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The impact of adverse childhood experiences and positive thoughts in depression, anxiety, and stress: a comparative study between people convicted of sex offenses and the general population

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Abstract
Adverse childhood experiences (ACEs) are often related to symptoms of stress, anxiety, and depression in adulthood. Positive thoughts can reduce these symptoms. This study compares a sample of people convicted of sex offenses with a sample of the general population on ACEs, symptoms of stress, anxiety, and depression, and positive thoughts, and analyzes the predictors of anxiety, depression, and stress. The sample comprises 168 people convicted of sex offenses and 213 participants from the general population who responded to a sociodemographic questionnaire, the ACE Questionnaire, the Depression Anxiety Stress Scale (DASS), and the Positive Thinking Skills Scale (PTSS). Negative correlations were found between PTSS and ACEs and between PTSS, ACEs, and depression. People convicted of sex offenses have higher ACEs and DASS scores. People convicted of child sexual abuse have higher scores on parental divorce, while people convicted of rape have higher levels of PTSS. Marital status and mental illness or suicide in the family are predictors of psychopathological symptoms, and emotional neglect is also a significant predictor of stress. This study reinforces the need for a comprehensive approach to preventing crime and for developing preventive programs with youth to avoid psychopathological symptoms in adulthood.

Keywords Adverse childhood experiences · Depression · Anxiety · Stress · Positive thoughts · People convicted of sex offenses · General population

Introduction

Children worldwide experience adverse childhood situations (Whitaker et al., 2021). Adverse childhood experiences (ACEs) include situations of abuse (emotional, physical, and sexual), neglect (emotional and physical), family dysfunction (witnessing domestic violence, parental separation, and drug use by family members), and violence (bullying and collective violence) (Giampetruzzi et al., 2023; Levenson et al., 2014). These experiences represent a public health risk (Wang et al., 2022).

Research has demonstrated that ACEs are strongly associated with later psychopathology, maladaptive behavior, and poorer health outcomes (Felitti et al., 1998). More recent meta-analyses and systematic reviews have further confirmed that ACEs are associated with a range of negative consequences that influence individuals' health and functioning throughout life (e.g., Madigan et al., 2023; Senaratne et al., 2024). The environment in which the child grows up is therefore fundamental to their development (e.g., Almeida & Costa, 2023; Almeida et al., 2024; DeLisi et al., 2021; Kobrinsky & Siedlecki, 2022), and experiencing adversity in childhood leaves the individual with fewer resources to cope with negative experiences (Kerber et al., 2023) and more vulnerable to various physical and mental health problems (Kerber et al., 2023; Whitaker et al., 2021) and aggressive behavior (Almeida et al., 2024).

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ACEs in sex offenders

ACEs make individuals more vulnerable to various risk factors, such as depression, antisocial and delinquent behavior, difficulties in relationships with others, and future victimization (Almeida & Costa, 2023). Additionally, these experiences can impair the ability to cope with psychosocial stress, as the individual may not have developed adaptive coping strategies (Almeida & Costa, 2023). Criminality in adulthood is also associated with experiencing ACEs, which are common in the lives of offenders (Levenson & Grady, 2016; Pires & Almeida, 2023), particularly regarding interpersonal violence (Levenson et al., 2014). Offenders generally have more histories of these experiences than the general population (Almeida et al., 2023), and these experiences are more varied and often start earlier in life (DeLisi et al., 2021). It is common for offenders to report acts of violence they had observed in childhood, as low-income family environments and abuse are more common in this population (Levenson et al., 2014).

Evidence shows that, particularly, people convicted of sexual offenses also report higher levels of ACEs than the general population, emphasizing their importance as a key risk factor for criminal behavior (Astridge et al., 2023; Yannon et al., 2024). Still, the link between childhood sexual victimization and later sexual offending remains debated. Early studies suggested that victims were at higher risk of becoming perpetrators (Glasser et al., 2001; Widom, 1989), while subsequent reviews and meta-analyses reinforce that childhood sexual victimization is a risk factor for later aggressive sexual behavior, although most sexually abused children do not become offenders (Berger & Krahé, 2025; Garbutt et al., 2023; Ogloff et al., 2012). In addition, moderating factors such as family environment, coping strategies, and social support significantly influence these trajectories (Chia et al., 2025; Finch et al., 2024).

Studies also indicate that in people convicted of sexual offenses, there is a tendency towards a higher prevalence of a history of physical abuse and neglect, as well as family dysfunction, including violence and drug use within the family context (Abbiati et al., 2014). People convicted of child sexual abuse have a particularly greater tendency to have been exposed to sexual victimization in childhood (Levenson et al., 2014; Simons et al., 2002), suggesting that some children who have been sexually abused in childhood may replicate their aggressor's behavior in the future and associate sexual intercourse with behavior between adults and children (Levenson & Grady, 2016). Furthermore, these offenders often have difficulties with social interaction, making it difficult for them to establish emotional and intimate relationships with adults (Chakhssi et al., 2013). Thus, sexual aggression can soothe suffering or satisfy the individual's needs for intimacy, affection, attention, power, and control (Steely Smith, 2022). On the other hand, people convicted of rape have more reports of violence in the family environment (Abbiati et al., 2014) and physical abuse (Simons et al., 2002). Moreover, the aggressions they commit are more violent than those carried out by people convicted of child sexual abuse (Kanters et al., 2016). In adulthood, these individuals turn to coercive or violent sexual behavior while maintaining more unstable relationships and overall aggressive behavior (Levenson & Grady, 2016).

Poor family functioning is thus a significant risk factor for deviant sexual behavior (Chakhssi et al., 2013; Levenson & Grady, 2016). Many people convicted of sex offenses grew up in unstructured social environments where their caregivers were not prepared to protect and care for them (Levenson & Grady, 2016). The relationship with their parents was often characterized by rejection and neglect, along with a lack of boundaries imposed by the maternal figure (Abbiati et al., 2014). Therefore, the lack of protection and care leads to them not developing emotional bonds with their parents (Levenson & Grady, 2016).

The model of the intergenerational learning of violent behavior explains the propensity of children who have been victims of ACEs to commit criminal and violent acts in adulthood (Besemer et al., 2017). This model states that children learn behaviors through what they observe in their caregivers. Then, the child imitates these behaviors, which will be reinforced by the maintenance of these behaviors by the caregivers (Wareham et al., 2009). Acceptance and reinforcement by the family lead to desensitization and the assimilation of beliefs that favor violence, including sexual violence (Levenson & Grady, 2016). In addition to this model, the literature on the cycle of violence emphasizes that being exposed to abuse and neglect in childhood increases the likelihood of replicating similar behaviors in adulthood (Koga et al., 2024; Xiao et al., 2023). This cycle suggests that victimization and perpetration are linked across generations, where early victimization contributes to the normalization of violence and increases the likelihood of becoming an offender later in life (Shakoor et al., 2022). Some studies also address more specific dynamics, in which sexually abused children may later associate sexual behavior with domination and control, thereby perpetuating the abuse (Berger & Krahé, 2025). Thus, both frameworks converge in reinforcing the importance of considering learned and reproduced patterns of violence and assessing the role of ACEs in sexual offending.

ACEs, psychopathological symptoms, and positive thoughts in sex offenders

Among individuals who have experienced ACEs, depression and anxiety are the most common symptoms (Kerber

et al., 2023; Kobrinsky & Siedlecki, 2022; Whitaker et al., 2021). The severity, amount, and type of exposure to ACEs are linked to the severity and symptoms manifested in adulthood (Giampetruzzi et al., 2023; Kerber et al., 2023). Developmental changes affect cognitive schemas related to the perception of safety in the world, contributing to negative perceptions and symptoms such as excessive fear, worry, irritability, hopelessness, and uncertainty (Giampetruzzi et al., 2023; Kobrinsky & Siedlecki, 2022).

Depressive symptoms are often related to experiences of domestic violence, encompassing situations of abuse, neglect, and violence in general (Tan & Mao, 2023). When violence was perpetrated by a caregiver or someone close to the child, depression (Levenson et al., 2014) and anxiety (Arbel et al., 2018) symptoms become more likely. Empirical evidence also indicates that weak attachment to parents and poor family functioning can increase anxiety levels (Almeida & Costa, 2023), which, in turn, are associated with significant difficulties in interpersonal relationships (Abdulkadir et al., 2022). Depressive and anxious symptoms may occur as a response to the prolonged stress caused by ACEs (Giampetruzzi et al., 2023; Kobrinsky & Siedlecki, 2022), and the prison environment can worsen depressive and anxiety symptoms that were present before imprisonment (Kastos et al., 2022). Specifically, people convicted of sex offenses whose victims are children are more likely to experience symptoms of depression and anxiety than those whose victims are adults (Chakhssi et al., 2013).

Beyond depression and anxiety, ACEs are also linked to the development of emotional disorders in adulthood, particularly those characterized by high levels of stress (Verstraeten et al., 2011). Evidence shows that ACEs reinforce sensitivity to threats (Briggs-Gowan et al., 2015) and impair an individual's ability to recover from stress (McLaughlin et al., 2010), contributing to high, stable, and daily worry (Arbel et al., 2018). Positive thinking, often applied in treatments for anxiety (Eagleson et al., 2016) and depression (Abdullayeva, 2021), has been shown to mitigate worry, although its impact may vary. Positive and negative thoughts often co-occur, with benefits from positive thinking emerging later, suggesting a delayed or cumulative effect (Arbel et al., 2018). In individuals exposed to significant adversity, these benefits tend to be temporary, as increased vigilance shifts from positive aspects and toward perceived threats (Arbel et al., 2018).

Positive thinking is the tendency to favor pleasant or favorable thoughts over unpleasant or unfavorable ones. It can emerge either through the active generation of positive content or the reformulation of negative thoughts (Ji et al., 2021). The literature emphasized that positive thinking is associated with a range of beneficial outcomes, including more developed social skills, greater life satisfaction, and perceived life as meaningful (Abdullayeva, 2021; Ji et al., 2021). They increase creativity and tolerance for challenges, allowing the individual to perceive beyond the negative aspects (Abdullayeva, 2021).

Positive thinking can target different domains. It may be directed at the self, reinforcing belief in one's capabilities and resilience (Gallagher et al., 2019), at others, fostering trust, support and positive social perceptions (Castellani et al., 2016), at events, helping individuals to view challenges as opportunities to grown (Horikoshi, 2023) and at the world fostering optimism and the perception of life as meaningful (Borawski 2022; Castellani et al., 2016). These domains shape how positive thinking can influence emotional regulation, coping, and resilience across contexts (Stover et al., 2024).

In adverse contexts, such as prison, coping strategies centered on positive aspects have proven to be effective in reducing psychological distress and the severity of mental health symptoms (Van Harreveld et al., 2007). These strategies include focusing on the positive side of the situation, accepting the current context, and sharing feelings with others (Rose et al., 2020). Overall, individuals with a positive mental framework demonstrated a greater ability to reinterpret adverse events, overcome challenges, and find meaning even in difficult situations (Taherkhani et al., 2023).

Individuals with a history of ACEs may find it difficult to maintain positive thoughts in these domains due to ingrained negative beliefs and emotional dysregulation (Hsu et al., 2022; Taylor et al., 2017). Nevertheless, interventions that explicitly target positive thoughts about the self, others, events, and the world may enhance coping strategies, improve mental health outcomes, and promote adaptive functioning even in challenging environments (Taherkhani et al., 2023).

Thus, promoting positive thinking from childhood has emerged as a crucial strategy for supporting mental health throughout life (Ji et al., 2021) and fostering more positive interpersonal relationships and favorable psychological and physical health outcomes in adulthood (Abdullayeva, 2021).

The present study

According to the literature, people convicted of sex offenses tend to have a greater history of ACEs throughout their childhood (Abbiati et al., 2014). These experiences affect the individual's normal development and impact their functioning in adulthood (Almeida & Costa, 2023; DeLisi et al., 2021; Kobrinsky & Siedlecki, 2022). In addition, ACEs increase the likelihood of developing negative thoughts (Giampetruzzi et al., 2023; Kobrinsky & Siedlecki, 2022), resulting in depressive and anxiety symptoms (Kerber et al., 2023) and high levels of stress (Arbel et al., 2018). Positive thoughts can soften the effects of ACEs (Abdullayeva, 2021).

Although there is literature on ACES, symptoms of stress, anxiety, and depression, and positive thoughts in the general population, these constructs have never been studied together or in a sample of people convicted of sex offenses. In this sense, this research aims to study the relationship between ACEs and depression, anxiety, stress, and positive thoughts in adulthood in a sample of the general population and a sample of people convicted of sex offenses. The study also intends to compare a sample of the general population with a sample of people convicted of sex offenses and a sample of people convicted of rape with a sample of people convicted of child sexual abuse in ACES, symptoms of stress, anxiety, and depression, and positive thoughts, and assess the variables that have an impact on depressive, anxiety, and stress in adulthood.

Method

Participants

The sample included 381 adult males (168 serving time for sex crimes and 213 from the general population). The sample of prisoners consisted of 168 adult men, most of whom were Portuguese ($n=140$, 83.3%), aged 23 to 84 ($M=46.38$, $SD=10.78$). About 39.3% ($n=66$) of the sample were single, 31% ($n=52$) were divorced or separated, 26.8% ($n=45$) were married or cohabiting, and 1.8% ($n=3$) were widowed. Regarding education, 25% ($n=42$) had completed 12th grade, followed by 25% ($n=42$) who had completed 6th grade. This study included participants from six prisons across the country, from north to south. The prisoners were serving time for sexual crimes, namely 32.7% rape ($n=55$), 58.3% sexual abuse of minors ($n=98$), 4.2% online sexual crimes ($n=7$), 3% sexual coercion ($n=5$), and 1.8% sexual abuse of an incapacitated person ($n=3$). Of all participants convicted of sex offenses, 74.4% reported knowing the victim ($n=125$). Regarding the degree of kinship, 36.9% responded affirmatively ($n=62$). Furthermore, the majority (90.5%, $n=152$) reported not having groomed minors.

The general population sample comprised 213 adult men, the majority Portuguese ($n=211$, 99.1%), aged between 19 and 77 ($M=34.97$, $SD=28.00$). Concerning marital status, 58.2% ($n=124$) of the participants were single, 37.6% ($n=80$) were married or cohabiting, 3.3% ($n=7$) were divorced or separated, and 0.9% ($n=2$) were widowed. Regarding their education, 54.5% ($n=116$) had completed 12th grade, followed by 26.3% ($n=56$) with bachelor's degrees.

A significant age difference was observed between the groups [t (378.60) = −8.94, p <.001]. The sample of people convicted of sex offenses had a higher mean age ($M=46.38$, $SD=10.78$) compared to the general population ($M=34.97$, $SD=14.14$). The mean difference was approximately 11 years, with a large effect size (Cohen's $d=-0.89$).

Measures

Sociodemographic questionnaire Provided information on age, gender, ethnicity, sexual orientation, nationality, education, current marital status, type of crime for which they are serving time, and whether they have been convicted in the past.

ACE questionnaire (ACE: Felitti et al., 1998; Portuguese version; Pinto et al., 2014): Assesses 10 adverse experiences that occurred in childhood (emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, divorce or parental Separation, exposure to domestic violence, substance abuse in the family environment, mental illness or suicide and detention of a family member). The questionnaire comprises 17 items, answered on a dichotomous scale (yes/no). Higher scores on this instrument indicate greater adverse experiences in childhood. The study that originated the Portuguese version has a good Cronbach's alpha (α=0.82).

Depression anxiety stress scale-21 (DASS-21: Lovibond & Lovibond, 1995); Portuguese version; Apóstolo et al., 2012): Assesses the existence of depression, anxiety, and stress symptoms. The questionnaire consists of 21 items, subdivided into 3 sub-scales: depression, anxiety, and stress. The answers are given on a 4-point Likert scale (0=never applied to me and 3=applied to me often or most of the time. Higher values on this instrument indicate more symptoms of depression, anxiety, and stress. The Portuguese version of the instrument has a high Cronbach's alpha (α=0.95).

Positive thinking skills scale (PTSS: Bekhet & Zauszniewski, 2013; Portuguese version; Almeida & Ifrim, 2023): Assesses the frequency with which positive thinking skills are used. The scale consists of 8 items. The answers are given on a 4-point Likert scale (0=never, 1=sometimes, 2=most of the time, and 3=always). Higher values in this instrument indicate a greater frequency of use of positive thinking skills. The Portuguese version of the instrument has a high Cronbach's alpha (α=0.90).

Procedure

To collect data from prisoners, authorization was requested from the General Directorate of Reintegration and Prison Services – Ministry of Justice (DGRSP). The prison directors were then contacted to clarify the objectives, methodology,

and protocol to be applied, and the prison selected and contacted the study participants. Before the protocol was applied, participants were informed about the nature of the study and asked to participate voluntarily by signing an informed consent form. The research protocol was applied in paper format in a group in a room provided by the prison. The sample of sex offenders included adult individuals who could read and write Portuguese and who were serving a prison sentence in Portugal for sexual offenses.

Data collection from the general population was conducted through an online research protocol shared via social networks such as Instagram, Facebook, and LinkedIn. Before completing the research protocol, participants read and provided informed consent to participate, which contained information about the study's objectives and participation process. The general population sample comprised adult individuals who could read and write Portuguese.

All ethical issues inherent in the study were respected, including the anonymity and confidentiality of the participants' data. This research was approved by the University's Institutional Review Board and Ethics Committee and followed the Declaration of Helsinki (World Medical Association, 2024).

Statistical analysis

The statistical software IBM Statistical Version of SPSS was used to analyze the data obtained. v. 29. Descriptive statistics were performed. To assess the relationship between socio-demographic variables and reclusiveness, a T-test and a chi-square test were conducted. We also performed Pearson's correlations for the sample of people convicted of rape, people convicted of child sexual abuse, and the general population. A T-test was used for independent samples to analyze the comparison between people convicted of rape, people convicted of child sexual abuse, and an ANCOVA was performed to compare the general population to people convicted of sex offenses. Lastly, multiple linear regressions were used to analyze the predictors of anxiety, depression, and stress.

Results

Descriptive analysis

In the sample of people convicted of sex offenses, the mean values obtained for the ACEs total score were (M=4.44, SD=4.79), as well as for the respective subscales, such as Emotional Abuse (M = 0.61, SD = 0.83), Physical Abuse (M = 0.64, SD = 0.83), Sexual Abuse (M = 0.40, SD = 0.72), Emotional Neglect (M = 0.58, SD = 0.81), Physical Neglect (M = 0.32, SD = 0.61), Divorce or Parental Separation (M = 0.27, SD = 0.45), Exposure to Domestic Violence (M = 0.91, SD=1.54), Substance Abuse in the Family (M = 0.35, SD = 0.48), Mental Illness or Suicide of a Family Member (M = 0.22, SD = 0.48), Imprisonment of a Family Member (M = 0.15, SD= 0.36). Moreover, we obtained the mean scores of the PTSS scale (M=14.46, SD=5.80), the DASS scale (M=15.00, SD=15.79), and their respective subscales, Depression (M=5.19, SD=5.60), Anxiety (M=4.66, SD=5.58) and Stress (M=5.15, SD=5.56).

Concerning the general population sample, the mean scores obtained for the ACEs were (M=1.69, SD=2.62) and the respective subscales, Emotional Abuse (M = 0.27, SD = 0.56), Physical Abuse (M = 0.22, SD = 0.48), Sexual Abuse (M = 0.07, SD = 0.28), Emotional Neglect (M = 0.29, SD = 0.64), Physical Neglect (M = 0.08, SD = 0.30), Divorce or Parental Separation (M = 0.23, SD = 0.42), Exposure to Domestic Violence (M = 0.22, SD = 0.78), Substance Abuse in the Family (M = 0.13, SD = 0.34), Mental Illness or Suicide of a Family Member (M = 0.15, SD = 0.36), Imprisonment of a Family Member (M = 0.03, SD = 0.17). Furthermore, we obtained the mean score on the PTSS scale (M=13.11, SD=5.74), the DASS scale (M=12.98, SD=14.44), and their respective subscales, Depression (M=4.16, SD=5.19), Anxiety (M=3.63, SD=4.94) and Stress (M=5.19, SD=5.38).

Chi-square tests further showed significant associations between being incarcerated and ethnicity (χ^2 (4)=29.50, p<.001), nationality (χ^2 (11)=39.40, p<.001), educational qualifications (χ^2 (8)=151.633, p<.001), marital status (χ^2 (4)=59.54, p<.001) and employment status (χ^2 (9)=373.23, p<.001).

Correlational analysis

Results from the sample of people convicted of sex offenses (Table 1), revealed statistically significant positive correlations between ACEs and all the ACEs subscales, namely, Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, Physical Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family Environment, Mental Illness or Suicide of a Family Member and Imprisonment of a Family Member. Regarding the DASS variable, the results presented statistically significant positive correlations among all variables related to ACEs, except for Divorce or Parental Separation. The Anxiety subscale revealed positive correlations with Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, Physical Neglect, Substance Abuse in the Family, Mental Illness, or Suicide of Family Members. The PTSS showed statistically significant negative correlations with Emotional Abuse, Physical Abuse, Exposure to Domestic Violence, and the total ACE.

Table 1 Pearson's Correlation between the ACEs, PTSS, and DASS (n = 381)

	People Convicted of Sex Offenses (n = 168)															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. ACE EA	1	.808**	.302**	.660**	.529**	.402**	.529**	.493**	.459**	.176*	.845**	–.253**	.325**	.243**	.271**	.297**
2. ACE PA		1	.234**	.592**	.476**	.415**	.486**	.470**	.477**	.163**	.802**	–.224**	.293**	.202**	.233**	.258**
3. ACE SA			1	.292**	.271**	.105	.249**	.242**	.145	.234**	.470**	–.012	.183*	.201*	.241**	.221**
4. ACE EN				1	.624**	.272**	.456**	.412**	.386**	.157*	.765**	–.149	.345**	.238**	.262**	.299**
5. ACE FN					1	.274**	.457**	.426**	.362**	.113	.701**	–.109	.348**	.237**	.252**	.296**
6. ACE Divorce						1	.288	.172*	.125	.156*	.463**	–.063	.077	.023	.029	.046
7. ACE EV							1	.377**	.433**	.122	.779**	–.202**	.177*	.145	.198**	.184*
8. ACE SA								1	.460**	.186*	.616**	–.104	.273**	.258**	.299**	.294**
9. ACE MI									1	.141	.588**	–.132	.380**	.327**	.343**	.371**
10. ACE Prison										1	.294**	–.002	.106	.131	.146	.135
11. ACE Total											1	–.216**	.369**	.290**	.336**	.351**
12. PTSS												1	–.137	–.104	–.142	–.135
13. DASS Dep.													1	.798**	.841**	.933**
14. DASS Anx.														1	.866**	.941**
15. DASS Stress															1	.956**
16. DASS Total																1
	General Population (n = 213)															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. ACE EA	1	.620**	.006	.486**	.343**	.301**	.511**	.283**	.140*	.120	.752**	–.072	.297**	.284**	.259**	.301**
2. ACE PA		1	.032	.326**	.267**	.292**	.463**	.198**	.182**	.040	.668**	–.078	.217**	.226**	.207**	.233**
3. ACE SA			1	.179**	–.006	.073	–.066	–.090	.038	.061	.148*	.085	.028	.034	.004	.023
4. ACE EN				1	.338**	.298**	.313**	.213**	.169*	.144*	.669**	–.107	.258**	.255**	.296**	.290**
5. ACE FN					1	.228**	.562**	.401**	.058	.049	.588**	–.037	.123	.202**	.195**	.186**
6. ACE Divorce						1	.367**	.322**	.297**	.112	.585**	–.064	.170*	.180**	.199**	.197*
7. ACE EV							1	.426**	.296**	.061	.786**	–.024	.201**	.137*	.115	.162*
8. ACE SA								1	.256**	.102	.536**	.029	.141*	.069	.105	.113
9. ACE MI									1	.006	.424**	–.127	.267**	.122	.149*	.193*
10. ACE Prison										1	.194**	–.092	.110	.070	.126	.111
11. ACE Total											1	–.088	.333**	.292**	.298**	.330**
12. PTSS												1	–.174*	–.065	–.106	–.125
13. DASS Dep.													1	.769**	.791**	.917**
14. DASS Anx.														1	.839**	.931**
15. DASS Stress															1	.944**
16. DASS Total																1

**p < .001; *p < .005; *ACE EA* Emotional Abuse, *ACE PA* Physical Abuse, *ACE SA* Sexual Abuse, *ACE EN* Emotional Neglect, *ACE FN* Physical Neglect, *ACE Divorce* Divorce or Parental Separation, *ACE EV* Exposure to Domestic Violence, *ACE SA* Substance Abuse, *ACE MI* Mental Illness or Suicide, *PTSS* Positive Thinking Skills Scale, *Dep.* Depression, *Anx.* Anxiety

Results from the general population sample (Table 1) revealed positive correlations between most of the subscales, specifically Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, Physical Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family Environment and Imprisonment of a Family Member, expect for the subscale Mental Illness or Suicide of a Family Member, with all the ACEs subscales. Concerning the data on the DASS variable, the results showed statistically significant positive correlations between all the variables relating to ACEs, apart from Sexual Abuse, Substance Abuse in the Family, and Imprisonment of a Family Member. However, unlike the Anxiety and Stress subscale, the Depression subscale also correlates positively with Exposure to Domestic Violence. The same was observed for the Stress subscale, the only one that showed a positive correlation with Imprisonment of a Family Member. The PTSS scale was negatively correlated with the Depression subscale of DASS.

Group differences

The ANCOVA was used to analyze the group differences between the samples of people convicted of sex offenses and the general population (Table 2), which included covariates such as marital status, age, and educational qualifications to compare those samples. The results showed that the sample of people convicted of sex offenses scored significantly higher than the general population in total ACEs and in all the subscales, namely, Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, Physical Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family, Mental Illness or Suicide of a Family Member and Imprisonment of a Family Member.

Regarding the statistical analysis carried out to compare the sample of people convicted of rape and people convicted of child sexual abuse (Table 3), results showed statistically significant differences in the variables ACE Divorce, and PTSS. The group of people convicted of child sexual abuse presented higher values in the subscale of Divorce when compared to the group of people convicted of rape. However, the group of people convicted of rape presented higher values on the PTSS scale.

The effect size, as measured by Cohen's d, indicated a large effect of total ACEs, Emotional Abuse, Physical Abuse, Emotional Neglect, Exposure to Domestic Violence, total DASS, DASS Depression, DASS Anxiety, DASS Stress and PTSS; a medium effect of Sexual Abuse and Physical Neglect; and a small effect of Divorce or Parental Separation, Substance Abuse in the Family Environment, Mental Illness or Suicide of a Family Member and Imprisonment of a Family Member.

Regression analysis

The explanatory model of depression using a multiple linear regression showed that the model was significant ($F(2,378) = 28.468$, $p < .001$). Durbin-Watson was 1.92, and VIF was <3. PTSS scale, Emotional Abuse, Physical Abuse, Sexual Abuse, Physical Neglect, Emotional Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family Environment, Imprisonment of a Family Member, age, and reclusion were not significant. For this reason, a new model was carried out with only significant paths. The model explained 13% of the

Table 2 ANCOVA test between ACEs, DASS, and PTSS in a sample of people convicted of sex offenses and the general population ($n = 381$)

	People Convicted of Sex Offenses ($n = 168$)		General Population ($n = 213$)			
					F	*P* value
ACE Total	4.598	0.329	1.566	0.284	39.374	<0.001
Emotional Abuse	0.649	0.061	0.244	0.053	20.078	<0.001
Physical Abuse	0.661	0.059	0.202	0.051	28.281	<0.001
Sexual Abuse	0.417	0.047	0.052	0.040	28.207	<0.001
Emotional Neglect	0.619	0.064	0.258	0.055	14.891	<0.001
Physical Neglect	0.326	0.041	0.072	0.035	17.834	<0.001
Divorce or Parental Separation	0.311	0.037	0.196	0.0.32	4.405	0.037
Exposure to Domestic Violence	0.826	0.104	0.288	0.090	12.384	<0.001
Substance Abuse in the Family	0.383	0.036	0.102	0.031	27.969	<0.001
Mental Illness or Suicide of a Family Member	0.244	0.035	0.136	0.030	4.480	0.035
Imprisonment of a Family Member	0.163	0.024	0.017	0.021	17.304	<0.001
DASS Total	14.523	1.308	13.357	1.129	0.368	0.544
Depression	5.153	0.469	4.194	0.405	1.938	0.165
Anxiety	4.319	0.457	3.899	0.395	0.392	0.532
Stress	5.051	0.475	5.265	0.410	0.094	0.759
PTSS	14.361	0.520	13.189	0.449	2.360	0.125

Table 3 T-test for independent samples between ACEs, DASS, and PTSS in a sample of people convicted of rape and people convicted of child abuse ($n=153$)

	People Convicted of Rape ($n=55$)		People Convicted of Child Sexual Abuse ($n=98$)				
	M				t	*p*	Cohen´s d
ACE Total	4.272	4.424	4.530	5.038	−0.317	0.376	4.828
Emotional Abuse	0.527	0.790	0.673	0.847	−1.049	0.148	0.827
Physical Abuse	0.618	0.828	0.653	0.839	−0.248	0.402	0.835
Sexual Abuse	0.436	0.714	0.388	0.741	0.394	0.347	0.731
Emotional Neglect	0.473	0.766	0.622	0.831	−1.099	0.137	0.809
Physical Neglect	0.309	0.573	0.327	0.654	−0.165	0.435	0.627
Divorce or Parental Separation	0.182	0.389	0.337	0.475	−2.60	0.016	0.446
Exposure to Domestic Violence	0.946	1.544	0.918	1.584	0.102	0.459	1.570
Substance Abuse in the Family Environment	0.327	0.474	0.327	0.471	0.009	0.496	0.472
Mental Illness or Suicide of a Family Member	0.273	0.448	0.184	0.389	1.284	0.101	0.412
Imprisonment of a Family Member	0.182	0.389	0.102	0.304	1.405	0.081	0.337
DASS Total	17.746	18.556	14.286	14.357	1.285	0.100	15.986
Depression	6.091	6.493	5.017	5.210	1.061	0.145	5.702
Anxiety	5.509	6368	4.408	5.117	1.168	0.122	5.596
Stress	6.146	6.491	4.801	5.070	1.415	0.080	5.612
PTSS	15.909	6.117	13.663	5.704	2.277	0.012	5.856

variance of DASS Depression. Marital status ($\beta = -0.153$, $p=.002$) and Mental Illness or Suicide of a Family Member ($\beta=0.32$, $p<.001$).

The explanatory model of anxiety, using a multiple linear regression, showed that it was significant ($F(2,378)=13.540$, $p<.001$). Durbin-Watson was 1.89, and VIF was <3. PTSS scale, Emotional Abuse, Physical Abuse, Sexual Abuse, Physical Neglect, Emotional Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family Environment, Imprisonment of a Family Member, age, education, and reclusion were not significant. For this reason, a new model was carried out with only significant paths. The model explained 6.7% of the variance of the DASS Anxiety subscale. Marital status ($\beta = -0.115$, $p=.021$) and Mental Illness or Suicide of a Family Member ($\beta=0.233$, $p<.001$).

The explanatory model of stress using multiple linear regression showed that the model was significant ($F(3,377)=19.923$, $p<.001$). Durbin-Watson was 1.82, and VIF was <3. PTSS scale, Emotional Abuse, Physical Abuse, Sexual Abuse, Physical Neglect, Divorce or Parental Separation, Exposure to Domestic Violence, Substance Abuse in the Family Environment, Imprisonment of a Family Member, age, education, and reclusion were not significant. For this reason, a new model was carried out with only significant paths. The model explained 13% of the variance of the DASS Stress subscale. Marital status ($\beta = -0.186$, $p<.001$), Emotional Neglect ($\beta=0.211$, $p<.001$), and Mental Illness or Suicide of a Family Member ($\beta=0.166$, $p=.001$).

Discussion

ACEs represent a global problem that affects children, with significant social and health implications (Islam et al., 2023; Panagou & MacBeth, 2022). Since they occur during early stages of development, children have fewer resources to cope with the adversity, becoming more vulnerable to mental health problems, risky and violent behavior, and difficulties in establishing interpersonal relationships (Kerber et al., 2023). In adulthood, these adversities are associated with higher rates of depressive and anxiety symptoms (Kobrinsky & Siedlecki, 2022), although research emphasizes potential resilience factors, such as positive thinking, in mitigating their impact (Arbel et al., 2018; Gloria & Steinhardt, 2014). Thus, the study of ACEs requires a comprehensive perspective that considers both negative consequences and coping strategies that may buffer these effects.

ACEs in people convicted of sex offenses and the general population

The findings revealed globally higher scores of ACEs in the sample of people convicted of sex offenses, namely in emotional, physical, and sexual abuse, physical and emotional neglect, divorce or parental separation, exposure to domestic violence, substance abuse in the family, mental illness or suicide in the family, and imprisonment of family members. These results reinforce the cumulative nature of ACEs in this population and their role as risk factors for maladaptive behavior (Chopin et al., 2023; Islam et al., 2023; Maira et

al., 2023) and violent behavior in adulthood (Levenson & Grady, 2016).

The results also identify a significantly higher score on the sexual abuse subscale in the sample of people convicted of sex offenses. However, empirical, longitudinal, and meta-analytic studies report some different results regarding the association between childhood sexual victimization and sexual offending (e.g., Steely Smith, 2022; Widom & Massey 2015). Some studies found no clear association, whereas others reported an increased risk but emphasized that several individuals who suffered sexual victimization do not become sexual offenders (Ogloff et al., 2012). Nevertheless, early exposure to sexual violence may negatively impact the individual's perception and development, normalizing sexually aggressive behaviors (Levenson & Grady, 2016) and creating difficulties in the establishment of emotional and intimate relationships with adults (Chakhssi et al., 2013).

Furthermore, our results show that exposure to violence in the household, substance abuse within the family, and imprisonment of family members were significantly higher in the sample of people convicted of sex offenses. Such environments may promote emotional desensitization and the normalization of aggressive behavior, supporting intergenerational patterns of learned violent behavior (Besemer et al., 2017), which can lead to sexual offenses later in life (Chakhssi et al., 2013; Levenson & Grady, 2016). Substance abuse within the family and imprisonment of family members further contribute to unstable environments that can negatively impact the development of social and emotional regulation skills (Islam et al., 2023). The imprisonment of family members can also normalize those behaviors, increasing the practice of similar behaviors (Islam et al., 2023; Levenson & Socia, 2016).

The relationship between ACEs, psychopathological symptoms, and positive thought

The results revealed the existence of a relationship between childhood adversities and symptoms of stress, anxiety, and depression in people convicted of sex offenses and the general population. This suggests that ACEs are linked to the presence of psychopathological symptoms, since they create a stressful (Arbel et al., 2018) and unstructured environment (Levenson & Grady, 2016). Additionally, emotional abuse and neglect are associated with both depression and anxiety in adulthood (Kerber et al., 2023).

The correlation between ACEs and anxiety shows that early adversities may have an impact on the mental health of sex offenders in adulthood, although with varying impacts (Chopin et al., 2023; Kobrinsky & Siedlecki, 2022). The anxiety subscale showed a positive correlation with all abuse and neglect subscales, substance abuse in the family, and mental illness or suicide of a family member, suggesting these adversities have the strongest association with anxiety. Those results are corroborated by the literature, which indicates that anxiety symptoms are associated with less capacity to cope with situations of uncertainty (Kobrinsky & Siedlecki, 2022). Additionally, it is associated with a poor relationship with their parents (Almeida & Costa, 2023) and difficulties in establishing interpersonal relationships (Abdulkadir et al., 2022).

In the general population sample, ACEs were significantly correlated with DASS. In particular, the depression subscale shows a correlation with exposure to domestic violence, which may highlight the impact on mental health outcomes, and the stress subscale shows a correlation with the imprisonment of a family member, which may show an effect on emotional regulation in adulthood. In this way, these results demonstrate that adverse factors during childhood impact individuals' mental health (DeLisi et al., 2021; Kobrinsky & Siedlecki, 2022).

Moreover, the results showed a negative correlation between PTSS and ACEs total, emotional abuse, physical abuse, and exposure to domestic violence in the sample of people convicted of sex offenses. In line with those results, the same was verified in the general population sample, where the results showed a negative correlation between PTSS, mental illness, or suicide in the family subscale of ACEs and the Depression subscale of DASS. These results highlight the inverse relationship between mental health and resilience facing adverse experiences (Taherkhani et al., 2023).

According to the literature, ACEs are also linked to emotional dysregulation and increased sensitivity to threats, impairing an individual's ability to recover from stress and contributing to persistent worry patterns (Arbel et al., 2018; Briggs-Gowan et al., 2015; McLaughlin et al., 2010). Although positive thoughts have been shown to mitigate worry and are often used in anxiety and depression treatment (Abdullayeva, 2021; Eagleson et al., 2016), their impact appeared to vary.

Positive thinking strategies can relieve stress, but they do not address the underlying causes of these symptoms, such as exposure to adversity or persistent negative thought patterns (Hsu et al., 2022). In addition, individuals with a history of adverse experiences may find it difficult to maintain positive thoughts due to ingrained negative beliefs and emotional dysregulation, making it difficult for positive thoughts to be effective in the long term (Taylor et al., 2017).

People convicted of sex offenses and subgroup comparisons

Despite the difference not being significant, regarding symptoms of stress, anxiety, and depression, people convicted of

sex offenses had higher mean scores than the general population, specifically on depression and anxiety. Incarcerated individuals carried a substantially higher level of mental illness compared to the general population (Fazel & Baillargeon, 2011) that may have been present before the prison sentence or may have developed and worsened during imprisonment, influenced by environmental stressors such as the loss of personal freedom and privacy, prison violence, social isolation, overcrowding, and feelings of guilt (Kastos et al., 2022).

In the PTSS scale, the sample of people convicted of sex offenses had higher mean scores than the general population, although the difference was not significant. The use of positive thoughts helps individuals reduce stress associated with adverse childhood experiences (Arbel et al., 2018) and become more tolerant of challenges, thereby experiencing lower stress (Abdullayeva, 2021). They also presented both depressive symptoms and positive thinking, highlighting that positive coping strategies may operate as compensatory mechanisms even in the presence of psychological distress. This suggests that the presence of depressive symptoms does not preclude the use of positive coping strategies, which may serve as a mechanism of psychological resilience or self-preservation in a distressing environment (Gloria & Steinhardt, 2014). These findings provide evidence regarding the role of positive thinking as a resilience factor among inmates, as they often use adaptive cognitive mechanisms to manage incarceration-related stress, even when experiencing significant psychological distress (Jiang & Winfree, 2006), suggesting that interventions enhancing those mechanisms may buffer the negative impact of ACEs and stress.

In this sense, positive thinking may function less as a marker of psychological well-being and more as a compensatory strategy, since in adverse environments such as prison, coping strategies involving positive thinking were reported to reduce psychological distress and symptoms of mental illness (Rose et al., 2020; Van Harreveld et al., 2007). Therefore, the absence of a significant difference in stress levels might reflect protective coping mechanisms, such as positive thinking, among the participants. These results supported the relevance of including positive thinking when interpreting stress-related outcomes.

The group difference analysis between people convicted of rape and people convicted of child sexual abuse showed significant differences between the divorce subscale and the PTSS scale. The sample of people convicted of child sexual abuse has higher scores in the divorce subscale when compared to the sample of people convicted of rape. Those results suggest that parental divorce may negatively impact the development of those individuals as the family environment becomes unstable. The results are in line with this, showing that low-income family function is a risk factor for deviant sexual behavior (Chakhssi et al., 2013; Levenson & Grady, 2016). This type of family functioning is associated with an unstructured social environment in which parents are not prepared to care for children (Levenson & Grady, 2016), leading to a parent-child relationship with rejection and neglect (Abbiati et al., 2014).

The sample of people convicted of rape shows higher scores on the PTSS scale, suggesting that they may have a more positive cognitive pattern when compared to the sample of people convicted of child abuse. The literature suggests that positive thoughts help reduce the stress caused by negative experiences, leading to increased resilience and abandonment of negative thoughts about those experiences (Taherkhani et al., 2023).

Predictors of depression, anxiety, and stress

As far as linear regression is concerned, the findings revealed a relationship between adverse experiences and symptoms of stress, anxiety, and depression. The regression model for the depression, anxiety, and stress subscale showed that mental illness or suicide of a family member is a significant predictor for the presence of depressive, anxious, and stress symptoms. Growing up in a family environment marked by mental health issues or suicide situations increases the vulnerability for depressive and anxious symptoms later in life, especially if they occur at an early age (Kobrinsky & Siedlecki, 2022). The stress of living in a household with mental health problems may also lead to emotional dysregulation, which can result in depressive symptoms (Kobrinsky & Siedlecki, 2022). Moreover, those environments may lead individuals to internalize maladaptive coping strategies as they perceive the world as unsafe or unstable (Giampetruzzi et al., 2023), thereby increasing their vulnerability to stress symptoms (Kobrinsky & Siedlecki, 2022).

In the stress subscale, emotional neglect is a significant predictor of stress symptoms in adulthood. This relationship may be associated with the development of poor coping strategies and difficulties in emotional regulation (Giampetruzzi et al., 2023; Kobrinsky & Siedlecki, 2022). The lack of emotional reassurance or validation during critical developmental periods can impair an individual's capacity to manage stress, increasing their susceptibility to stress-related problems later in life (Arbel et al., 2018).

In all the subscales (depression, anxiety, and stress), marital status was shown to be a predictor of the presence of symptoms in adulthood, reducing their impact on the individual's day-to-day life. Marital status may be a predictor since the individual may have social support to help deal with depressive, anxious, and stress symptoms (Koball et al., 2010). However, this can also be true in divorce cases, as divorce, despite being a stressful event, can reduce the stress associated with marriage (Hetherington, 2003).

Limitations

This study has some limitations that should be considered. The small and uneven sample sizes, particularly between offenders convicted of rape and child sexual abuse, reduce the representativeness of the findings. Another limitation of this study is the sociodemographic differences between samples, such as marital status and education. In the general population, because of online data collection, we had no control over the setting in which the protocol was used, which may also be a limitation. Due to the self-report-sensitive nature of the study's instruments, responses may have a social desirability that could interfere with the study's findings, especially among sex offenders due to the social stigma attached to their crime (Tan & Grace, 2008; Tierney & McCabe, 2001). Furthermore, self-reports of ACEs are susceptible to bias due to influences such as forgetfulness or resistance to revealing adverse experiences (Colman et al., 2016). Although the results are limited by the inability to confirm self-reports, this study's findings are consistent with previous research, which adds credibility to the conclusions.

Conclusion

Despite the limitations presented, the current study makes a relevant contribution to Psychology and Criminology. This study highlights the high prevalence of ACEs and symptoms of stress, anxiety, and depression in the sample of people convicted of sex offenses, a fact that may be associated with the development of delinquent and criminal behavior later in life (Islam et al., 2023) since at this stage of their development, the individual depends on their caregivers becoming more vulnerable to being victimized (Chopin et al., 2023) and having fewer resources to deal with adversity (Kerber et al., 2023). Furthermore, the high score of positive thoughts in the sample of people convicted of rape provides valuable insights into the complexity of the sexual offense. This study emphasizes the need for a more comprehensive and multifaceted approach that addresses both the effect of ACEs on adult life and psychopathological symptoms, aiming to prevent recidivism and promote resocialization by understanding their negative impact and their relationship to the perpetration of sexual crimes.

This research confirms the association between ACEs and criminal behavior, namely, sexual aggression, a relationship that has been widely studied in the literature and which highlights the impact of those experiences in adulthood (Levenson & Socia, 2016). Additionally, this study contributes to understanding the complex mechanism by which ACEs affect the development of individuals and make them more susceptible to deviant or criminal behavior, with some authors explaining this phenomenon through intergenerational learning (Besemer et al., 2017), which states that the child learns and imitates the behavior observed and which is maintained by the practice of the same behaviors by their caregivers (Wareham et al., 2009).

ACEs are also associated with symptoms of stress, anxiety, and depression in adulthood, which studies have shown that adverse experiences at early ages affect the normative development of the individual (Islam et al., 2023; Kobrinsky & Siedlecki, 2022; Maira et al., 2023). Those developmental changes affect their cognitive schemas, leading them to perceive the world as an unsafe and dangerous place (Giampetruzzi et al., 2023; Kobrinsky & Siedlecki, 2022), which affects their ability to establish interpersonal relationships (Abdulkadir et al., 2022). That difficulty stems from the fact that, in childhood, the individual experienced a weak emotional bond with their caregivers (Almeida & Costa, 2023), making it difficult to establish an emotional or intimate bond with others in adulthood (Chakhssi et al., 2013).

The presence of positive thoughts may be a coping mechanism to reduce the stress caused by adverse experiences, and research has shown that positive thoughts help individuals see life more positively (Taherkhani et al., 2023) and enhance overall satisfaction with life (Abdullayeva, 2021; Ji et al., 2021). In this study, the results show that people convicted of rape have higher scores on the PTSS scale than people convicted of child sexual abuse, suggesting that they use positive thoughts to cope with adversity and reduce stress symptoms. The difference between those two samples may reflect distinct coping strategies and how each group processes and reacts to their experiences.

Implications for practice

The implications of this study are wide-ranging and highlight the need for a comprehensive and multifaceted approach to deal with the complex issues associated with sexual aggression. In terms of primary prevention, the results of this study enable the creation of awareness campaigns about the impact of childhood experiences on adulthood, making the public aware of the effects of family problems and mental health illnesses, as well as understanding their relationship with sexual aggression.

The family structure is essential to an individual's development. Sex offenders showed more unstable family environments, with the presence of violence, substance abuse, and imprisonment of family members, and specifically, people convicted of child abuse showed a higher prevalence of parental divorce. This suggests the need for programs that can provide support for children with unstable families to prevent future behavior problems associated with adverse experiences, provide support for children with separated families, and address the harmful effects of divorce, as well

as situations of domestic violence or abuse. In this regard, those programs can also help parents improve their communication and family cohesion.

People convicted of sex offenses show high levels of depression, anxiety, and stress that can be a symptom of adversity during childhood. Therefore, it is essential to develop mental health programs to prevent the presence of mental health problems in adulthood, addressing emotional dysregulation, early symptoms of depression and anxiety, as well as strategies to manage stress at an early age. The programs could involve evidence-based therapies such as cognitive-behavioral therapy (Gaynor & Gordon, 2018).

Integrating positive thinking into programs and providing strategies for incorporating it into daily life seems important. Since positive thoughts help cope with adversity and reduce the stress it causes, it is essential to develop this skill to mitigate its negative impact in adulthood. In addition to their preventive nature, these programs could also be applied at the intervention level through their application to sex offenders. This would allow us to understand the adverse situations they have been subjected to and how these have impacted their development and behavior. In this way, using cognitive-behavioral therapies (Gaynor & Gordon, 2018), it would be possible to address their beliefs and lead to changes in their behavior.

In their adulthood, it would be beneficial for these individuals to have access to intervention programs or psychological support to reduce and help manage depressive and anxiety symptoms, as well as to provide stress reduction strategies. Considering that most people convicted of sex offenses serve prison sentences or are sentenced to measures in the community, these programs could be part of their sentences, taking place both inside prisons and as an obligation to be fulfilled at least during their sentence. In summary, these implications for practice highlight the need for a personalized and holistic approach to the prevention and intervention of sexual aggression, taking into consideration the relationship between individual, family, and social factors. By considering the specific needs of people convicted of rape and people convicted of child sexual abuse, it is possible to create more effective interventions that contribute to reducing and better understanding sexual aggression.

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Data availability Data will be made available on request.

Declarations

Ethical approval The Egas Moniz School of Health & Science Ethics Committee approved the present research (N. 1119))).

Competing interests The authors declare that they have no competing interests.

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