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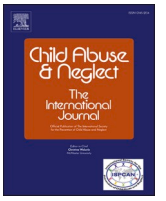

Adverse childhood experiences and aggression in adulthood: The moderating role of positive childhood experiences

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ABSTRACT

Background: Adverse childhood experiences (ACEs) have a significant impact on a person's psychological development and predispose them to various harmful consequences in adulthood, such as different forms of aggression. Contrarily, positive childhood experiences (PCEs) operate as protective factors, buffering against the adverse effects of ACEs and promoting adaptive behaviors and psychological well-being. However, the role of PCEs in the relationship between ACEs and aggression remains relatively unexplored.

Objective: To explore the moderation role of PCEs in the relationship between ACEs and aggression and its different components across sexes in a community sample.

Methods: A sample of 1541 Portuguese adults answered an online protocol with a sociodemographic questionnaire, the Benevolent Childhood Experiences Scale, the Childhood History Questionnaire, and the Buss-Perry Aggression Questionnaire.

Results: ACEs were positively correlated with aggression, including physical and verbal aggression, anger, and hostility, with women reporting a higher prevalence of ACEs and higher levels of anger. Men revealed higher scores in physical and verbal aggression. Furthermore, moderation analyses clarified the moderating effect of PCEs on the relationship between ACEs and aggression in women and between ACEs and anger in both sexes. PCEs attenuate the adverse impact of ACEs, reducing aggression and anger levels.

Conclusions: This study stresses the complex interplay between childhood experiences and adult aggression, highlighting the differential effects of ACEs and PCEs across men and women. By clarifying these dynamics, interventions can be tailored to bolster protective factors like PCEs. This will ultimately foster healthier developmental trajectories and reduce the prevalence of aggression in adulthood.

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1. Introduction

Childhood experiences are fundamental to people's social, cognitive, and emotional development (Morris et al., 2021). During this period, children go through their first noteworthy experiences and modulate their personalities (Schouw et al., 2020). These experiences can be categorized as positive or adverse, each assembling varying effects on physical and mental health (Lee et al., 2022) and impacting the development of aggression in adulthood differently (Crandall et al., 2019; Khodabandeh et al., 2018; Kowalski et al., 2022).

According to the US Centers for Disease Control and Prevention (2014), adverse childhood experiences (ACEs) are considered a public health matter and can be described as negative experiences (Narayan et al., 2021; Navarro et al., 2022) in different social contexts (Rodriguez et al., 2021), that occur during the child's developmental stages (Narayan et al., 2021). ACEs can take various forms and harm a child's well-being. These experiences can be direct, such as childhood maltreatment, including sexual, emotional, and physical abuse or neglect (Novais et al., 2021). They can also be indirect and come from problematic living environments surrounding the child, such as exposure to parental divorce (Daines et al., 2021), interparental violence, or having a family member with a substance use disorder (Navarro et al., 2022; Novais et al., 2021). Despite the considerably high rates of ACEs among adults, women are overrepresented in this group (e.g., Bryant et al., 2020; Merrick et al., 2018). Comparative to men, women tend to report more ACEs and more experiences of emotional, physical, and sexual abuse and neglect (e.g., Martin et al., 2023).

ACEs are often linked with a range of adverse outcomes in adulthood, including poor mental health, such as stress, anxiety, depression, and post-traumatic stress disorder (PTSD; Ross et al., 2020), physical health problems, such as chronic diseases (Ross et al., 2020), diabetes (Anda et al., 2010), and reduced life expectancy (Felitti et al., 1998). In addition, ACEs have been proven to be linked with impaired self-regulation (Weissman et al., 2019) and poor relational (Khodabandeh et al., 2018) and coping skills (McLafferty et al., 2019). These difficulties can lead to increased emotional reactivity, expanding the chances of engaging in aggressive behavioral responses (Brodbeck et al., 2022; Roberton et al., 2012; Sullivan et al., 2010). Studies point to higher odds of engaging in these types of behavior in individuals who experience four or more ACEs (Crandall et al., 2019), as well as an increased probability of experiencing childhood revictimization due to the lack of emotional regulation and coping skills leading to externalized and internalized behaviors, making them more vulnerable to negative experiences in the future (Dvir et al., 2014), doubling the odds when the victim is female (Yapp et al., 2021). Indeed, sex differences in the effects of ACEs have been well-documented in the literature. For example, women who report ACEs are at greater risk for depression and anxiety than men (e.g., Whitaker et al., 2021). Moreover, differences in how individuals experience and respond to adversity have also been observed: Boys often exhibit more external forms of aggression (Im et al., 2018), while girls typically use more indirect forms, such as spreading rumors and social ostracism, starting just before their school years (Padgett & Tremblay, 2020). Social norms and cultural expectations that shape a child's behavior (e.g., Tarsha & Narvaez, 2019) are identified as factors that may explain these sex differences.

On the other hand, some children also come across positive childhood experiences (PCEs), for instance, having a safe caregiver, a close friend, or a predictable routine (Doom et al., 2021), that have been shown to improve mental health (Almeida et al., 2023a, 2023b; Crandall et al., 2019; Crandall et al., 2020). A study confirmed maternal responsiveness during childhood secures positive adulthood outcomes, enhancing prosocial behaviors (Bonell et al., 2016; Tarsha & Narvaez, 2019) and diminishing violent behaviors (Tarsha & Narvaez, 2019). This study supports several findings regarding the PCEs' buffer effect in overcoming difficulties caused by ACEs (Crandall et al., 2019; Karatzias et al., 2020; Kuhar & Kocjan, 2021). PCEs can neutralize ACEs' effects, moderating their symptoms (Crandall et al., 2019), diminishing health issues (e.g., stress, depression, PTSD; Narayan et al., 2018) and risk behaviors (Tarsha & Narvaez, 2019). It was also found that individuals who experienced PCEs develop better self-esteem (Xia et al., 2022) and emotional regulation skills (Rollins & Crandall, 2021), which can help them manage their emotions and reduce the likelihood of engaging in aggressive behavior (Garofalo et al., 2020).

Cultural issues play an important role in individual development. The cultural background in which a child is raised shapes their life experiences as it influences parental and caregiver practices (Bornstein, 2012). However, most studies on childhood experiences, both positive (e.g., Han et al., 2023) and negative (e.g., Hughes et al., 2017), have been conducted in the United States (US), with fewer studies from other regions. For example, research from Western European countries remains scarce. Given these countries' unique social and economic contexts, conducting studies in Western Europe, such as in Portugal, is crucial.

Portugal is a Western European country with a culture similar to Spain, Italy, and Greece (Dias et al., 2015), but it is conceptualized as a collectivist society. The countries' ethnic composition is quite homogeneous, with most of the population being ethnically Portuguese. However, the 21st century has seen increased ethnic diversity due to waves of immigrants from former colonies in Africa and Asia and, more recently, from Brazil. Despite being one of the oldest countries in Europe, Portugal achieved political stability only in 1974, after the end of a fascist regime (Aluh et al., 2022). During this regime, women were primary targets of discrimination and violence by men (Santos, 2022), and children also experienced these adversities, either by exposure or by being victimized themselves (Santos, 2022). This led to the normalization of violence among children, perpetuated through subsequent generations (Lomazzi, 2023). Some of these values and beliefs persist in the Portuguese population (Aluh et al., 2022). However, comparative data reveals no significant differences between Portugal and other North American or European countries regarding ACEs self-reporting. A study by Dias et al. (2015) found lower rates of sexual and physical abuse in Portugal compared to the US and Germany, while rates of emotional abuse were similar between Portugal and the US. Additionally, no significant differences were found between Portugal and the Netherlands for emotional, sexual, and physical abuse, as well as emotional neglect. The only difference was physical neglect, with Portuguese individuals reporting less physical neglect than the Dutch.

1.1. Adverse childhood experiences, positive childhood experiences, and aggression

Research shows that individuals who experienced ACEs are more likely to reveal aggression problems in adulthood (Burke et al., 2022; Felitti et al., 1998; Mumford et al., 2019), which can happen due to the impact of childhood adversity during the development phases, specifically on the emotional regulation, altering the brain's stress response system and increasing the chances of engaging in aggressiveness to cope with stressful events (Heim & Nemeroff, 2001). Aggression is a reaction with adverse effects on others (Buss, 1961) that can be expressed in several forms, such as anger (Bryant & Smith, 2001; Dolejš et al., 2016), hostility (cognitive, and emotional components), verbal aggression, physical aggression (instrumental or motor components of behavior) (Bryant & Smith, 2001) or violence (Dolejš et al., 2016). Aggression is a risk factor for aggressive behavior (Cruz et al., 2019) and antisocial behavior (Ruddle et al., 2017). ACEs increase the likelihood of engaging in impulsive and reactive forms of aggression (e.g., physical altercations, verbal outbursts) when compared to those who did not experience childhood adversity, who tend to choose more proactive and premeditated actions, usually to achieve a specific goal (Farrington, 2007).

Other studies also mention that ACEs affect proactive and reactive aggression (McRae et al., 2021), and physical aggressiveness is related to the number of ACEs (Samardzić et al., 2010). Sex appears to have a significant role in aggression, with studies pointing to sex differences concerning aggressive reactions. Women tend to show more anger and passive aggression, and men more aggressiveness than women in physical aggression (Hofmann & Müller, 2020). Physical aggression is usually related to impulsiveness, and hostility is typically more common in anxious and depressed individuals (Dolejš et al., 2016). Other studies also mention that aggression is related to low tolerance to frustration and difficulties in emotion regulation (Miller et al., 2019). These findings highlight the damaging role of ACEs in shaping later aggression and the urgent need for intervention and support in a child's first years of life (Dvir et al., 2014). However, ACEs can be counter-acted by PCEs, which also play a fundamental role in adjusting risk behaviors (Chester, 2017), portraying the importance of PCEs in reducing unfavorable outcomes following ACEs (Crandall et al., 2019; Kuhar & Kocjan, 2021).

Therefore, childhood experiences play a crucial role in the development of psychopathology. The Developmental Psychopathology Perspective (DPP; Toth & Cicchetti, 2013) suggests that childhood maltreatment cannot be evaluated from a static point of view, i.e., that adulthood functioning does not derive solely from risk factors but rather from childhood adversity together with multiple environmental factors (e.g., biological, genetical, psychological, social) interacting over time. This means that adversity in early life can alter the course of normal development and increase the risk of psychopathology and aggression. However, protective factors (e.g., supportive environment, positive relationships, well-established coping strategies) can mitigate the impact of adversity and promote positive adaptation (Toth & Cicchetti, 2013). In addition, this perspective also supports the argument that the impact of ACEs can be variable, as some individuals experience different outcomes later in life (e.g., depression, personality disorders, antisocial behavior). However, some individuals do not develop problematic behaviors or psychopathology, which accentuates the need to develop and evaluate new prevention and intervention models (Toth & Cicchetti, 2013). Overall, the DPP highlights the importance of considering the complexity of risk and protective factors when considering the development of aggression and other mental health issues. By taking a DPP, there is a higher possibility for researchers to understand better the etiology of these problems and the propensity of specific risk groups and, therefore, develop more effective interventions and prevention strategies to stop these children from developing maladaptive processes in adulthood (Toth & Cicchetti, 2013).

Some studies have shown that children who grew up in supportive and nurturing environments can develop social skills (Luecken et al., 2013) and resilience (Crouch et al., 2021) and improve intentional self-regulation (Rollins & Crandall, 2021), earning protective factors against stress (Hou et al., 2022) and frustration (Violato & Arato, 2004). Additionally, PCEs can also influence one's self-esteem, confidence, and a sense of control of their life, contributing to a more positive self-concept and achievement of goals through non-violent means (i.e., positive coping mechanisms and emotional regulation), reducing the likelihood of these individuals to develop aggression (Bonell et al., 2016).

1.2. The present study

According to DPP, childhood experiences significantly influence an individual's development, emphasizing the interaction of early adversity and several environmental factors over time (Toth & Cicchetti, 2013). ACEs can play an essential role in aggression in adulthood (e.g., Burke et al., 2022; Mumford et al., 2019; Oliveira et al., 2023). Although some research suggests that women who reported more PCEs tend to enroll in less aggressiveness, demonstrating that PCEs are protective factors against aggression (Pro et al., 2020), few studies have, however, examined the impact of PCEs on aggression and the potential differences between men and women. In Portugal, as previously mentioned, as far as we know, no studies have examined the role of PCEs in the link between ACEs and aggression. Considering that culture plays a significant role in individuals' development (Tarsha & Narvaez, 2019) and the cultural specificities of this Western European country, the present study extends previous research on this topic. Thus, this study aims to explore the moderating role of PCEs in the relationship between ACEs and aggression and its different components (i.e., physical aggression, verbal aggression, anger, and hostility) in a sample of Portuguese male and female adults from the community. Therefore, consistent with previous studies, it was hypothesized that the PCEs would moderate the relationship between ACEs and aggression and its components.

2. Method

2.1. Participants

The study comprised 1541 Portuguese participants from the community (461 male and 1080 female), aged between 18 and 77 years of age ($M = 31.43$, $SD = 14.56$). Most participants are Caucasian ($n = 1439$, 93.4 %), single ($n = 991$, 64.3 %), and are professionally active ($n = 790$, 51.3 %). Most completed secondary education ($n = 965$, 62.6 %) and described a medium socioeconomic level ($n = 860$, 55.8 %). Thirteen (0.8 %) were convicted of a crime. Detailed information about participants' sociodemographic characteristics is presented in Table 1.

2.2. Measures

A **Sociodemographic Questionnaire** was used to collect sociodemographic information, such as sex, age, nationality, ethnicity, education level, marital status, and criminal convictions.

The **Benevolent Childhood Experiences Scale** (BCEs; Narayan et al., 2018; Portuguese version Almeida et al., 2021) is a self-report scale composed of 10 items to assess positive and supportive experiences from birth to 18 years of age. The positive experiences include internal and external safety and security, supportive relationships, and a positive and predictable quality of life. The Portuguese version revealed good psychometric properties ($\alpha = 0.68$). In this sample, the internal consistency was also 0.68.

The **Childhood History Questionnaire – Short version** (ACE; Felitti et al., 1998; Portuguese version Pinto et al., 2014) is a self-report measure to assess childhood adversity before 16 years of age. It comprises 17 items, assessing 10 factors: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, parental separation or divorce, exposure to domestic violence, household substance abuse, mental illness or suicide, and incarcerated household members. The presence of ACEs is considered if the participant answers in the affirmative to at least one question. The total adversity results from the sum of each 10 factors. The Portuguese version showed an internal consistency value of 0.88. In this sample, the internal consistency was also 0.84.

The **Buss-Perry Aggression Questionnaire – Short Form** (BPAQ-SF; Bryant & Smith, 2001; Portuguese version Cunha et al., 2021) is a 12-item self-report instrument consisting of a short version of the BPAQ (Buss & Perry, 1992). Items are answered on a 5-point Likert-type scale from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me) and organized into four scales of three items each: physical aggression, verbal aggression, anger, and hostility. The higher the score, the higher the level of aggression. Both the original and the Portuguese version showed good psychometric properties. In this sample, the internal consistency was 0.87 for the total scale, 0.71 for physical aggression, 0.72 for verbal aggression, 0.72 for anger, and 0.74 for hostility.

2.3. Procedure

The present study uses a cross-sectional design with a convenience sample. The sample was recruited online through a Google Forms survey. The study was disseminated by e-mail (e.g., researchers' contacts, universities/institutional mailing lists) and social networks (e.g., LinkedIn, Facebook). Male and female individuals over 18 years old were invited to complete the survey. Before completing the questionnaires, all the participants signed an electronic informed consent.

Participation in the study was voluntary and anonymous (i.e., no personal information was collected), with no financial compensation or incentives being granted to the participants. All the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013) were followed. The Egas Moniz School of Health & Science Institutional Review Board approved the research.

Table 1
Sociodemographic and juridical characterization ($n = 1541$).

	n	%
Sex		
Male	461	29.9
Female	1080	70.1
Education		
Until 4th grade	4	0.3
Until 6th grade	13	0.8
Until 9th grade	94	6.1
Until 12th grade	965	62.6
Graduation	381	24.7
Master	81	5.3
PhD	3	0.2
Marital status		
Single	991	64.3
Married/cohabitation	451	29.3
Separated/divorced	82	5.3
Widow	17	1.1

2.4. Statistical analysis

The statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software, version 29.0. Descriptive statistics were used to characterize the sample and main variables. Pearson correlation coefficients were computed to analyze the correlation between ACEs, PCEs, and aggression and its components. *t*-tests were used to compare the main variables by sex, and Chi-Squared tests were used to analyze the associations between the prevalence of ACEs and sex. The moderating role of PCEs (W) in the link between the ACEs and aggression and its different components was tested using simple moderation analyses by sex with Process Model 1 (Hayes, 2022). Process Model 1 enables testing the conditional effect (i.e., the effect of one variable on another, conditioned on a third or interaction) by estimating the effect of X on Y at a certain point (or points) along the moderator and testing whether this effect is significant.

3. Results

3.1. Descriptive analyses

Analyzing the prevalence of ACEs, results revealed that 68.33 % (n = 1053) of the participants reported at least one ACEs. Emotional abuse (EA; n = 539, 35 %) was the most reported type of ACE, followed by emotional neglect (EN; n = 527, 34.2 %). Physical neglect (PN) was the type of ACEs reported less (n = 137, 8.9 %). Regarding PCEs, almost all the participants reported at least one positive experience in childhood (n = 1539, 99 %), with a mean average of 8.76 (SD = 1.64). Participants revealed an average of 23.91 (SD = 8.49) for total aggression, 4.46 (SD = 2.23) for physical aggression, 5.85 (SD = 2.45) for verbal aggression, 6.46 (SD = 2.76) for anger, and 7.14 (SD = 3.03) for hostility. Results are presented in Table 2.

3.2. Comparison analyses

Chi-squared tests were performed to test the associations between the prevalence of ACEs and sex. Results showed statistically significant differences between sex in emotional abuse, $\chi^2(1) = 11.640$, $p < .001$, sexual abuse, $\chi^2(1) = 17.667$, $p < .001$, emotional neglect, $\chi^2(1) = 18.400$, $p < .001$, exposure to domestic violence, $\chi^2(1) = 7.962$, $p = .005$, substance abuse of a family member, $\chi^2(1) = 13.536$, $p < .001$, mental disorder/suicide of a family member, $\chi^2(1) = 27.434$, $p < .001$, and total ACEs, $\chi^2(1) = 15.587$, $p < .001$ (cf. Table 3). Women reported a higher prevalence of ACEs than men.

t-tests were performed to analyze differences between sexes in total ACEs (sum scores), PCEs, and aggression and its components. Results revealed differences between men and women on ACEs total scores, $t(1539) = -4.957$, $p < .001$, physical aggression, $t(1539) = 8.463$, $p < .001$, verbal aggression, $t(1539) = 2.299$, $p = .022$, and anger, $t(422) = -2.285$, $p = .022$ (cf. Table 3). Women reported the highest scores on ACEs regarding total scores and anger, while men reported the highest scores on physical and verbal aggression.

3.3. Correlation analyses

Tables 4 and 5 present the correlation analyses for men and women between ACEs (total score), PCEs, and aggression and its components. Results revealed that both for men and women, ACEs were positively correlated with total aggression, physical and verbal

Table 2
Frequencies of Adverse Childhood Experiences (ACEs) and Descriptive of ACEs, Positive Childhood Experiences (PCEs) and Aggression (n = 1541).

	n	%
Adverse Childhood Experiences	1053	68.3
Emotional Abuse	539	35.0
Physical Abuse	382	24.8
Sexual Abuse	165	10.7
Emotional Neglect	527	34.2
Physical Neglect	137	8.9
Parental Divorce/Separation	415	26.9
Exposure to Domestic Violence	231	15.0
Family Substance Abuse	279	18.1
Family Mental Disorder	349	22.6
Prison of a Family Member	142	9.2
PCE	1539	99.9
	M (*SD*)	Min - Max
Adverse Childhood Experiences	2.05 (2.16)	0–10
Positive Childhood Experiences	8.76 (1.64)	0–10
Aggression	23.91 (8.49)	12–60
Physical aggression	4.46 (2.23)	3–15
Verbal aggression	5.85 (2.45)	3–15
Anger	6.46 (2.76)	3–15
Hostility	7.14 (2.76)	3–15

Table 3
Comparison Analysis between Women and Men in ACEs, PCEs and Aggression ($n = 1541$).

	Women ($n = 1080$) *n* (%)	Men ($n = 461$) *n* (%)	χ^2	*p*	*Cramer's' V*	
ACEs	771 (71.4)	282 (61.2)	15.587	<0.001	0.101	
EA	407 (37.7)	132 (28.6)	11.640	<0.001	0.087	
PA	273 (25.3)	109 (23.6)	0.462	0.496	0.017	
SA	139 (12.9)	26 (5.6)	17.667	<0.001	0.107	
EN	406 (37.6)	121 (26.2)	18.480	<0.001	0.110	
PN	99 (9.2)	38 (8.2)	0.340	0.560	0.015	
PD	292 (27.0)	123 (26.7)	0.021	0.885	0.004	
EDV	180 (16.7)	51 (11.1)	7.962	0.005	0.072	
FSA	221 (20.5)	58 (12.6)	13.536	<0.001	0.094	
FMD	284 (26.3)	65 (14.1)	27.434	<0.001	0.133	
PFM	109 (10.1)	33 (7.2)	3.325	0.068	0.046	
	Women ($n = 1080$) *M (SD)*	Men ($n = 461$) *M (SD)*	*t*	*p*	CI	*d*
ACEs	2.23 (2.22)	1.64 (1.95)	−4.957	<0.001	[−0.83, −0.36]	0.276
PCEs	8.80 (1.66)	8.67 (1.59)	−1.415	0.157	[−0.31, 0.05]	0.079
Aggression	23.71 (8.28)	24.38 (8.96)	1.418	0.156	[−0.26, 1.60]	0.079
PA	4.15 (1.98)	5.18 (2.57)	8.463	<0.001	[0.79, 1.26]	0.471
VA	5.75 (2.39)	6.07 (2.58)	2.299	0.022	[0.05, 0.58]	0.128
Ang	6.57 (2.76)	6.21 (2.77)	−2.285	0.022	[−0.65, −0.05]	0.127
Host	7.24 (3.06)	6.92 (2.92)	−1.888	0.059	[−0.65, −0.05]	0.105

Note. ACEs = Adverse Childhood Experiences; EA = Emotional Abuse; PA = Physical Abuse; SA = Sexual Abuse; EN = Emotional Neglect; PN = Physical Neglect; PD = Parental Divorce/Separation; EDV = Exposure to Domestic Violence; FSA = Family Substance Abuse; FMD = Family Mental Disorder; PFM = Prison of a Family Member; PCEs = Positive Childhood Experiences; PA = Physical Aggression; VA = Verbal Aggression; Ang = Anger; Host = Hostility.

Table 4
Correlation Analysis between Adverse Childhood Experiences, Aggression, and Positive Childhood Experiences for Women ($n = 1080$).

	1	2	3	4	5	6
1. ACEs	1					
2. Aggression	0.292***	1				
3. PA	0.210***	0.726***	1			
4. VA	0.188***	0.826***	0.546***	1		
5. Ang	0.215***	0.864***	0.526***	0.656***	1	
6. Host	0.314***	0.809***	0.414***	0.505***	0.581***	
7. PCEs	−0.445***	−0.254***	−0.214***	−0.132***	−0.166***	−0.295***

Note. ACEs = Adverse Childhood Experiences; PA = Physical Aggression; VA = Verbal Aggression; Ang = Anger; Host = Hostility; PCEs = Positive Childhood Experiences.
**$p < .01$; ***$p < .001$.

Table 5
Correlation Analysis between Adverse Childhood Experiences, Aggression, and Positive Childhood Experiences for Men ($n = 461$).

	1	2	3	4	5	6
1. ACEs	1					
2. Aggression	0.174***	1				
3. PA	0.177***	0.802***	1			
4. VA	0.108*	0.837***	0.583***	1		
5. Ang	0.140**	0.876***	0.625***	0.685***	1	
6. Host	0.147**	0.790***	0.469***	0.519***	0.580***	
7. PCEs	−0.309***	−0.146**	−0.154***	−0.096*	−0.120*	−0.114*

Note. ACEs = Adverse Childhood Experiences; PA = Physical Aggression; VA = Verbal Aggression; Ang = Anger; Host = Hostility; PCEs = Positive Childhood Experiences.
**$p < .01$; ***$p < .001$.

aggression, anger, and hostility, and PCEs were negatively correlated with ACEs, total aggression, physical aggression, anger, and hostility.

3.4. Moderation analyses

Moderation models were used to test whether PCEs moderated the effect of ACEs on aggression and its components by sex. Table 6

Table 6
Effects of ACEs at the Values of PCEs on the Outcomes (Total Aggression, Physical Aggression, Verbal Aggression, Anger, and Hostility).

	b	SE	*t*	*p*	95 % CI
Men ($n = 461$)					
Total Aggression					
ACEs	2.45	1.03	2.3676	0.018	0.42, 4.48
PCEs	−0.12	0.38	−0.3079	0.758	−0.86, 0.63
Interaction	−0.22	0.12	−1.7713	0.077	−0.46, 0.02
Physical aggression					
ACEs	0.53	0.30	1.7987	0.073	−0.05, 1.12
PCEs	−0.09	0.11	−0.8252	0.410	−0.31, 0.12
Interaction	−0.04	0.04	−1.1808	0.238	−0.11, 0.03
Verbal aggression					
ACEs	0.29	0.30	0.9732	0.331	−0.30, 0.89
PCEs	−0.07	0.11	−0.6019	0.548	−0.29, 0.15
Interaction	−0.02	0.04	−0.6012	0.548	−0.09, 0.05
Anger					
ACEs	0.81	0.32	2.5092	0.012	0.17, 1.44
PCEs	0.02	0.12	0.1566	0.876	−0.21, 0.25
Interaction	−0.08	0.04	−2.0479	0.041	−0.15, −0.00
Hostility					
ACEs	0.81	0.34	2.3915	0.017	0.14, 1.48
PCEs	0.02	0.12	0.1725	0.863	−0.22, 0.27
Interaction	−0.08	0.04	−1.8848	0.060	−0.16, 0.00
Women ($n = 1080$)					
Total Aggression					
ACEs	−0.50	0.54	−0.9286	0.353	−1.55, 0.56
PCEs	−1.30	0.25	−5.1034	<0.001	−1.79, −0.79
Interaction	0.16	0.06	2.5524	0.011	0.04, 0.28
Physical aggression					
ACEs	0.00	0.13	0.0137	0.989	−0.26, 0.26
PCEs	−0.23	0.06	−3.6888	<0.000	−0.35, −0.11
Interaction	0.02	0.02	0.9881	0.323	−0.01, 0.05
Verbal aggression					
ACEs	−0.07	0.16	−0.4167	0.677	−0.38, 0.25
PCEs	−0.18	0.08	−2.4013	0.017	−0.33, −0.03
Interaction	0.03	0.02	1.5269	0.127	−0.01, 0.07
Anger					
ACEs	−0.38	0.18	−2.0650	0.039	−0.74, −0.02
PCEs	−0.38	0.09	−4.3475	<0.001	−0.55, −0.21
Interaction	0.07	0.02	3.3363	<0.001	0.03, 0.11
Hostility					
ACEs	−0.05	0.20	−0.2747	0.784	−0.44, 0.33
PCEs	−0.50	0.09	−5.4374	<0.001	−0.68, −0.32
Interaction	0.04	0.02	1.9407	0.053	−0.00, 0.09

summarizes the results of the moderations.

Only one significant interaction was found for men, namely between ACEs and PCEs in predicting anger ($b = -0.09$, SE = 0.04, $t = -2.0479$, $p = .041$). However, ACEs were related to a decrease in anger only at PCE values below 7 (see Fig. 1A). For women, significant interactions were found between ACEs and PCEs in predicting total aggression ($b = 0.16$, SE = 0.06, $t = 2.5524$, $p = .011$) and anger ($b = 0.07$, SE = 0.02, $t = 3.3363$, $p < .001$). Results revealed that ACEs were related to a decrease both in total aggression and anger at low/medium (BCE total score below 7) and high PCEs (BCE total score below 10; see Fig. 1B and C).

4. Discussion

The present study aims to identify whether PCEs moderate the effect of ACEs on aggression and its components by sex in a sample from the community. Regarding the prevalence of ACEs, this research revealed that more than half (68.33 %) of the total sample reported at least one experience. This rate is similar to those found in the US (Swedo et al., 2023) but higher than the prevalences reported in a meta-analysis of 546,458 adults from 22 countries (Madigan et al., 2023). Among all types of ACEs, our results showed that emotional abuse was the most reported, followed by emotional neglect. These findings align with prior studies conducted both among Portuguese participants (e.g., Dias et al., 2015) and international samples (Giano et al., 2020), which identified emotional abuse and emotional neglect as the most common types of ACEs reported. The discrepancies between studies and countries may be related to methodological issues and cultural factors that influence individuals' experiences and parental and caregiver practices (Bornstein, 2012). Indeed, as previously mentioned, in Portugal, women and children experienced higher levels of violence for many years (Santos, 2022), which can result in normalizing violence, thereby continuing the cycle across generations (Lomazzi, 2023).

In addition, our results showed that women tend to have a higher prevalence of ACEs than men. This finding aligns with previous studies that have found a higher prevalence of ACEs among women compared to men, particularly for sexual abuse, exposure to

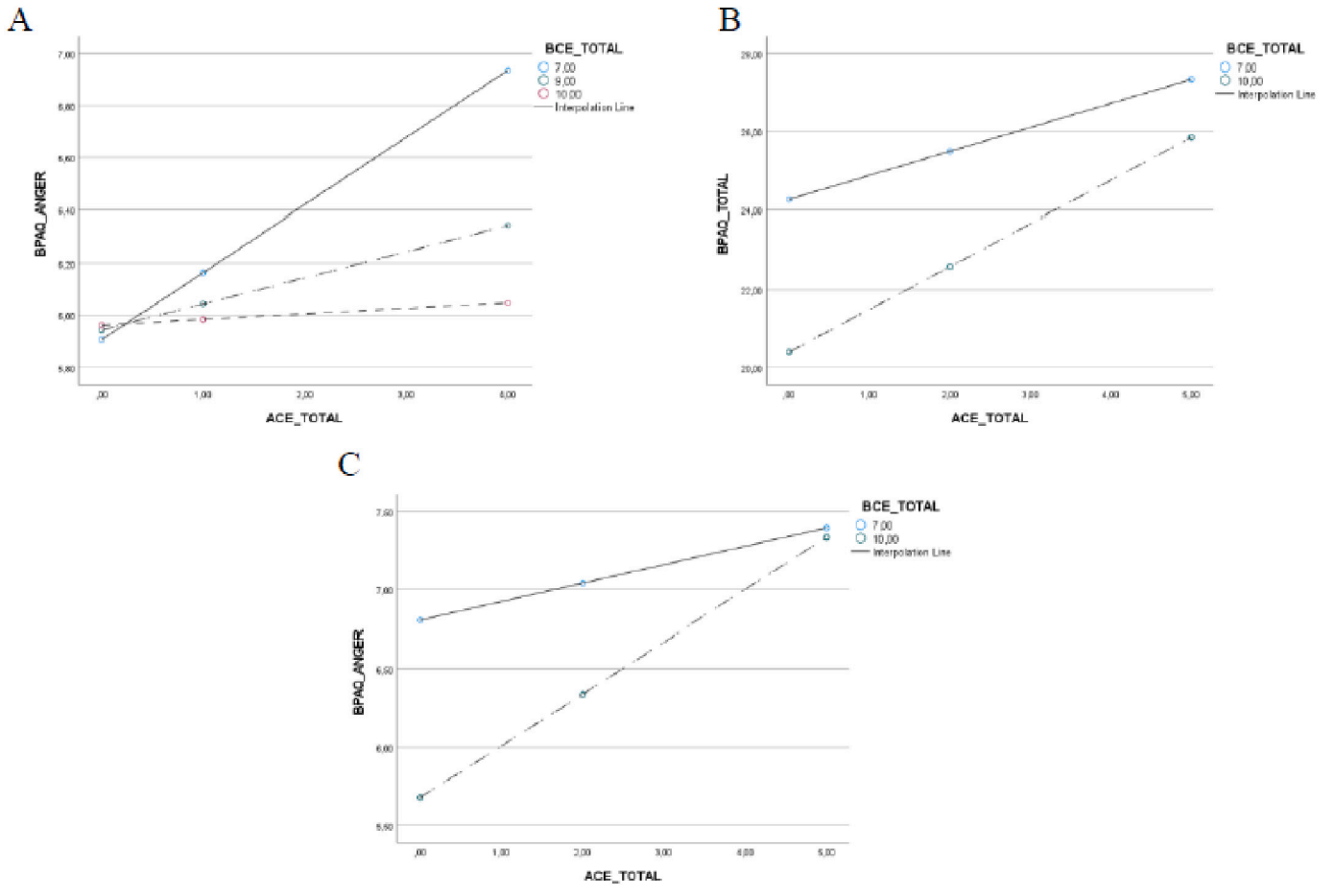

Fig. 1. A. Interaction between Adverse Childhood Experiences (ACE TOTAL) and Positive Childhood Experiences (BCE Total) for predicting Anger (BPAQ ANGER) among men. BCE Total 7: $b = 0.257$, SE $= 0.082$, $t = 3.134$, $p = .002$; BCE Total 9: $b = 0.100$, SE $= 0.075$, $t = 1.339$, $p = .181$; BCE Total 10: $b = 0.022$, SE $= 0.097$, $t = 0.221$, $p = .825$.
B. Interaction between Adverse Childhood Experiences (ACE TOTAL) and Positive Childhood Experiences (BCE Total) for predicting Total Aggression (BPAQ TOTAL) among women. BCE Total 7: $b = 0.614$, SE $= 0.148$, $t = 4.161$, $p < .001$; BCE Total 10: $b = 1.091$, SE $= 0.154$, $t = 7.073$, $p < .001$.
C. Interaction between Adverse Childhood Experiences (ACE TOTAL) and Positive Childhood Experiences (BCE Total) for predicting Anger (BPAQ ANGER) among women. BCE Total 7: $b = 0.118$, SE $= 0.051$, $t = 2.339$, $p = .020$; BCE Total 10: $b = 0.331$, SE $= 0.053$, $t = 6.280$, $p < .001$.

domestic violence, household substance abuse, and household mental illness (Bryant et al., 2020; Giano et al., 2020; Martin et al., 2023; Merrick et al., 2018). One possible explanation for these results is that girls tend to spend more time at home compared to boys, who spend more time in community environments, increasing the risk of abuse from family members (e.g., Fagan & Wright, 2012). Another explanation anchored on the historical background. As women have been the most victimized group (Santos, 2022), this contributes to a higher legitimation and normalization of violence against them (Lomazzi, 2023), which may explain the higher rates of ACEs reported by them. Nonetheless, previous research has suggested that women may be more willing to report some types of ACEs, such as sexual abuse (Finkelhor, 2019; Strine et al., 2012) and that variation in responses on trauma-related topics may occur due to the sensitive nature of questions (Curran et al., 2016). Thus, more research is needed to investigate the reasons for the higher prevalence of ACEs among women than men.

There is already a large body of literature on the relationship between ACEs and adverse outcomes in adulthood. However, it is essential to note that some children who have experienced ACEs grow into healthy adults, which tends to indicate the presence of protective factors throughout childhood development (Luo et al., 2024), such as PCEs. Our research revealed that most participants reported at least one PCEs throughout childhood, a similar rate to those found in previous studies conducted in Portugal (Almeida et al., 2021; Almeida et al., 2023a). The literature mentions that PCEs occur more often than negative ones (Daines et al., 2021). Other studies corroborate the results of this research, revealing that PCEs were highly prevalent (Almeida et al., 2021).

Regarding aggression and its components, our participants revealed, in general, results similar to those found in the general population (Cunha et al., 2021), except for hostility, in which they presented higher scores. Curiously, the levels of hostility found in our study are closer to those found in a sample of Portuguese male intimate partner violence perpetrators (Cunha et al., 2021). These high levels of hostility might be explained by the high prevalence of ACEs among our sample, as literature has documented a relationship between ACEs and hostility (e.g., Oliveira et al., 2023), as well as found in the present study. As hostility is described as the overt expression of animosity or antagonism in action, feeling, or attitude (American Psychological Association [APA], 2018), it is unsurprising that individuals exposed to ACEs also tend to present higher hostility. Sex differences were also found concerning aggression components. Thus, women revealed higher scores on anger, while men exhibited higher levels of physical and verbal aggression, consistent with Ahsan's (2015) study. The literature suggests that genetic factors may play a crucial role in women exhibiting higher levels of anger (Halder, 2007). Additionally, Ahsan (2015) notes that women's concern and perception of their physical appearance and health can also make them more aggressive, specifically angrier, towards others. Prior literature (e.g., Eagly & Wood, 2016; Wagels et al., 2018) also corroborates that male samples show higher scores of physical and verbal aggression, with some theories mentioning the biological differences between men and women in explaining these results (e.g., Wagels et al., 2018), and others highlighting that aggression is more readily accepted in male roles while discouraged in female ones (Eagly & Wood, 2016). In our study, we identified that ACEs are linked with increased levels of aggression in adulthood, aligning with prior research (e.g., Dinç & Küçük, 2021; Hughes et al., 2017). It is already well documented in the literature that ACEs have implications for the development of mental health and tend to cause behavioral problems, such as aggressiveness (Wang et al., 2017). Indeed, ACEs and traumatic experiences can reduce coping strategies for dealing with stressful situations and tend to increase levels of aggression (Allen, 2010). ACEs can also severely affect neurological development and are associated with emotional and behavioral change processes (Hambrick et al., 2019). All these processes have also been associated with aggression (Hecht & Latzman, 2018). Additionally, the idea of the transmission of violent behavior between generations is also widely defended since people who grow up in violent environments tend to practice the same behaviors in adulthood because these are what they have learned as coping mechanisms (Polat, 2017). Regarding the moderation models, the results indicate a significant interaction between ACEs and PCEs in predicting anger among the male sample. Additionally, in the female sample, it was possible to verify the presence of significant interactions between ACEs and PCEs in the prediction of aggression and anger. It is known in the literature that PCEs can play a significant role in predicting long-term health and well-being and that both ACEs and PCEs have sustained effects on the lifespan of adults (e.g., Narayan et al., 2021). Also, international studies have shown that PCEs predict various positive outcomes in adulthood (e.g., Almeida et al., 2021; Crandall et al., 2019; Doom et al., 2021). A systematic review revealed that more PCEs significantly predict adaptive and positive psychosocial functioning and lower psychosocial stress, even after childhood adversities were analyzed (Han et al., 2023). Specifically, PCEs consistently predicted decreased aggression (Narayan et al., 2023). The evidence from research underscores the consequences of PCEs on adult outcomes (Almeida et al., 2023a, 2023b), promoting well-being into adulthood (Narayan et al., 2018). For instance, studies demonstrate how early PCEs can be a protective factor against mental health issues (Qu et al., 2022), being linked with skills of emotional regulation (Almeida et al., 2023a), less anxiety and depression (Qu et al., 2022). Some other studies have also revealed that PCEs moderate the influence of traumatic events, leading to increased resilience in confronting adversity (Almeida et al., 2023b; Narayan et al., 2018).

4.1. Limitations and strengths

Despite the substantial contributions, this research also has some limitations that should be mentioned. First, our conclusions are based on cross-sectional results, and future longitudinal research is necessary to understand better sex differences concerning aggressiveness (Pro et al., 2020), particularly concerning the influence of PCEs. Second, using self-report questions can compromise answers because of social desirability. Third, our sample has considerably more female participants than males, and future studies should use a more homogeneous sample in terms of sex. Fourth, our sample does not represent the entire Portuguese population, which does not allow us to generalize the results. Nevertheless, the sample is extensive and includes many regions of Portugal, from north to south.

The results of this study are of great applicability in clinical and forensic psychology. They expose the relevance of PCEs to women

and men throughout life and highlight their importance as a protective factor against aggression in the presence of ACEs. Furthermore, the results show the different roles of PCEs in women and men. Although ACEs hurt individuals throughout their lives, PCEs can be experiences that positively impact human development, protect individuals from adversity and developing aggression, and increase their quality of life.

While ACEs lead to increased aggression levels, this research highlights that PCEs mitigate the adverse effects of ACEs on aggression and anger in women and anger in males. Other studies have found that PCEs are protective aspects that promote resilience even in the presence of ACEs (Almeida et al., 2023a). The results of this research emphasize the importance of creating prevention programs with youth and families to prevent ACEs and to potentiate PCEs in young people's lives, reducing their tendency to develop aggression. This knowledge can also improve the design of screening protocols for children at risk, signalizing them to integrate intervention programs to develop adaptive ways of solving problems, increasing tolerance to frustration, and decreasing aggression in adulthood.

Prevention programs can provide parental education on ACEs and PCEs, giving them knowledge about positive strategies, stress management, and positive communication. Some preventive programs also can support services for families, reducing stressors like poverty and housing instability, and accessible mental health services for addressing issues such as depression, anxiety, and substance abuse. Intervention programs can implement strategies by developing screening protocols in schools and community organizations for early identification of children at risk for ACEs and training professionals to identify ACEs and the protective role of PCEs. Some intervention programs can also provide therapeutic interventions for youth who suffer trauma to help individuals process and heal from adverse experiences. Can work on anger management and conflict resolution training and enhance PCEs through positive extracurricular activities. Implementing these prevention and intervention strategies may mitigate some adverse effects of ACEs, enhance the protective benefits of PCEs, reduce aggression, and improve individuals' overall quality of life.

Given the scarcity of studies about the moderation role of PCEs in the relationship between ACEs and aggression, it is essential to invest in future studies with these variables to understand the relationship between them more clearly. Future studies should also include samples with specific populations, such as victims and offenders in adolescence and adulthood.

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CRediT authorship contribution statement

Telma Catarina Almeida: Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Jorge Cardoso:** Writing – review & editing, Funding acquisition. **Ana Francisca Matos:** Writing – original draft. **Ana Murça:** Writing – original draft. **Olga Cunha:** Writing – review & editing, Writing – original draft, Funding acquisition, Formal analysis, Data curation.

Data availability

Data will be made available on request.

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