. Procedures involved in the collection and processing of data were in accordance with the Personal Data Protection Law No. 67/98 of October 26<sup>st</sup> and Deliberation No. 227/2007 of May 28<sup>st</sup>, as well as the Deontological Code of the Order of Portuguese Psychologists<sup>53</sup>.

### Materials

**Sociodemographic questionnaire.** It assesses the variables age, gender, marital status, level of schooling, monthly family income, residence situation, household members, occupational situation, level of schooling of the father and mother

**Adverse Childhood Experiences and Exposure to Traumatic Events.** Childhood History Questionnaire<sup>54</sup>, composed of 38 dichotomous and multiple-choice questions. Assesses 3 categories: experiences against the child or young person, dysfunctional family environment and neglect and is quoted through the calculation of Total Adversity, being 0 points for absence of adversity and 1 point for the presence of adversity;

**Life Events Checklist-5<sup>35</sup>,** adapted to young people, being a self-response checklist, depicts potentially traumatic life events, being divided into two parts: consisting of 14 events, in which the answers can be being "happened", "I saw it happen", "I knew it happened", "I'm not sure", "does not apply" and a part consisting of 9 semi-open

answer questions related to an event that the participant considers to have been the worst experienced, when applicable;

**Delinquent Behaviour and Consumption of Psychoactive Substances.** Adapted Self-reported Delinquency Scale<sup>56</sup> is a self-response measuring the involvement of adolescents in illegal and antisocial activities and consumption of psychoactive substances. It was adapted for this study, consisting of 11 items, with a Likert-type response scale.

**Antisocial Traits.** Antisocial Process Screening Device (APSD-SR)<sup>57</sup>, a multidimensional psychometric measure specifically designed to assess psychopathic traits in adolescents. It consists of 20 items, quoted on an ordinal scale of 3 points assessing 3 factors, traits-callous / non-emotional, narcissism and impulsivity, with higher scores indicating characteristics associated with each factor.

**Social Support.** Multidimensional Scale of Perceived Social Support<sup>58</sup>, built to measure satisfaction with perceived social support. It is a self-report instrument composed of 12 items, assessing satisfaction with perceived social support in 3 dimensions, namely (a) significant figure ( $n = 4$ ); (b) family ( $n = 4$ ) and (c) friends ( $n = 4$ ), in which the subject should indicate the degree of agreement for each of the statement (if applicable), on a 6-position Likert scale. The total score for the scale can vary between 12 and 72, corresponding to higher scores, a perception of greater social support.

### Statistical analysis

Statistical Program for Social Sciences (SPSS-26) was used for statistical analysis, including descriptive statistical analyses, allowing the synthesis of the data of the sample through a single value, and inferential statistical analyses, allowing to test the hypotheses under study.

A Pearson correlation analysis to explore the relationship between the variables under study, namely ACEs, ETE, DB, AT and SS, was performed. The analyses of hierarchical regression were also carried out, aiming to explore a possible mediating effect between SS, ACEs and DB (including CPS) and SS, ETE and DB (including CPS). The possible mediation relationship between AT, ACEs and DB (including CPS), as well as between AT, ETE and DB (including CPS) was also explored. In order to test mediation between variables, the model 4 of SPSS command Process v3.4<sup>59</sup>, was used, a more robust way to deal with mediation, according to a growing literature body.

## Results

### Descriptive analysis of variables

It is possible to observe that of the total number of participants ( $n = 175$ ), 113 (66.5%) experienced at least one ACEs (Table 1).

Concerning ETE, participants related one or more exposure (Table 2).

In respect to DB ( $M = 1.95$ ,  $SD = 2.68$ ), the results did not show a recurrent practice of this type of behaviour, however, regarding AT ( $M = 10.20$ ,  $SD = 4.84$ ), the results seem to lead in the sense of the practice or adoption of behaviours encompassed by this problem. In relation to SS ( $M = 62.70$ ,  $SD = 9.28$ ), the results in the 3 subscales reveal that the participants have and perceive support figures (Table 3).

### Relationship between ACEs and DB: predictors and mediating variables

The correlations between the main variables of the study are presented in Table 4. It can be verified that all variables are statistically correlated with each other.

A linear regression analysis was performed to test the predictors of DB (including CPS). The results obtained (Table 5) show that all

Table 1. Results of Adverse Childhood Experience (ACEs) scale and assessed dimensions

Dimension	n (%)	
Total adverse childhood experiences (ACEs)	113	(66.5)
Emotional abuse	30	(17.1)
Physical abuse	17	(9.8)
Sexual abuse	14	(8.1)
Emotional neglect	45	(26.0)
Physical neglect	34	(19.5)
Divorced or separated parents	37	(21.1)
Exposure to domestic violence	16	(9.1)
Parents or other family with consumption of psychoactive substances (CPS)	30	(17.1)
Family member with a mental disorder or committing suicide	34	(19.4)
Arrested family member	11	(6.3)

Table 2. Results of Exposure to Traumatic Events (ETE) questionnaire

Traumatic event	n (%)		M
Exposure to some type of natural disaster	86	(49.4)	.49
Experienced or heard of a close family member or close friend who had been exposed to a fire or explosion	106	(60.6)	.61
Exposure to a transport accident	110	(64.0)	.64
Suffered and/or were exposed to a major accident at school, at home or during a recreational activity	96	(55.2)	.55
Exposure to physical aggression	86	(49.1)	.49
Exposed or heard of someone close who had suffered gun-aggression	50	(28.6)	.29
Exposure to sexual aggression	32	(18.6)	.19
Exposure to another uncomfortable or unwanted sexual experience	35	(20.0)	.20
Experienced life-threatening illness or injury	91	(52.0)	.52
Exposure to severe human suffering	55	(31.8)	.32
Exposure to sudden violent death	51	(29.1)	.29
Exposure to unexpected accidental death	73	(42.0)	.42
Caused or heard of someone close to them who caused pain, injury, serious injury or death to another person	54	(30.9)	.31
Exposure to another extremely stressful event or experience	39	(22.3)	.22

Table 3. Mean and standard deviation of the quality variables

Variables	n (%)	M	SD	Sample		Instrument	
				Min	Max	Min	Max
Total adverse childhood experiences (ACEs)	171	14.6	13.66	.00	61.00		
Total delinquent behaviour (DB)	174	1.95	2.68	.00	13.00	0.00	22.00
Total antisocial traits (AT)	175	10.20	4.84	1.00	29.00	0.00	40.00
Total social support (SS)	175	62.70	9.28	12.00	72.00	12.00	72.00
Subscale significant figure	175	21.63	3.58	4.00	24.00	4.00	24.00
Subscale family	175	21.06	4.00	4.00	24.00	4.00	24.00
Subscale friend	175	20.00	3.70	4.00	24.00	4.00	24.00

independent variables considered are individually predictors of DB (including CPS). The variable AT are the one that explains more of the variance of DB, 30%. ACEs can explain 12.3%, ETE 8.3% and SS 3.7% of the variance. When considered all these variables together in a multi regression model, ETE was not significant. The best significant model obtained have the ACEs, AT, SS and age as predictors variables, and can explain more that each of them individually, 43.3% variance of DB,  $F(4, 163) = 31.06, p < .001$ .

In order to test mediating effects between variables, the model 4 of SPSS command Process v3.4<sup>59</sup>, was used:

The results of SS as mediating the relationship between ACEs and DB (including CPS) show no mediating effect. There is a

significant total effect of ACEs to DB ( $B = .0686, SE = .0141, p < .001$ ) and also a significant and similar direct effect ( $B = .0694, SE = .0170, p < .001$ ), but a not significant indirect effect ( $B = -.009, \text{Bootstrap } 95\% \text{ CI} = [-.0226, .0189], \text{BootStrapSE} = .0102$ ).

The results of AT as mediating the relationship between ACEs and DB (including CPS) show that it occurs in a full mediating effect, as the ACEs and DB (including CPS) relationship does not exist in presence of AT variable. Results give a significant total effect of ACEs to DB ( $B = .0686, SE = .0141, p < .001$ ) but a not significant direct effect ( $B = .0249, SE = .0142, p = .0808$ ), but there is a significant indirect effect ( $B = .0437, \text{Bootstrap } 95\% \text{ CI} = [.0205, .0709], \text{BootStrapSE} = .0131$ ), resulting in a full mediating

**Table 4.** Correlation between social support (SS), exposure to traumatic events (ETE), adverse childhood experiences (ACEs), delinquent behaviour (DB), antisocial traits (AT) and Age.

Variables	1	2	3	4	5
1. Social support (SS)	-				
2. Exposure to Traumatic events (ETE)	.223**	-			
3. Adverse childhood experiences (ACEs)	-.553***	.231**	-		
4. Delinquent behaviour (DB)	-.193*	.289***	.351***	-	
5. Antisocial traits (AT)	-.410***	.209**	.459***	.548***	-
6. Age	-.203**	.170*	.173*	.442**	.205*

Note. The DB variable includes the CPS variable.

The number of participants available for each correlation ranged from 166 to 175.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

**Table 5.** Linear regression analysis between variables with significative correlations

Model Variable					
Predictor	Dependent	R2	B	$\beta$	t
Adverse childhood experiences (ACEs)	Delinquent behaviour (DB)	.123***	.069	.351	4.851***
Antisocial traits (AT)	Delinquent behaviour (DB)	.300***	.302	.548	8.589***
Social support (SS)	Delinquent behaviour (DB)	.037*	-.056	-.193	-2.581*
Exposure to Traumatic events (ETE)	Delinquent behaviour (DB)	.076***	.461	.275	3.674***
Age	Delinquent behaviour (DB)	.195***	.731	.442	6.421***
Adverse childhood experiences (ACEs)			.034	.171	2.297*
Antisocial traits (AT)	Delinquent behaviour (DB)	.433***	.254	.463	6.764***
Social support (SS)			.047	.164	2.264*
Age			.572	.347	5.711***

Notes. The DB variable includes the CPS variable.

The number of participants available for each correlation ranged from 166 to 175.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

effect. The variable AT can capture almost 2/3 of the significant relationship of ACEs and DB (effect  $B = .0686$  drops to  $B = .0437$  in presence of AT).

The results of SS as mediating the relationship between ETE and DB (including CPS) show no mediating effect. There is a significant total effect of ETE to DB ( $B = .4544$ ,  $SE = .1227$ ,  $p = .003$ ) also a significant direct effect ( $B = .3931$ ,  $SE = .1340$ ,  $p = .0038$ ), but a not significant indirect effect ( $B = .0613$ , Bootstrap 95%  $CI = [-.0431, .1969]$ , BootstrapSE = .0602).

The results of AT as mediating the relationship between ETE and DB (including CPS) show that it occurs in a full mediating effect. Results give a significant total effect of ETE to DB ( $B = .4544$ ,  $SE = .1227$ ,  $p = .003$ ) but a not significant direct effect ( $B = .1547$ ,  $SE = .1142$ ,  $p = .1774$ ), but as there is a significant indirect effect ( $B = .2998$ , Bootstrap 95%  $CI = [.1245, .5163]$ , BootstrapSE = .0999), resulting in a full mediation. The variable AT can capture almost 2/3 of the significant relationship of ETE and DB (effect  $B = .4544$  drops to  $B = .2998$  in presence of AT).

## Discussion

After analysing the results, and relating the hypothesis 1, regarding the existence of an association between the main variables, the results were statistically significant, indicating a positive correlation between the 3 main variables: ACEs, ETE, and AT. This result predicts that adolescents exposed to ACEs, as well as to ETE, tend to present a greater predisposition regarding the practice of DB (including CPS), which is corroborated by the literature on this subject<sup>6,7,10,28</sup>. Regardless of the form and type of ACE and/or ETE,

consequences can be diverse, significantly affecting the physical, social, behavioural, emotional and cognitive development of the subjects<sup>6</sup>. Thus, DB may function as a strategy in attempting to adapt and socialize in repressive contexts<sup>60</sup>. The relationship between the CPS and DB can also be explained, given that CPS can be considered as a facilitator or motivator of delinquent and violent actions, with the aggravation of association with groups of deviant peers<sup>61</sup>. It should be considered that adolescence is a phase of discovery and experimentation of personal and social boundaries<sup>62</sup>, reason why this relation should not be considered as of cause-and-effect.

Regarding the hypothesis 2, the exploration of the association between ACEs as a predictor of DB (including CPS) and AT and SS as mediating variables, was partially confirmed. In fact, it is observed that ACEs are predictive of the DB (including CPS), an expected result, considering what is reported in the literature<sup>11,19,20</sup>. Accordingly, the DB can be better explained in cases where the subjects experienced some type of adversity, since the DB is associated with intense psychological suffering, such as depression, anxious symptomatology and low self-esteem<sup>23</sup>, which are connected with the ACEs<sup>5,7,9,10</sup>. In respect to the second part of the hypothesis 2, namely if AT and SS played the role of mediators between the independent variable ACEs and the dependent variable DB (including CPS), only AT showed to be a total mediator of this relation. SS did not have any effect when included in the hierarchical regression model. This result is corroborated by the literature as a possible consequence of exposure to ACEs, to the extent that adversity can exert on the individual and on the development of his personality, a distorted view of the world and the interactions

that surround it<sup>63</sup>. In turn, and given that AT is also associated with DB<sup>48,64</sup>, there is a mediating effect of AT in the relationship between ACEs and DB (including CPS). In this sense, AT can evolve into more serious typologies in adolescence and, extended to other contexts such as school and the community, being congruent with what is expected in the practice of DB<sup>21,25,46,48,49,64</sup>. The SS variable did not exert any mediating effect influence on the relationship between the ACEs and the DB (including CPS), oppositely to what the literature reports, i.e., SS did not function as an amortization factor for the consequences of ACEs and, in turn, in the practice of DB. This result can be explained, given that in the genesis of ACEs are often acts practiced by figures of support and trust, particularly those close to the subject, such as parents or caregivers, often influencing the way the quality of SS is interpreted<sup>37</sup>. The sample of this study relates children and young people, particularly in the adolescence phase, and thus, SS at this stage may not play the expected role, compared to other samples, which are not at risk. Since adolescence is a phase of development involving contextual and social changes, the perception of SS can be particularly difficult for young people exposed to ACEs<sup>63</sup>.

Finally, in regard to hypothesis 3, having as mediating variables the AT and SS: ETE is a predictor of DB (including CPS) as theoretically expected<sup>19-21</sup>. Concerning AT as mediator of this relationship, a full mediating effect was verified, as expected<sup>50,65,66</sup>. In fact, some studies<sup>50,67</sup> point out that subjects who have been victims of abuse and/or exposure to violence are more likely to develop aggressive behaviour in the future, reproducing the experiences of family violence during child abuse. Furthermore, there is also a high co-morbidity between AT, hyperactivity disorder and attention deficit, anxiety, depression, mood and substance use<sup>65,66</sup>. Regarding the SS variable, the mediating effect between ETE and the DB (including CPS) does not exist, revealing that SS does not seem to exert an influence on the recovery of ETE in children and youths, similar to what happens with ACEs. It is important to clarify that, if traumatic events involve close relations, the perception of this SS is distorted, with feelings of threat, danger and insecurity, both relating the subject and also relating the relationships with others, which is understandable in cases where the subjects were abused by relatives or close friends. It may be the family and close friends who do not carry out the necessary SS to the victim, avoiding to talk about the event, leading them to be interpreted as not caring, which may result in distorted cognitive trust schemes<sup>63</sup>.

### Limitations

The study has some limitations. The results cannot be inferred to the Portuguese general population, since the small sample is limited to a geographical area of Portugal, Porto. In addition, the present study involved university students, not involving a clinical sample, which should be considered in future studies. Because no longitudinal assessment was carried out, a linear cause-and-effect relationship between the independent and the dependent variables should not be established. Future studies should extend the sample to other Portuguese geographical areas, opting by a longitudinal design, analysing if victims develop AT and how it may or may not evolve to DB.

### Conclusions

Although ACEs and traumatic events appear as important predictors of delinquency throughout life, there are children and adolescents with ACEs who develop behavioural pathways of greater adaptation and resilience. Understanding the variables that mediate ACEs and their impact on the behaviour of adolescents is essential for the design of intervention policies and strategies

aiming to combat DB. This study proves to be particularly useful as it allows identifying the mediating variables, AT and SS, of the relationship between ACEs, ETE and DB (including CPS), assisting the practice of professionals who operate in the field of adolescents' healthy behaviour, namely in terms of mitigating the consequences associated with ACEs. Efforts to prevent delinquency should, therefore, include the group of young people who early demonstrate antisocial and DB, given their greater risk for the development of future forms of social maladaptation.

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### References

1. Boullier M, Blair M. Adverse childhood experiences. *Paediatr Child Health*. 2018;28(3):132-7.
2. Center of Disease Control and Prevention. Adverse childhood experiences presentation graphics 2012 [Available from: <https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/ace-graphics.html>].
3. Jackson AM, Deye K. Aspects of abuse: consequences of childhood victimization. *Curr Probl Pediatr Adolesc Health Care*. 2015;45(3):86-93.
4. Logan-Greene P, Semanchin Jones A. Chronic neglect and aggression/delinquency: A longitudinal examination. *Child Abuse Negl*. 2015;45:9-20.
5. Campbell KA, Telford SR, Cook LJ, Waitzman NJ, Keenan HT. Medicaid Expenditures for Children Remaining at Home After a First Finding of Child Maltreatment. *Pediatrics*. 2016;138(3).
6. Holt S, Buckley H, Whelan S. The impact of exposure to domestic violence on children and young people: a review of the literature. *Child Abuse Negl*. 2008;32(8):797-810.
7. Teixeira CAB, Lasiuk G, Barton S, Fernandes MNE, Gherardi-Donato E. An exploration of addiction in adults experiencing early-life stress: a metasynthesis. *Rev Latino-Am Enfermagem*. 2017;25:e2939.
8. Pereira FG, Viana MC. A exposição a experiências adversas na infância é um fator de risco para o desenvolvimento de doenças e agravos à saúde na vida adulta? [Is exposure to adverse experiences in childhood a risk factor for the development of diseases and health problems in adult life?]. *Revista Brasileira de Pesquisa em Saúde/Brazilian Journal of Health Research*. 2015;17(1):4-5.
9. Pinto VCP, Alves JFC, Maia AC. Adversidade na infância prediz sintomas depressivos e tentativas de suicídio em mulheres adultas portuguesas [Adversity in childhood predicts depressive symptoms and suicide attempts in adult Portuguese women]. *Estudos de Psicologia (Campinas)*. 2015;32(4):617-25.
10. Wegman HL, Stetler C. A meta-analytic review of the effects of childhood abuse on medical outcomes in adulthood. *Psychosom Med*. 2009;71(8):805-12.
11. Silva FM, Mota CP. Vinculação aos pais, adversidade na infância e desenvolvimento de psicopatologia [Attachment to parents, adverse childhood experiences and psychopathology]. *Arquivos Brasileiros de Psicologia*. 2018;70(1):175-92.
12. Nurius PS, Green S, Logan-Greene P, Borja S. Life course pathways of adverse childhood experiences toward adult psychological well-being: A stress process analysis. *Child Abuse Negl*. 2015;45:143-53.
13. Finkelhor D, Ormrod RK, Turner HA. Polyvictimization and trauma in a national longitudinal cohort. *Dev Psychopathol*. 2007;19(1):149-66.

14. Leban L, Gibson CL. The role of gender in the relationship between adverse childhood experiences and delinquency and substance use in adolescence. *J Crim Justice*. 2020;66: 101637.
15. Scott-Storey K. Cumulative abuse: do things add up? An evaluation of the conceptualization, operationalization, and methodological approaches in the study of the phenomenon of cumulative abuse. *Trauma Violence Abus*. 2011;12(3):135-50.
16. Jones MS, Pierce H. Early Exposure to Adverse Childhood Experiences and Youth Delinquent Behavior in Fragile Families. *Youth Soc*. 2020.
17. Ferreira PMJS, problemas e práticas. Controlo e identidade: a não conformidade durante a adolescência [Control and Identity: Non-compliance during adolescence]. *Sociologia, problemas e práticas*. 2000(33):55-85.
18. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-V). Arlington, VA: American Psychiatric Association Publishing; 2013.
19. Aguilar B, Sroufe LA, Egeland B, Carlson E. Distinguishing the early-onset/persistent and adolescence-onset antisocial behavior types: from birth to 16 years. *Dev Psychopathol*. 2000;12(2):109-32.
20. Lemos IT. Risco psicossocial e psicopatologia em adolescentes com percurso delinvente [Psychosocial risk and psychopathology in adolescents with delinquent course]. *Análise Psicológica*. 2012;28(1):117-32.
21. Nardi FL, Hauck Filho N, Dell'Aglio DD. Preditores do Comportamento Antissocial em Adolescentes [Predictors of antisocial behavior in adolescents]. *Psicologia: Teoria e Pesquisa*. 2016;32(1):63-70.
22. Benda BB. The Robustness of Self-Control in Relation to Form of Delinquency. *Youth Soc*. 2005;36(4):418-44.
23. Benavente R. Delinquência juvenil: Da disfunção social à psicopatologia [Juvenile Delinquency: From social dysfunction to psychopathology]. *Análise Psicológica*. 2002;20(4):637-45.
24. Laranjeira CA. A análise psicossocial do jovem delinvente: uma revisão da literatura [Psychosocial analyses of the young delinquent: a literature review]. *Psicologia em Estudo*. 2007;12(2):221-7.
25. Henriques BM. Comportamento Antissocial na Infância e Adolescência [Antisocial Behavior in Childhood and Adolescence]. *International Journal of Developmental and Educational Psychology Revista INFAD de Psicologia*. 2016;4(1).
26. SICAD. Intervention Service in Additive Behaviours and Dependencies. 2018 [Available from: <http://www.sicad.pt/PT/Cidadao/SubstanciasPicoativas/Paginas/detalhe.aspx?itemId=19>].
27. São Martinho S, Moura A, Freitas D, Martins AM, Silvestre AR, Negreiros J. Community intervention: assessment of parental training of a family prevention programme of substance use and associated risk behaviours. *Univ Psychol*. 2017;16(2).
28. Garbin CAS, Queiroz APDDg, Roviada TAS, Saliba O. A violência familiar sofrida na infância: uma investigação com adolescentes [Domestic violence experienced in infancy: an investigation in adolescents]. *Psicologia em Revista*. 2012;18(1):108-18.
29. Caridade SMM, Martins AC, Nunes L. Estilo de vida dos adolescentes e jovens adultos e comportamentos desviantes e delinquentes: Das vivências familiares, escolares e individuais [Adolescents' and young adults' lifestyle and deviant and delinquent behaviors: From family, school, and individual experiences]. *Revista Portuguesa de Investigação Comportamental e Social*. 2019;5(1):40-60.
30. Foa EB, Asnaani A, Zang Y, Capaldi S, Yeh R. Psychometrics of the Child PTSD Symptom Scale for DSM-5 for Trauma-Exposed Children and Adolescents. *J Clin Child Adolesc Psychol*. 2018;47(1):38-46.
31. Pedras S, Pereira MdG. Experiências adversas, trauma, TEPT e comportamentos de risco na população e em veteranos de guerra [Adverse experiences, trauma, PTSD and risk behaviors in population and war veterans]. *Temas em Psicologia*. 2013;21(1):139-50.
32. Silva CRd, Kolling NdM, Carvalho JCN, Cunha SMd, Kristensen CH. Comorbidade psiquiátrica em dependentes de cocaína/crack e alcoolistas: um estudo exploratório [Psychiatric comorbidity on cocaine/crack-dependent and alcoholics: an exploratory study] *Aletheia*. 2009;30:101-12.
33. DuMont KA, Widom CS, Czaja SJ. Predictors of resilience in abused and neglected children grown-up: the role of individual and neighborhood characteristics. *Child Abuse Negl*. 2007;31(3):255-74.
34. Rutter M. Resilience as a dynamic concept. *Dev Psychopathol*. 2012;24(2):335-44.
35. Hambrick EP, Rubens SL, Brawner TW, Taussig HN. Do sleep problems mediate the link between adverse childhood experiences and delinquency in preadolescent children in foster care? *J Child Psychol Psychiatry*. 2018;59(2):140-9.
36. Moore KA, N. Ramirez A. Adverse Childhood Experience and Adolescent Well-being: Do Protective Factors Matter? *Child Indic Res*. 2015;9(2):299-316.
37. Taylor SE. Social Support: A Review. In: Friedman HS, editor. *The Oxford Handbook of Health Psychology*. Oxford Handbooks Online: Oxford University Press; 2011.
38. Festinger T, Baker A. Prevalence of recalled childhood emotional abuse among child welfare staff and related well-being factors. *Child Youth Serv Rev*. 2010;32(4):520-6.
39. Frederick J, Goddard C. Living on an island: consequences of childhood abuse, attachment disruption and adversity in later life. *Child Fam Soc Work*. 2008;13(3):300-10.
40. Aragão EIS, Vieira SS, Alves MGG, Santos AF. Suporte social e estresse: uma revisão da literatura [Social support and stress: A literature review]. *Psicologia em foco*. 2009;2(1):79-90.
41. Campos EP. Suporte social e família [Family and social support]. *Doença e família*. São Paulo: Casa do Psicólogo; 2004. p. 141-61.
42. Maia AC, Seabra A. Experiências adversas, comportamentos de risco, queixas de saúde e preocupações modernas de saúde em universitários: Uma comparação entre diferentes licenciaturas [Adverse experiences, health risk behaviour, subjective health complaints and modern health concerns in college students: A comparison between different degrees]. *Psicologia, Saúde & Doenças*. 2007;8(2):167-80.
43. Rosário A. Avaliação de instrumentos que investigam o abuso de álcool e outras drogas em adolescentes: revisão de literatura [Assessment of instruments that investigate the abuse of alcohol and other drugs in adolescents: literature review] [Master]. São Paulo: Faculdade de Medicina da Universidade de São Paulo; 2011.
44. Brown SM, Shillington AM. Childhood adversity and the risk of substance use and delinquency: The role of protective adult relationships. *Child Abuse Negl*. 2017;63:211-21.
45. Homem TC, Gaspar MF, Santos MJS, Azevedo AF, Canavarro MC. A pilot study with the incredible years parenting training: does it work for fathers of preschoolers with oppositional behavior symptoms? *Fathering: A Journal of Theory, Research & Practice about Men as Fathers*. 2014;12(3):262-82.
46. Frick PJ, Viding E. Antisocial behavior from a developmental psychopathology perspective. *Dev Psychopathol*. 2009;21(4):1111-31.
47. Dandreaux DM, Frick PJ. Developmental pathways to conduct problems: a further test of the childhood and adolescent-onset distinction. *J Abnorm Child Psychol*. 2009;37(3):375-85.
48. Rosando A. Perturbações do comportamento na infância e adolescência: uma revisão da literatura [Behavior disorders in children and adolescents: A literature review]. *Revista de Psicologia da Criança e do Adolescente*. 2013;4(1):117-27.
49. Caridade S, Dinis MAP, Sani A, Nunes LM, Azevedo V. School personnel perception of parental involvement and students' behavior problems: Practical implications. *Educ Urban Soc*. 2020.
50. Duarte J. Experiências Adversas na Infância e Violência nas Relações de Intimidade: O Papel Mediador da Regulação Emocional [Adverse Experiences in Childhood and Violence in Intimacy Relations: the Mediator Role of Emotional Regulation] [Master]. Porto: Universidade Lusófona do Porto; 2015.
51. Lei n.º 67/98 de 26 de outubro de 1998. Lei da Proteção de Dados Pessoais [Law No. 67/98 of 26 October of 1998. Personal Data Protection Law], *Diário da República n.º 247/1998, Série I-A de 1998-10-26, (1998)*.
52. Deliberação n.º 67/98 de 28 de maio de 2007. Aplicável aos tratamentos de dados pessoais efectuados no âmbito de estudos de investigação científica na área da saúde [Deliberation No. 67/98 of 28 May of 2007. Applicable to the processing of personal data carried out in the context of studies scientific research in health], *National Commission for Data Protection, (2007)*.
53. Order of Portuguese Psychologists. Código Deontológico da Ordem dos Psicólogos Portugueses [Deontological Code of the Order of Portuguese Psychologists]: Ordem dos Psicólogos Portugueses; 2016 [Available from: [https://www.ordemdospsicologos.pt/pt/cod\\_deontologico](https://www.ordemdospsicologos.pt/pt/cod_deontologico)].

54. Silva S, Maia A, editors. Versão portuguesa do Family ACE Questionnaire [Portuguese version of Family ACE Questionnaire]. XIII Conferência Internacional de Avaliação Psicológica: Formas e Contextos; 2008; Braga. Braga: Psiquilibrios.
55. Correia-Santos P, Morgado D, Jongenelen I, Maia Â, Pinto R. Lista de Acontecimentos de Vida para DSM-5 [Life Events Checklist for DSM-5]. 2015.
56. Carroll A, Durkin K, Houghton S, Hattie J. An Adaptation of Mak's Self-reported Delinquency Scale for Western Australian Adolescents. *Aust J Psychol.* 1996;48(1):1-7.
57. Pechorro P, Maroco J, Poiães C, Vieira RX. Validation of the portuguese version of the antisocial process screening device-self-report with a focus on delinquent behavior and behavior problems. *Int J Offender Ther Comp Criminol.* 2013;57(1):112-26.
58. Carvalho S, Pinto-Gouveia J, Pimentel P, Maia D, Mota-Pereira J. Características psicométricas da versão portuguesa da Escala Multidimensional de Suporte Social Percebido (Multidimensional Scale of Perceived Social Support - MSPSS) [[Psychometric characteristics of the Portuguese version of the Multidimensional Scale of Perceived Social Support - MSPSS]. *Psychologica.* 2011(54):331-57.
59. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach: Guilford Press; 2018.
60. Knutson JF, DeGarmo DS, Reid JB. Social disadvantage and neglectful parenting as precursors to the development of antisocial and aggressive child behavior: Testing a theoretical model. *Aggressive Behav.* 2004;30(3):187-205.
61. Lühring G, Gauer G, Vasconcelos S, Davoglio T, Silva L, Navarrete S. Correlação entre traços de psicopatia e abuso de drogas em uma amostra de adolescentes brasileiros em conflito com a lei [Correlation between traits of psychopathy and drug abuse in a sample of Brazilian teenagers in conflict with the law]. *Revista Saúde e Desenvolvimento Humano.* 2014;2(1):29-39.
62. Malta DC, Porto DL, Melo FC, Monteiro RA, Sardinha LM, Lessa BH. Family and the protection from use of tobacco, alcohol, and drugs in adolescents, National School Health Survey [Family and the protection from use of tobacco, alcohol, and drugs in adolescents, National School Health Survey]. *Revista Brasileira de Epidemiologia.* 2011;14 Suppl 1:166-77.
63. Pinto RJ, Morgado D, Reis S, Monteiro R, Levendosky A, Jongenelen I. When social support is not enough: Trauma and PTSD symptoms in a risk-sample of adolescents. *Child Abuse Negl.* 2017;72:110-9.
64. Biederman J, Petty CR, Dolan C, Hughes S, Mick E, Monuteaux MC, et al. The long-term longitudinal course of oppositional defiant disorder and conduct disorder in ADHD boys: findings from a controlled 10-year prospective longitudinal follow-up study. *Psychol Med.* 2008;38(7):1027-36.
65. Bordin IAS, Offord DR. Transtorno da conduta e comportamento anti-social [Conduct disorder and antisocial behaviour]. *Rev Bras Psiquiatr.* 2000;22(suppl 2):12-5.
66. Fernandes E, António JP. Perturbação de hiperactividade com défice de atenção [Hyperactive attention deficit disorder]. *Revista portuguesa de medicina geral e familiar.* 2004;20(4):451-4.
67. Faias J, Caridade S, Cardoso J. Exposição à violência familiar e abuso íntimo em jovens: Que relação? [Exposure to family violence and dating violence: What relationship?]. *Psychologica.* 2017;59(1):7-23.