

Evaluation of childhood trauma with respect to criminal behavior, dissociative experiences, adverse family experiences and psychiatric backgrounds among prison inmates[☆]

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ABSTRACT

Objective: To evaluate childhood trauma in relation to criminal behavior, dissociative experiences, adverse family experiences during childhood and psychiatric backgrounds among prison inmates.

Methods: In total, 200 prison inmates were included in this questionnaire-based study. Data on demographic characteristics, adverse family experiences during childhood and psychiatric backgrounds were collected via face-to-face interviews, and a psychometric evaluation was conducted using the Childhood Trauma Questionnaire (CTQ-28) and Dissociative Experiences Scale (DES).

Results: Several historical items were more common in females than in males including family history of psychiatric disease (23.0% vs. 13.0%, $p = 0.048$), a personal history of psychiatric disease (51.0% vs. 29.0%, $p < 0.001$), and previous suicide attempts (49.0% vs. 25.0%, $p < 0.001$). In male inmates, in contrast, there were higher rates of substance abuse (48.0% vs. 29.0%, $p < 0.001$) and previous convictions (50.0% vs. 25.0%, $p < 0.001$). Males had a younger age at first crime (24.9 ± 8.9 years vs. 30.3 ± 9.2 years, $p < 0.001$), whereas females had higher rates of violent crimes (69.2% vs. 30.8% $p < 0.001$) and higher CTQ total scores (51.9 ± 20.9 vs. 46.2 ± 18.9 , $p = 0.04$). A significant relationship of CTQ total score was noted with age at first offense ($\beta = 0.772$, $p < 0.001$) but not with sentence length ($\beta = 0.075$, $p = 0.292$). There were also possible mediating roles of psychiatric problems, adverse family experiences and DES in the relationship between CTQ and age at first offense.

Conclusion: In conclusion, our findings revealed a high prevalence of and significant associations among childhood trauma, dissociative experiences, adverse family experiences and psychiatric problems in a cohort of incarcerated females and males. A psychiatric background, childhood trauma characterized by sexual abuse and violent crimes were found to be predominant in female prison inmates, whereas a criminal background with a younger age at first offense and frequent previous convictions, substance use and sexual crimes were more prevalent among male prison inmates. Our findings indicate a potential link between childhood traumatization and criminal behavior in terms of subsequent offending but not in terms of severity of the subsequent offense.

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1. Introduction

The likelihood of engaging in violent behavior and of becoming incarcerated is based on several individual, social and environmental factors [1–3]. One such factor is childhood trauma, which has been associated with increased risks of violent and aggressive behavior and

criminality in adulthood [2,4–6] and is considered highly prevalent among inmates across gender and ethnic groups [2,6–8].

Dissociation involves disruptions to normally integrated functions of memory, perception identity, consciousness and motor control [9,10]. Dissociation is also considered a risk factor for developing aggressive and violent behavior in studies with inpatient and outpatient psychiatric samples [10–12]. Additionally, childhood traumatic experiences were shown to predict the development of dissociative symptoms [13,14] and to be strongly associated with dissociative experiences and with pathologic dissociation among inmates [10,15].

Adverse family experiences during childhood such as family dysfunction, parental separation/divorce, incarceration of a household member, low-income, mental illness, substance abuse and domestic

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violence are considered childhood stressors that lead to negative mental, physical, and behavioral health outcomes [16,17].

Prisons reflect an over-representation of the specific population with a high prevalence of mental disorders, personality disorders and associated problems, such as substance and alcohol misuse within a society rather than reflecting a cross-section of society [18–21]. Childhood trauma, either experienced or witnessed and whether physical, sexual, or emotional, has been considered to have a long-lasting impact across the life cycle, leading to an increased risk of lifetime victimization [5,22–25].

The association between childhood trauma and behavioral health and aggressive behavior in adulthood is well established [5]. However, the specific trajectories that connect childhood traumatization to criminal behavior have been less extensively investigated in prison inmates in terms of adverse family experiences during childhood and the persisting psychopathological effects of unresolved childhood trauma in adulthood [5,26,27].

This questionnaire-based study was therefore designed to evaluate adverse family experiences and psychiatric and criminal background with respect to gender and forms of crime in a cohort of incarcerated females and males. The relationship between childhood trauma and criminal behavior in relation to dissociative experiences, adverse family experiences and psychiatric background was also addressed. The hypothesis tested was that a potential link exists between childhood traumatization and criminal behavior and that adverse childhood family experiences along with dissociative experiences and psychiatric problems in adulthood would mediate the relationship between childhood traumatization and subsequent offending.

2. Methods

2.1. Study population

Overall, 216 prison inmates were selected via a random sampling of 2080 inmates incarcerated in four different closed prisons located in Istanbul province between April 2010 and January 2011. Each subject was given a brief description of the study via face-to-face interviews, and 200 of 216 inmates (92.6%) were included in the questionnaire survey based on their voluntary participation. Sixteen subjects were excluded due to their failure to complete the questionnaire/interview ($n = 14$) or refusal to participate in the study ($n = 2$). Overall, our study population included 100 males [45 of 950 inmates (47.0%), 37 of 750 inmates (49.0%) and 18 of 80 inmates (22.5%) from the Umraniye E-type Closed Prison, Umraniye T-type Closed Prison and Pasakapisi Closed Prison, Istanbul, respectively] and 100 females [100 of 300 inmates (33.3%) from Bakirkoy Women's Closed Prison, Istanbul]. Being 18–65 years of age and literate and having sufficient cognitive and mental abilities to complete the questionnaire and interview were the inclusion criteria of this study. Prison inmates diagnosed with dementia or other organic mental disorders during psychiatric examination and those who had not yet been convicted of the crime they were charged with were excluded from the study.

An official letter was sent to the Ministry of Justice regarding the execution of the research study, and written informed consent was obtained from the Ministry of Justice General Directorate of Prisons and Detention Houses and from each subject after providing detailed explanations of the objectives and protocols of the study. This study was conducted in accordance with ethical principles stated in the Declaration of Helsinki and was approved by the Ethics Committee of the Erenkoy Mental and Neurological Diseases Training and Research Hospital.

2.2. Assessments

Data on demographics (age, gender), adverse family experiences during childhood (number of family members/siblings, parental loss or separation, economic status, family history of psychiatric disease

and substance abuse) and psychiatric backgrounds (past histories of psychiatric disease and suicide attempts, substance use) were collected via face-to-face interviews. The psychometric evaluation was based on the Childhood Trauma Questionnaire (CTQ-28) and Dissociative Experiences Scale (DES). Psychometric scales were applied via face-to-face interviews in a separate room and only after the formation of a secure researcher-inmate bond.

Data on forms of crime committed, age at first offense, sentences received and time served in prison prior to study enrollment and the presence of convicted family members were obtained from prison records. Adverse family experiences, psychiatric and criminal backgrounds, CTQ and DES scores were evaluated according to gender and forms of crime. CTQ scores were also evaluated with respect to DES scores, age, adverse family experiences and psychiatric backgrounds, whereas the relationship between CTQ scores and criminal behavior was tested in terms of age at first offense and length of sentence and potential mediators.

2.3. Classification of forms of crime

Forms of crime were classified using Gillin's criteria as follows: property crimes (burglary, larceny, theft, motor vehicle theft, arson, shoplifting, and vandalism), sexual crimes (rape and sexual assault), violent crimes (physical assault, murder, manslaughter, euthanasia and infanticide) and political crimes [28].

2.4. Childhood Trauma Questionnaire (CTQ-28)

The Childhood Trauma Questionnaire (CTQ) is a self-report 28-item inventory used to screen for histories and severities of abuse and neglect based on five subscales, with three assessing abuse (Emotional, Physical, and Sexual) and two assessing neglect (Emotional and Physical). Each subscale includes five items and a three-item Minimization-Denial subscale check for extreme response bias, which refers to specific attempts made by the respondents to minimize their childhood abuse experiences. A 5-point frequency of occurrence scale was utilized: (1) never true, (2) rarely true, (3) sometimes true, (4) often true, and (5) very often true. Each subscale score ranges from 5 (no history of abuse or neglect) to 25 (very extreme history of abuse and neglect) [29]. As defined in the CTQ manual [30], the mean scores for the valid subscales were further categorized as follows: Emotional Abuse: none or minimal = 5–8, low to moderate = 9–12, moderate to severe = 13–15, and severe to extreme = 16+; Physical Abuse: none or minimal = 5–7, low to moderate = 8–9, moderate to severe = 10–12, and severe to extreme = 13+; Sexual Abuse: none or minimal = 5, low to moderate = 6–7, moderate to severe = 8–12, and severe to extreme = 13+; Emotional Neglect: none or minimal = 5–9, low to moderate = 10–14, moderate to severe = 15–17, and severe to extreme = 18+; and Physical Neglect: none or minimal = 5–7, low to moderate = 8–9, moderate to severe = 10–12, and severe to extreme = 13+. For each domain, childhood trauma was considered likely when a participant had scores \geq those defined in the low-to-moderate category. The validity and reliability of the Turkish version of the questionnaire were determined by Aslan et al. [31].

2.5. Dissociative Experiences Scale (DES)

The DES is a psychological self-assessment 28-item questionnaire that measures dissociative symptoms based on three subscales on amnesia (consisting of items 3–6, 8, 10, 25, and 26), absorption and fantasy (consisting of items 2, 14–18, 20, 22, and 23) and depersonalization/de-realization (consisting of items 7, 11–13, 27, and 28). The overall DES score is obtained by adding the 28 item scores and dividing by 28, yielding an overall score ranging from 0 to 100 with scores exceeding 30 denoting the likelihood of dissociative disorder and suggesting that a clinical assessment for dissociation is warranted [32–34]. The validity and reliability of the Turkish version of the questionnaire were determined by Yargic et al. and were found to be equal to its original form [35].

2.6. Statistical analysis

A statistical analysis was conducted using IBM SPSS Statistics (IBM Corp. Released 2012, IBM SPSS Statistics for Windows, version 20.0. Armonk, NY: IBM Corp). Chi-square (χ^2) and Fisher's exact tests were used to compare the categorical data whereas Student's *t*-test, Mann-Whitney U test and ANOVA along with the Bonferroni correction for *p* values, were used to analyze the numerical data. Pearson's correlation test was used for our correlation analysis. Data were expressed as the mean \pm standard deviation (SD), minimum-maximum and percentage (%) values where appropriate. $p < 0.05$ was considered statistically significant. To test the potential role of reported psychiatric problems, adverse family experiences and DES as mediators between reported childhood trauma and criminal behavior, we used the process macro for SPSS [36] based on testing for the following four conditions: 1) potential predictors are associated with mediators, 2) potential predictors are associated with outcome variables, 3) mediators are associated with outcome variables while controlling for predictors and 4) the impact of predictors is significantly less after controlling for mediators. To support these conditions, bootstrapped (1000 iterations) 95% confidence intervals and the Sobel test *p* value were obtained for the proposed mediators to allow the determination of the presence of any indirect effects, using the process macro for SPSS [26,36].

3. Results

3.1. Demographics, adverse family experiences, psychiatric and criminal background

The mean \pm SD age at first offense was 27.6 \pm 9.4 years. The most common adverse family experiences during childhood were a low family economic status (69.0%) and the presence of a convicted family member (53.5%). A history of psychiatric disease, suicide attempts and

substance use was noted in 40.0%, 37.0% and 38.5% of subjects, respectively. Current convictions were due to property crimes (61.0%) in most cases, followed by violent (26.0%) and sexual crimes (13.0%) (Table 1).

Several historical items were more common in females than in males including family history of psychiatric disease (23.0% vs. 13.0%, $p = 0.048$), a personal history of psychiatric disease (51.0% vs. 29.0%, $p < 0.001$), and previous suicide attempts (49.0% vs. 25.0%, $p < 0.001$). In male inmates, in contrast, there were higher rates of substance abuse (48.0% vs. 29.0%, $p < 0.001$) and previous convictions (50.0% vs. 25.0%, $p < 0.001$). Males also had a younger age at first crime (24.9 \pm 8.9 years vs. 30.3 \pm 9.2 years, $p < 0.001$) (Table 1).

A significant gender influence on forms of crime was noted, as the rates of sexual crimes were higher in males (92.3 vs. 7.7%, $p < 0.001$), and the rates of violent crimes were higher in females (69.2 vs. 30.8% $p < 0.001$).

No significant difference was noted between forms of crime with respect to adverse family experiences. Violent crimes were associated with significantly higher rates of previous suicide attempts (48.1 vs. 15.1%, $p = 0.01$) and an older age at first offense (30.3 \pm 10.2 vs. 23.8 \pm 7.1, $p = 0.005$) than sexual crimes (Table 1).

3.2. CTQ and DES scores in the overall study population

The total CTQ score was a mean \pm SD of 49.1 \pm 20.1 and ≥ 62 in 23.5% of subjects. Emotional abuse was considered likely in 47.0% of subjects; physical abuse, in 37.0%; sexual abuse, in 49.5%; emotional neglect, in 68.0%; and physical neglect, in 55.5%. The percentage of subjects with severe/extreme traumatization ranged from 15.5% for emotional abuse to 29.0% for emotional neglect (Table 2).

The total DES score was reported as 29.7 \pm 21.1, with a likelihood of dissociative disorder (total score > 30) noted for 43.5% of subjects (Table 2).

Table 1
Demographics, adverse family experiences, psychiatric and criminal background according to gender and forms of crime.

	Total (n = 200)	Gender			Forms of crime				Post-hoc test		
		Female (n = 100)	Male (n = 100)	p Value	Property crime (n = 122)	Sexual crime (n = 26)	Violent crime (n = 52)	p Value	p ¹	p ²	p ³
Adverse family experiences											
# of family members, mean \pm SD	7.5 \pm 3.6	7.7 \pm 4.0	7.3 \pm 3.01	0.477 ^d	7.6 \pm 3.9	7.8 \pm 2.6	7.2 \pm 2.9	0.489 ^a	-	-	-
# of siblings, mean \pm SD	4.1 \pm 2.7	4.1 \pm 2.6	4.1 \pm 2.9	0.574 ^d	4.1 \pm 2.8	4.7 \pm 2.2	4.1 \pm 2.8	0.192 ^a	-	-	-
Economic status at childhood, n(%)	Low 138 (69.0)	67(67.0)	71(71.0)	0.541 ^b	78(63.9)	21 (80.8)	39(75)	0.137 ^c	-	-	-
	High 62 (31.0)	33(33.0)	29(29.0)		44(36.1)	5(19.2)	13(25)				
Parental separation, n(%)	79 (39.5)	41(41.0)	38(38.0)	0.664 ^b	49(40.2)	12(46.2)	18(34.6)	0.604 ^c	-	-	-
Parental loss, n(%)	27 (13.5)	18(18.0)	9(9.0)	0.097 ^c	17(13.9)	2(7.7)	8(15.4)	0.723 ^c	-	-	-
Convicted family member, n(%)	107 (53.5)	51(51.0)	56(56.0)	0.285	71(58.2)	12(46.2)	24(46.2)	0.25	-	-	-
Family history, n(%)	36(18.0)	23(23.0)	13(13.0)	0.048	22(18.0)	3(11.5)	11(21.2)	0.58	-	-	-
	71 (35.5)	37(37.0)	34(34.0)	0.384	42(34.4)	8(30.8)	21(40.4)	0.65	-	-	-
Psychiatric background											
History of psychiatric disease	80 (40.0)	51(51.0)	29(29.0)	<0.001	53(43.4)	6(23.1)	21(80.8)	0.15	-	-	-
Previous suicide attempt	74 (37.0)	49(49.0)	25(25.0)	<0.001	45(36.9)	4(15.4)	25(48.1)	0.01	0.06	0.23	0.01
Substance use	77 (38.5)	29(29.0)	48(48.0)	<0.001	52(42.6)	13(50.0)	12(23.1)	0.02	0.64	0.02	0.03
Criminal background											
Previous conviction, n(%)	75 (37.5)	25(25.0)	50(50.0)	<0.001	53(43.4)	11(42.3)	11(21.2)	0.01	0.91	0.01	0.09
Age at first offense (year), mean \pm SD	27.6 \pm 9.4	30.3 \pm 9.2	24.9 \pm 8.9	<0.001	27.2 \pm 9.2	23.8 \pm 7.1	30.3 \pm 10.2	0.01	0.102	0.070	0.005
Time served in prison (day), mean \pm SD	3429.9 \pm 3121.5	7236 \pm 7132	960.6 \pm 619.6	0.01	739.9 \pm 634.5	760.0 \pm 459.4	1123.1 \pm 787.5	0.00	0.422	<0.001	0.026
Sentence received (day), mean \pm SD	1815.5 \pm 10386	896.9 \pm 876.2	1474.1 \pm 11102	<0.001	2875.0 \pm 2854.9	2905.0 \pm 2854.9	5295.1 \pm 3686.0	0.00	0.617	<0.001	0.014

χ^2 test. Independent samples *t*-test. ANOVA.

p1: property-sexual; p2: property-violent; p3:sexual-violent.

Post-hoc tests $p < 0.016$ (Bonferroni correction). Values in bold indicate statistical significance ($p < 0.05$).

^a Kruskal Wallis test.

^b Chi-Square test.

^c Fisher Exact test.

^d Mann Whitney U test.

3.3. CTQ and DES scores according to forms of crime and gender

The CTQ total (51.9 ± 20.9 vs. 46.2 ± 18.9 , $p = 0.04$) and sexual abuse domain (9.5 ± 5.3 vs. 7.0 ± 3.8 , $p = 0.00$) scores were significantly higher in females than in males. No significant difference in DES scores was noted between men and women. Both CTQ and DES scores were similar with respect to forms of crime.

3.4. CTQ scores with respect to DES, age, adverse family experiences and psychiatric background

Significant positive correlations were noted between CTQ and DES in terms of total scores ($r = 0.50$, $p < 0.01$) and domain scores ($p < 0.01$ for each) (Table 3).

CTQ emotional abuse ($r = -0.156$, $p < 0.05$) and sexual abuse ($r = -0.149$, $p < 0.05$) scores were negatively correlated with age, whereas physical neglect scores were positively correlated with the number of siblings ($r = 0.166$, $p < 0.05$) (Table 3).

CTQ total and domain scores were higher in inmates with a low economic status during childhood (p values ranged from <0.05 to <0.001), a history of parental separation ($p < 0.001$ for each), a family history of substance abuse (p values ranged from <0.05 to <0.001), and a personal history of suicide attempts ($p < 0.001$ for each) and substance use (p values ranged from <0.05 to <0.001). Emotional ($p < 0.001$) and physical ($p = 0.001$) neglect scores were significantly higher in inmates with a convicted family member, whereas emotional abuse scores were higher in inmates with a history of a psychiatric disease ($p = 0.019$) (Table 3).

3.5. Mediators and the relationship between childhood trauma and criminal behavior

To explore the relationship between CTQ and criminal behavior (age at first offense and sentence length) and the possible mediating roles of adverse family experiences psychiatric problems and DES in this relationship, four conditions were tested. For condition 1, the trauma predictor CTQ total was regressed onto psychiatric problems ($\beta = 0.315$, $p < 0.001$), adverse family experiences ($\beta = 0.391$, $p < 0.001$) and DES total score ($\beta = 0.514$, $p < 0.001$), while controlling for age. For condition 2, the CTQ total score was regressed onto the outcome variables 'sentence length in months' and 'age at first offense', individually, while controlling for age. 'Sentence length in months' was not associated with 'CTQ total' ($\beta = 0.075$, $p = 0.292$). However, 'age at first offense' was significantly associated with 'CTQ total' ($\beta = 0.772$, $p < 0.001$). For condition 3, "Psychiatric problems, adverse family experiences and DES" were regressed onto 'sentence length in months' and

'age at first offense' while controlling for age; their relationship to either sentence length ($\beta = 0.033$, $p = 0.639$, $\beta = 0.040$, $p = 0.572$ and $\beta = -0.018$, $p = 0.798$, respectively) or age at first offense ($\beta = -0.075$, $p = 0.091$, $\beta = -0.072$, $p = 0.10$; and $\beta = -0.082$, $p = 0.071$, respectively) was not significant. For condition 4, 'CTQ total' was regressed onto 'age at first offense', while controlling for age. The mediators were then added into the model. The changes are shown in Table 4. After establishing changes in each relationship and after controlling for the proposed mediators, we performed a bootstrap analysis of the direct and indirect effects of proposed predicting and mediating variables on the outcome variables, which provided clarity on the significance of these changes, as shown in Table 4. Where the confidence intervals contain a zero value, there was no effect. Inspection of the confidence intervals (Table 4) revealed a significant indirect effect of the DES, psychiatric problems and adverse family experiences on the relationship between CTQ total and age at first offense. Fig. 1 illustrates the outcome of the analyses. For sentence length, since none of the parameters (outcome or potential mediators) were associated with criminal behavior, no assessment could be performed to assess the strength of the relationship when controlling for a mediator or the effects of mediator variables with bootstrapped confidence intervals.

4. Discussion

Our findings in a cohort of prison inmates revealed a high prevalence of adverse family experiences during childhood overall, a preponderance of individual and family histories for psychiatric diseases in females and higher rates of previous conviction and younger age at first offense in males. Childhood trauma was evident in a considerable portion of inmates that ranged from 37.0% for physical neglect to 68.0% for emotional neglect, whereas the likelihood of dissociative disorder was noted in almost half of the inmates. CTQ total and sexual abuse scores were higher along with higher rates of committing violent crimes in females, whereas no gender influence was evident for the DES scores and adverse family experiences, and CTQ scores were similar for different forms of crime. CTQ total scores were associated with age at first offense but not with sentence length in our cohort.

Overall, CTQ scores were in the range of moderate-to-severe trauma for the sexual abuse domain and in the low-to-moderate range for all other domains in our cohort. This supports data from past studies revealing high rates of exposure to traumatic events among inmates across gender and ethnic groups [6] and the presence of at least one moderate to severe childhood trauma for half of all inmates [6,37].

Alongside a high prevalence of childhood trauma, there was a significant relationship between CTQ total scores and age at first offense in

Table 2
CTQ and DES scores in the overall study population.

Childhood Trauma Questionnaire	Score, mean(SD)	Severity, n(%)			
		None or minimal	Low to moderate	Moderate to severe	Severe to extreme
Emotional abuse	9.8 ± 5.2	106 (53.0)	48 (24.0)	15 (7.5)	31 (15.5)
Physical abuse	8.6 ± 5.4	126 (63.0)	16 (8.0)	19 (9.5)	39 (19.5)
Sexual abuse	8.2 ± 4.8	101 (50.5)	23 (11.5)	42 (21.0)	34 (17.0)
Emotional neglect	13.6 ± 6.0	64 (32.0)	47 (23.5)	31 (15.5)	58 (29.0)
Physical neglect	8.9 ± 3.7	89 (44.5)	41 (20.5)	33 (16.5)	37 (18.5)
Minimization score	0.5 ± 0.8	–	–	–	–
Total score	49.1 ± 20.1	Percentiles, n(%)			
		25–34	35–45	46–61	62+
		58 (29.0)	47 (23.5)	48 (24.0)	47 (23.5)
Dissociative experiences scale					Score, mean(SD)
Absorption					37.2 ± 23.0
Amnesia					23.5 ± 21.97
De-realization/depersonalization					25.7 ± 24.8
Total score		mean(SD)			29.7 ± 21.1
		>30 DE (+), n(%)			87(43.5)

DE: dissociative experiences.

Table 3
CTQ scores with respect to DES, age, adverse family experiences and psychiatric background.

	Childhood trauma questionnaire					Total score
	Emotional abuse	Physical abuse	Sexual abuse	Emotional neglect	Physical neglect	
DES scores ^a						
Absorption	0.42**	0.41**	0.24**	0.22**	0.40**	0.41**
Amnesia	0.46**	0.42**	0.29**	0.24**	0.44**	0.45**
Derealization/depersonalization	0.49**	0.45**	0.32**	0.31**	0.40**	0.49**
Total score	0.51**	0.47**	0.32**	0.29**	0.47**	0.50**
Age ^b	−0.156*	−0.126	−0.149*	−0.074	−0.067	−0.112
Adverse family experiences						
Number of family members	0.072	0.046	0.034	0.093	0.108	0.098
Number of siblings	0.083	0.062	−0.008	0.128	0.166*	0.132
Economic status (childhood)						
Low (n = 138)	10.3 ± 5.1	9.1 ± 5.4	8.8 ± 5.04	14.4 ± 5.8	9.5 ± 3.6	51.9 ± 19.8
High (n = 62)	8.8 ± 5.3	7.6 ± 5.2	6.9 ± 3.8	11.8 ± 6.02	7.7 ± 3.4	42.8 ± 19.4
p value ^c	0.004	0.003	0.008	0.003	<0.001	<0.001
Parental separation						
No (n = 121)	8.6 ± 4.3	7.2 ± 3.9	7.1 ± 3.6	12.03 ± 5.9	8.2 ± 3.3	42.9 ± 16.4
Yes (n = 79)	11.6 ± 5.9	10.8 ± 6.4	9.9 ± 5.7	15.9 ± 5.2	10.1 ± 3.9	58.5 ± 21.6
p value ^c	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Parental loss						
No (n = 173)	9.6 ± 5.1	8.4 ± 5.3	8 ± 4.6	13.4 ± 5.9	8.7 ± 3.5	48.2 ± 19.7
Yes (n = 27)	11.1 ± 5.9	9.6 ± 5.6	9.4 ± 5.6	14.5 ± 6.1	10.1 ± 4.6	54.7 ± 22.1
p value ^c	0.210	0.231	0.200	0.385	0.184	0.126
Convicted family member						
No (n = 93)	9.4 ± 5.2	8.3 ± 5.6	8.5 ± 5.05	11.8 ± 5.8	8.1 ± 3.4	46.1 ± 21.1
Yes (n = 107)	10.1 ± 5.2	8.9 ± 5.2	7.9 ± 4.5	15.2 ± 5.7	9.6 ± 3.8	51.6 ± 18.9
p value ^c	0.197	0.083	0.579	<0.001	0.001	0.006
Family history for substance abuse						
No (n = 129)	9.03 ± 4.8	7.7 ± 4.6	7.6 ± 4.2	12.5 ± 5.8	8.3 ± 3.4	45.1 ± 18.1
Yes (n = 71)	11.2 ± 5.7	10.3 ± 6.1	9.3 ± 5.4	15.6 ± 5.8	10.1 ± 3.9	56.2 ± 21.6
p value ^c	0.006	0.001	0.012	<0.001	0.001	<0.001
Psychiatric background						
Past history of psychiatric disease						
No (n = 120)	9.0 ± 4.5	7.9 ± 4.6	7.9 ± 4.4	13.5 ± 5.9	8.6 ± 3.5	46.7 ± 18.1
Yes (n = 80)	11.1 ± 5.9	9.6 ± 6.2	8.8 ± 6.2	13.8 ± 6.1	9.4 ± 3.9	52.6 ± 22.4
p value	0.019	0.064	0.396	0.699	0.201	0.120
Suicide attempt						
No (n = 126)	8.4 ± 4.4	7.4 ± 4.8	6.9 ± 3.6	12.4 ± 6.0	7.9 ± 3.4	42.8 ± 17.2
Yes (n = 74)	12.3 ± 5.5	10.6 ± 5.7	10.6 ± 5.6	15.6 ± 5.5	10.7 ± 4.0	59.7 ± 20.3
p value ^c	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Substance use						
No (n = 123)	8.9 ± 5	7.7 ± 4.9	7.6 ± 4.4	12.8 ± 5.9	8.2 ± 3.2	45.2 ± 19.4
Yes (n = 77)	11.2 ± 5.3	10.0 ± 5.7	9.2 ± 5.2	14.9 ± 6.0	10.1 ± 4.4	55.2 ± 19.8
p value ^c	<0.001	<0.001	0.012	0.013	0.001	<0.001

Values in bold indicate statistical significance ($p < 0.05$).

^a Pearson correlation analysis

^b Spearman's rho correlation.

^c Mann-Whitney U test.

* $p < 0.05$.

** $p < 0.01$.

our cohort. This seems to support the potential link considered between childhood traumatization and criminal behavior [6] and the consideration of childhood trauma to predict an early onset and chronicity of offending [38–40].

Childhood traumatization has been suggested to be associated with aggressive, hostile and violent behavior, as victims of childhood trauma have a higher likelihood of committing serious-violent crimes [7,11,26,38,41,42]. In fact, experiencing trauma and abuse during childhood was considered to increase the odds of violent behavior in juvenile offenders by >200% [43]. However, despite males had greater involvement in criminal behavior with higher rates of previous conviction and younger age at first crime, females had higher CTQ scores and committed violent crimes more commonly than males in our cohort.

Albeit opposing the consideration of the vast majority of offenses committed by females to be non-violent or property related [19], our

findings in fact support the high prevalence of sexual abuse among incarcerated females reported in past cross-sectional studies to range from 68% to 98% [6,19,44–50]. This seems notable given that sexual abuse is considered to be one of the most salient, severe, and distressing forms of trauma to occur during childhood [38,51,52].

Notably, in a study among female prisoners, adult experience of trauma was reported to be significantly associated with the severity of the most recent offense, as measured by the length of the sentence, but not with age at first offense [26]. Those authors noted the potential mediator role of adulthood psychological trauma in the relationship between childhood trauma and the severity of subsequent offending behavior in female inmates [26].

This seems notable given the higher prevalence of psychiatric diseases and previous suicide attempts among incarcerated females in our cohort. Childhood sexual abuse was shown to predict mental disorders and mental health problems even after controlling for

Table 4
Mediators and the relationship between childhood trauma and criminal behavior.

Condition 1		Relation of CTQ with potential mediators													
		Psychiatric problems		Adverse family experiences		DES									
β		0.315		0.391		0.514									
SE		0.921		1.127		0.060									
p		<0.001		<0.001		<0.001									
Condition 2		Relation of age at first offense with			Relation of sentence length with										
Condition 3		Potential mediators			Potential mediators										
CTQ		Psychiatric problems	Adverse family experiences	DES	CTQ	Psychiatric problems	Adverse family experiences	DES							
β	0.772	-0.075	-0.072	-0.082	0.075	0.033	0.040	-0.018							
SE	0.044	0.282	0.356	0.020	0.002	32.75	41.30	2.283							
p	<0.001	0.091	0.102	0.071	0.292	0.639	0.572	0.798							
Condition 4		Changes in B value for CTQ-age at first offense relationship after controlling for each proposed mediator													
Initial strength		Strength when controlling for						Independent effect of							
		Psychiatric problems		Adverse family experiences		DES		Psychiatric problems		Adverse family experiences		DES			
		β	p	β	p	β	p	β	p	β	p	β	p		
CTQ-age at first offense		0.772	<0.001	-0.117	0.012	-0.119	0.013	-0.119	0.019	-0.075	0.091	-0.072	0.102	-0.082	0.071
Bootstrapping confidence intervals		Direct and indirect effects of mediator variables with bootstrapped confidence intervals													
		Mediator						Bootstrapping (1000)							
								95% CI lower bound*			95% CI upper bound*				
Relationship CTQ- age at first offense		DES						-0.25			0.167				
		Psychiatric problems						-0.68			0.63				
		Adverse family experiences						-0.81			0.76				

* Where the confidence interval contains 0.0, this mediator has non-significant effect.

sociodemographic factors and for other forms of childhood and adult trauma [53]. Alongside an association of sexual abuse with suicide attempts [54], depression, anxiety and sexual abuse have been reported to be highly prevalent in the majority of female inmates compared to females of the general population and male inmates [55–57].

Furthermore, unresolved childhood trauma has been considered to be associated with re-enactments in the behavior of offenders involving both “acting-in” behaviors, such as self-harm, suicide, or depression, and “acting-out” behaviors, such as harm to others and criminal activity [27].

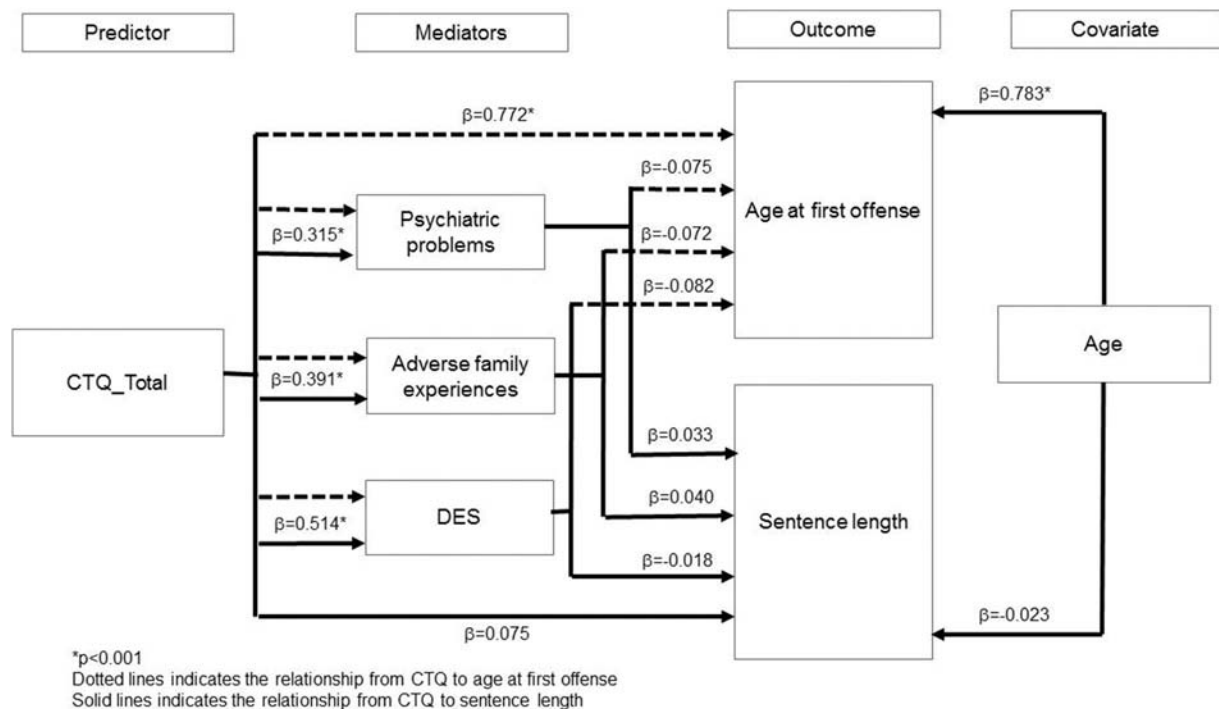


Fig. 1. The relationship of childhood trauma with age at first offense and length of criminal sentence in relation to mediating roles of adverse family experiences, psychiatric problems and dissociative experiences. CTQ, Childhood Trauma Questionnaire; DES, Dissociative Experiences Scale.

Hence, our findings seem to indicate the potential impact of severe persisting effects of unresolved childhood trauma, characterized by sexual abuse in particular, on offending violent crimes in the adulthood among females.

Nonetheless, caution must be exercised in the interpretation of these results, given that the female inmates were from a closed prison with a large prisoner capacity and conditions that are more appropriate for prisoners who have children and are serving particularly long sentences. In addition, during the interviews, we noticed that females serving particularly long sentences showed a greater tendency to communicate with researchers and a greater willingness to participate in the study. This observation seems to be consistent with the statement that these prisoners need to receive psychological treatment.

A younger age at first offense and higher rates of previous incarceration, substance use and sexual crimes among males in our cohort appear to be consistent with the consideration of substance abuse alongside trauma as a major risk factor for incarceration among males [2,58–60] and younger ages at the time of the first crime for most sexual criminals [61].

Indeed, the male inmates in our cohort began offending in their late-teenage years, unlike life-course persistent offenders, who begin offending very early in life, often in childhood, and commit a wide variety of serious and violent crimes throughout their lives [38,62,63]. Thus, our findings seem to emphasize the likelihood of a vicious cycle of substance misuse and offending behavior in males, with substance misuse acting as a trigger for future criminal behavior and as a coping mechanism as a result of the persisting effects of childhood trauma [26,64,65].

CTQ total scores were associated with age at first offense but not with sentence length in our cohort. This seems to indicate a direct association between childhood trauma and subsequent offending while also emphasizing that an offense committed by those with childhood trauma does not necessarily have to be a violent and more serious offense.

Childhood traumatization was associated with substance abuse and earlier and more frequent offending mostly with sexual crimes among males; however, there was a predominance of sexual abuse and a psychiatric history with suicide attempts and violent crimes among females in our cohort. This seems to indicate a potential gender influence on the persisting effects of unresolved childhood traumatization in terms of type and severity of psychopathological outcome and offending patterns in adulthood.

Our findings also revealed an association of childhood traumatization with a higher likelihood of adverse family experiences, psychiatric problems and dissociative experiences alongside their potential mediator role in the relationship between childhood trauma and subsequent criminal behavior.

Similarly, childhood emotional and physical neglect and an inclination toward exhibiting criminal behavior were considered more likely in the case of adverse family conditions, such as crowded households, parental incarceration and parental separation due to decreased levels of parental care and monitoring, reduced family incomes and stigma and labeling processes [66–72].

Consistent with the high rates of dissociative experiences (10 to 50%) reported in past studies conducted on prison inmates [13,73–75], the DES scores were >30 in almost half of the inmates in our cohort. Although dissociation is hypothesized to facilitate the perpetration of violence in offenders by creating amnesia and perceptual alterations, such as depersonalization/de-realization under certain conditions [10,12,76], our findings revealed no significant differences between forms of crime with respect to DES scores. Additionally, despite a higher prevalence of violent crimes found among females, DES scores were found to be similar between female and male inmates in our cohort.

In fact, childhood trauma has been considered a rather challenging concept, given that it may not only be predicted by unfavorable familial conditions but also act synergistically with these factors to modify

personality traits of aggression, impulsivity, alcohol abuse and suicidality [18,77,78].

Hence, our findings indicate a potential link between childhood traumatization and subsequent offending; however, the association between childhood trauma and severity of subsequent offending must be more specifically addressed in terms of type and gender-specific adverse effects of unresolved childhood trauma.

The main strength of this cross-sectional study is the generalizability of our findings to the entire inmate population in Turkey given our inclusion of inmates of both sexes and of four large prisons in Istanbul province hosting prisoners from several regions across Turkey. However, certain limitations to this study should be considered. First, our cross-sectional design precludes the possibility of drawing extensive causal conclusions. Second, although psychometric scales were applied via face-to-face interviews conducted in a separate room and only after the formation of a secure researcher-inmate bond, males are considered more likely to not report sexual abuse and to refuse considering traumatic experiences of sexual abuse [79]. Nevertheless, despite these certain limitations, our findings present new data on the relationship between childhood trauma and subsequent offending in terms of adverse family experiences during childhood, dissociative experiences and psychiatric background and thus represent a valuable contribution to the literature.

5. Conclusion

In conclusion, our findings revealed a high prevalence of and significant associations among childhood trauma, dissociative experiences, adverse family experiences and psychiatric problems in a cohort of incarcerated females and males. A psychiatric background, childhood trauma characterized by sexual abuse and violent crimes were found to be predominant in female prison inmates. A criminal background with a younger age at first offense and frequent previous convictions, substance use and sexual crimes were more prevalent among male inmates. Our findings indicate a potential link between childhood traumatization and criminal behavior in terms of subsequent offending, but not in terms of severity of the subsequent offense. Accordingly, a potential gender influence on long-term reflections of unresolved childhood traumatization seems likely in terms of type and severity of adulthood psychopathology and offending pattern. Our findings emphasize the importance of recognizing traumatic and dissociative experiences and unfavorable familial conditions in childhood to provide timely support to prevent long-term psychopathology and common trajectories from childhood trauma to criminal behavior.

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