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Childhood maltreatment and personality disorders in the USA: Specificity of effects and the impact of gender

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Abstract

Childhood maltreatment increases the risk for adult personality disorders (PDs), but several PDs or maltreatment types co-occur. Specificity of maltreatment–personality associations is poorly understood. Using a representative US population sample, we identified specific associations between maltreatment types (sexual, physical and emotional abuse and physical and emotional neglect) and PDs after controlling for basic demographics, parental psychopathology, co-occurring maltreatment types and comorbid PD. We then examined interactions of gender and maltreatment in predicting PDs. Each maltreatment type significantly predicted three–four PDs. Borderline and schizotypal PDs were most strongly predicted by sexual abuse, antisocial by physical abuse and avoidant and schizoid by emotional neglect. Specific vulnerabilities differ by gender; maltreated boys may respond with attention seeking and girls with social withdrawal. Findings highlight the importance of evaluating all forms of maltreatment even when they co-occur and can inform development of interventions to prevent personality pathology in at-risk children.

Introduction

Personality disorders (PDs), as defined in DSM-IV (APA, 1994), are pervasive, enduring patterns of experience and behaviour that create significant distress or functional impairment. PDs predict suicidality, crime and physical and mental health problems (Black, Gunter, Loveless, Allen, & Sieleni, 2010; Chen et al., 2009; Leichsenring, Leibling, Kruse, New, & Leweke, 2011). Identifying risk factors for PDs constitutes an important step in developing preventive interventions.

One risk factor is childhood maltreatment. Studies have found associations between adult PD symptoms and childhood maltreatment, either self reported (Bernstein, Stein, & Handelsman, 1998; Bierer et al., 2003; Lobbetael, Arntz, & Bernstein, 2010) or publicly

documented (Widom, Czaja, & Paris, 2009). However, findings on the general relationship of childhood maltreatment to personality pathology do not differentiate between specific types of maltreatment or specific PDs. Separate PD symptom profiles suggest the need to investigate specific aspects of their risk factors. The World Health Organization categorization of maltreatment into sexual abuse, physical abuse, emotional abuse, physical neglect and emotional neglect (Leeb, Paulozzi, Melanson, Simon, & Arias, 2007) stimulates questions about relationships between specific maltreatment types and PDs.

Information on specificity of these relationships is limited because of gaps in the literature, including failure to consider the frequent co-occurrence of maltreatment subtypes (Gilbert et al., 2009) or comorbidity of the 10 DSM-IV-defined PDs (Grant, Stinson, Dawson, Chou, & Ruan, 2005). Thus, apparent relationships between specific types of maltreatment and PDs may be artefacts of the complex patterns of co-occurrence and comorbidity. To accurately identify specific associations, all PDs and all maltreatment subtypes must be included in a single controlled analysis.

Another gap in information arises because most studies treated different maltreatment types or PDs as interchangeable, or examined only a subset of them. For example, few studies addressed neglect or emotional abuse and PDs, despite evidence for severe long-term effects on other mental health outcomes (Gilbert et al., 2009). Studies incorporating all maltreatment subtypes would address this gap. To date, the unique specificity of associations between all maltreatment types and personality diagnoses has not been examined in a general population sample, only in three primary clinical samples (Bernstein et al., 1998; Bierer et al., 2003; Lobbetael et al., 2010). Results of these studies diverged widely, although all found that physical abuse predicted antisocial PD, and emotional abuse predicted borderline and paranoid PDs. Thus, few general inferences can be drawn.

Yet another gap in information concerns potential genetic vulnerability. As a proxy for genetic vulnerability, parental psychopathology is associated with childhood maltreatment (Gilbert et al., 2009; Widom et al., 2009), antisocial PD (Buu et al., 2009) and borderline PD (Widom et al., 2009), but studies of maltreatment effects have not adjusted for family history.

Finally, gender generally moderates associations between childhood maltreatment and subsequent psychopathology (Schilling, Aseltine, & Gore, 2007; Widom, Czaja, & Dutton, 2008), but no population-based studies have examined the gender's effects on specific maltreatment-PD associations. Differential effects on male and female development are relevant to etiological theories and identification of high-risk populations.

One recent study (Afifi et al., 2011) explored associations of PDs with the five maltreatment types in a large national dataset (the National Epidemiological Survey on Alcohol and Related Conditions (NESARC)), reporting numerous positive associations. However, the study lacked control for co-occurring maltreatment types, thereby introducing a common confound and leaving results unclear and non-specific. Additionally, similar to most clinical studies, the study did not control parental psychopathology, or examine gender differences.

Filling these research gaps has clinical and theoretical importance. We therefore estimated specific associations between each maltreatment type (sexual, physical and emotional abuse and physical and emotional neglect) and each DSM-IV PD in the NESARC, after controlling for co-occurring maltreatments, co-occurring PDs and relevant family history and demographic covariates. Given the relative inattention to neglect and emotional abuse, we compared the effects of these and other maltreatment types. Finally, we examined how gender moderates these associations.

Method

Sample and procedures

In 2001–2002 (NESARC wave 1), in-person interviews were conducted with a representative sample of 43 093 adults, oversampling Black people, Hispanics and young adults. In 2004–2005 (NESARC wave 2; the sample for the present study), 34 653 participants were re-interviewed (86.7% of those eligible; cumulative response rate 70.2%). Reasons for ineligibility included death, deportation, mental or physical impairment, or active military duty. Data were weighted to represent the US adult population (age 18 years) on age, gender, race, ethnicity and region. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV) (Grant et al., 2003; Ruan et al., 2008), a structured diagnostic interview, was administered by experienced lay interviewers with extensive training and supervision. All procedures, including informed consent, received ethical approval from the US Census Bureau and Office of Management and Budget. Detailed methodological information is provided elsewhere (Grant et al., 2004).

Personality disorder assessment

Antisocial, avoidant, dependent, histrionic, obsessive–compulsive, paranoid and schizoid PDs were assessed at wave 1. At wave 2, borderline, narcissistic and schizotypal PDs were assessed, and antisocial PD was re-assessed. Antisocial PD was identified if respondents reported a history of conduct disorder and 3 adult antisocial symptoms continuing from waves 1 to 2. Other PDs were identified when respondents endorsed enough symptoms to meet the DSM-IV diagnostic threshold and reported social/occupational dysfunction for 1 item. Test-retest reliability of NESARC PDs ranges from fair (paranoid, histrionic and avoidant $\kappa = 0.40$ – 0.45) to very good (schizotypal, antisocial, narcissistic and borderline $\kappa = 0.67$ – 0.71) (Grant et al., 2003; Ruan et al., 2008) thus comparing favourably to semi-structured clinical interviews (Zimmerman, 1994) and correlate with significant social and mental disability (Grant et al., 2004).

Childhood maltreatments

The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV items regarding the frequency of childhood maltreatment were drawn from the Childhood Trauma Questionnaire, a widely used scale validated against child welfare, family and clinician reports (Bernstein et al., 1994; Bernstein, Ahluvalia, Pogge, & Handelsman, 1997). The means [range] of sexual, physical and emotional abuse and physical and emotional neglect scales in the NESARC are 0.39 [0–16], 0.84 [0–8], 1.38 [0–12], 1.05 [0–20] and 3.23 [0–20] respectively. These scales have excellent test-retest reliability (intraclass correlation coefficients, 0.79–0.88) and internal consistency (Cronbach's alphas, 0.78–0.90) (Ruan et al., 2008).

To aid interpretation, we created dichotomous childhood maltreatment variables, coded as follows. Sexual abuse: respondents reported that an adult coerced them into sexual bodily contact ($N = 3854$, 11.1%). Physical abuse: respondents' caregivers injured them or at least fairly often used physical force against them ($N = 5757$, 16.6%). Emotional abuse: respondents at least sometimes feared injury from a caregiver, or were at least fairly often verbally abused or threatened by a caregiver ($N = 4724$, 13.6%). Physical neglect: respondents' caregivers left them unsupervised before age 10 years at least sometimes, demanded age-inappropriate chores, or withheld food, basic necessities, or adequate medical treatment ($N = 5980$, 17.3%). Emotional neglect: at least two of the following items almost never happened: someone in their family wanted them to succeed, made them feel important, or family was supportive or close knit ($N = 3036$, 8.8%). Sexual abuse and emotional abuse/neglect were more common among women, physical abuse among men.

Odds of all maltreatment types were reduced among older adults (≥ 65) and elevated among Native Americans.

Assessment of covariates

Demographic information included age, gender, race/ethnicity and education. Parental psychiatric history was based on observed manifestations of maternal and paternal alcohol or drug problems, depression and antisocial PD. Test-retest reliability of these in the NESARC ranged from good to excellent (Grant et al., 2003).

Data analyses

Tetrachoric correlations and odds ratios (ORs) were computed to investigate co-occurrence of the five childhood maltreatment types. Associations of each maltreatment with the 10 PDs were examined by using logistic regression models controlling for age, sex, ethnicity, education, the other maltreatment types, parental psychiatric history in 1 area and presence of 1 other PD. To account for maltreatment co-occurrence, all five types were included as separate predictors. Model singularities precluded controlling other PDs individually. Adjusted OR (AOR) were computed with a reference level of 'no maltreatment'. Because of the large number of analyses, significance was set to $\alpha = 0.01$. Effects of maltreatment severity were examined in similar logistic regressions using a continuous measure of the target maltreatment (summed responses to all relevant items). Among maltreated respondents ($N = 12,437$), we created a count of maltreatment types and conducted logistic regressions predicting PD from this accumulation variable and our control variables.

To examine how gender affects maltreatment–PD associations, we first assessed the association of each PD with gender using logistic regression, controlling other demographic characteristics. This was to determine whether to use synergistic interaction models (when gender was associated with overall risk for the PD) or standard interaction models (when gender was unrelated to overall risk). In these preliminary analyses, we used a liberal significance level ($\alpha = 0.05$) to avoid excluding appropriate candidates for synergistic models. When one gender increased PD risk, we used synergistic interaction models (Darroch, 1997), calculating attributable proportions (APs) due to interaction for each maltreatment–PD pair following the procedure of Andersson et al. (Andersson, Alfredsson, Kallberg, Zdravkovic, & Ahlbom, 2005). This method has been used extensively to analyse additive interactions with binary outcomes (Wicks, Hjern, & Dalman, 2010). An AP above zero indicates synergy: combined effects of maltreatment and 'risk gender' are greater than the sum of effects of maltreatment in the other gender and gender among those without maltreatment. APs were considered significant if their 99% confidence intervals did not include zero and as showing a trend towards significant if 95% confidence intervals did not include zero. Interaction analyses controlled for demographics, parental psychopathology and presence of 1 other PD but did not individually control additional PDs and maltreatment types because of model restrictions. When neither gender was an independent risk factor, ORs on the basis of maltreatment were estimated in men and women separately, and multiplicative interaction terms were tested in logistic regressions. All analyses were conducted by using SUDAAN 10.0 ('SUDAAN Language Manual', Research Triangle Institute, Research Triangle Park, NC, USA, 2008).

Results

All five types of maltreatment were substantially and significantly associated with each other (Wald $\chi^2 p < 0.0001$), underscoring the need to control for all types in analyses to discern the unique effects of any one type. Tetrachoric correlations ranged from 0.38 (sexual abuse and emotional neglect) to 0.82 (physical and emotional abuse).

Maltreatment effects

Table 1 displays associations of childhood maltreatment types and PDs after full control for the covariates. Sexual abuse was associated with antisocial, borderline, narcissistic and schizotypal PDs (median [AOR] = 1.98). AOR exceeded 2.0 for borderline and schizotypal PDs. Physical abuse was associated with antisocial, borderline and schizotypal PDs (median [AOR] = 1.40); AOR exceeded 2.0 only for antisocial PD. Emotional abuse was associated with borderline, narcissistic and schizotypal PDs (median [AOR] = 1.49). Physical neglect was associated with borderline, narcissistic, paranoid and schizotypal PDs (median [AOR] = 1.39). Emotional neglect was associated with avoidant, paranoid and schizoid PDs (median [AOR] = 1.66) and was the only maltreatment significantly associated with avoidant and schizoid PDs.

Findings regarding severity were similar. Significant values were maintained for sexual and emotional maltreatments, but physical abuse severity was non-significant for schizotypal, and physical neglect was only significant for narcissistic PD. Additionally, repeated sexual abuse was associated with paranoid and schizotypal PDs and emotional abuse with antisocial PD.

Risk of antisocial, avoidant, borderline, narcissistic, paranoid, schizoid and schizotypal PDs were increased by the accumulation of multiple maltreatment types, with AOR per additional maltreatment ranging from 1.12 (narcissistic) to 1.50 (antisocial).

Maltreatment–gender interactions

Exploratory logistic regressions showed men at significantly greater risk for antisocial, narcissistic or schizotypal PDs (AORs 1.2–2.8). Synergistic interaction analysis indicated that this vulnerability increases in response to particular maltreatment types (Table 2). For antisocial PD, significant synergistic effects were found between the male gender and physical and emotional abuse. For narcissistic PD, synergistic effects were found between the male gender and sexual abuse, emotional abuse and physical neglect. For schizotypal PD, synergistic effects were found between the male gender and sexual abuse.

Exploratory logistic regressions showed women at greater risk for avoidant, borderline, dependent or paranoid PDs (AORs 1.4–1.95). Synergistic interaction analysis indicated that female vulnerability to avoidant and paranoid PDs increases in response to particular maltreatment types (Table 2). For avoidant PD, significant synergistic effects were found between the female gender and physical neglect. For paranoid PD, synergistic effects were found between the female gender and physical abuse. For avoidant and dependent PDs, we found a trend towards synergy between the female gender and emotional neglect, and for paranoid PD, we found a trend towards synergy between the female gender and emotional abuse or physical neglect. For borderline PD, no gender–maltreatment interactions reached a trend level of significance.

Among PDs not associated with gender overall, significant multiplicative interactions with gender were found for schizoid ($p < 0.01$) and histrionic (trend level; $p < 0.05$) but not obsessive–compulsive PD. Specifically, sexual abuse and emotional neglect may be associated with increased risk of histrionic PD only among men, whereas physical and emotional neglect increase risk of schizoid PD only among women.

Discussion

This was the first epidemiological study to assess unique effects of five childhood maltreatment types on subsequent occurrence of DSM-IV PDs, taking into account co-

occurring maltreatment, PD and moderating gender effects. The results contribute to the understanding of childhood maltreatments and PDs in several ways.

Each maltreatment subtype, including emotional abuse and both forms of neglect, uniquely contributes to three or four specific PDs; effects not attributable to parental psychiatric history or other maltreatment types. Specific associations with PDs were at least as strong for neglect or emotional abuse as for sexual or physical abuse, indicated both by OR point estimates and substantial overlap in confidence intervals. Indeed, only emotional neglect uniquely predicted avoidant and schizoid PDs. Although previous literature pays limited attention to neglect and emotional maltreatment, our findings emphasize the importance of attending to potential long-term effects of these maltreatments, even in the presence of sexual or physical abuse.

Our analyses confirm previous clinical results showing associations of physical abuse with antisocial PD and emotional abuse with borderline PD, demonstrating that these associations are neither restricted to treatment-seeking samples nor fully explained by parental psychopathology. However, we did not find that emotional abuse or its severity was associated with paranoid PD. The relationship may be restricted to clinical samples or a function of demographic variables that were controlled in our study.

As anticipated, we uncovered a less diffuse pattern of associations than a previous population-based study that did not address the co-occurrence of maltreatments (Afifi et al., 2011). Our more conservative estimates, which account for maltreatment co-occurrence and PD comorbidity, are more likely to be accurate regarding the specificity of risk for PD. These results are clinically valuable because treatments such as dialectical behavioural (Lynch, Trost, Salsman, & Linehan, 2007) or mentalization-based (Bateman & Fonagy, 2009) therapies for borderline PD, or schema-focused therapies (Giesen-Bloo et al., 2006) designed around several PDs, might be adapted for preventive use when specific risk groups for these PDs are known.

Further research can use the detected pattern of associations when considering intermediate variables that may mediate associations between childhood maltreatment and adult PD. For example, emotional neglect could promote interpersonal avoidance, common to avoidant, paranoid and schizoid PDs. Sexual abuse may promote identity disturbance and emotional dysregulation, contributing to the range of PDs that we identified. Research into such intermediate variables can guide the development of targeted interventions to help at-risk children. For instance, cognitive and dialectical behavioural skills training might promote resilience among sexually abused children, because these programmes strengthen emotional regulation in populations including adult survivors of child abuse (Cloitre, Koenen, Cohen, & Han, 2002) and school children (Fraser et al., 2005). Cognitive behavioural interventions, which show promise for preventing (Christensen, Pallister, Smale, Hickie, & Calear, 2010) and treating (Silverman, Pina, & Viswesvaran, 2008) social avoidance among children and adolescents, may help children exposed to emotional neglect.

Our findings suggest that gender modifies several maltreatment–PD pathways and is therefore relevant to designing interventions. Neglect predicted certain PDs more strongly among women, whereas sexual abuse was sometimes a stronger predictor among men. In addition, maltreated men had a heightened risk of antisocial or narcissistic PDs, suggesting that boys may respond to maltreatment by acting out. Conversely, maltreated women had a heightened risk of avoidant, paranoid or schizoid PDs, suggesting that girls may respond with social withdrawal. Thus, interventions targeting girls may benefit from a focus on anxiety and interpersonal avoidance, whereas interventions targeting boys could focus on unhealthy attention seeking and acting out.

Although a more stringent threshold for NESARC PD diagnoses has been suggested (Trull, Jahng, Tomko, Wood, & Sher, 2010), we used the original well-validated (Grant et al., 2004) NESARC criteria for PD. The more stringent the criteria limit the investigation to more severe cases, whereas the original threshold allows inclusion of everyone who meets DSM-IV requirements and comparison of our results to previous PD studies from the NESARC.

Study limitations are noted. The study used retrospective self-report to identify childhood maltreatment. Self-report may be subject to recall bias, and personality pathology may alter perceptions of one's childhood experiences, leading to differential reports of maltreatment. Using a validated scale that ascertains specific concrete experiences rather than asking participants to make value judgments about maltreatment, reduces the potential impact of such reporting factors; such methods have been validated through sibling confirmation (Bifulco, Brown, Lillie, & Jarvis, 1997) and prospectively (Robins et al., 1985). Although official verified reports of maltreatment are an important source of information in maltreatment studies, they miss the many cases that are not disclosed to authorities but can be identified by self-report. These considerations bolster the argument that retrospective self-report in epidemiological studies plays an important role in finding associations that merit further investigation (Rutter, Pickles, Murray, & Eaves, 2001). PDs were also assessed by self-report. Although reliability was similar to other PD measures and diagnoses were valid indicators of functional impairment, differential validity among PDs is limited by high comorbidity (Grant et al., 2005). This made it especially important to control other personality pathology in our analyses but made it statistically unfeasible to control each PD separately. We therefore accounted for non-specific elements of personality pathology through 'any other PD' covariate, allowing for specificity of results.

We did not control for axis I comorbidity. Given the cross-sectional nature of the study, determining whether axis I disorders preceded or followed PDs was not possible, whereas the time order of childhood maltreatments and PDs was clearer. Sensitivity analyses controlling lifetime axis I mood, anxiety and substance use disorders produced few substantive changes. Values were generally reduced slightly (median[AOR] 1.12 vs. 1.20 overall; 1.39 vs. 1.48 for the 17 values that were significant in the main analyses); significance fell below $p < 0.01$ for a few associations (antisocial–sexual abuse, borderline–physical abuse, schizotypal–physical/emotional abuse and paranoid–emotional neglect; all $p < 0.05$). The causes and direction of shared variability remain unknown. Longitudinal research spanning the years from childhood to adulthood would help clarify patterns of axis I and II symptoms following maltreatment.

Study strengths include the large, representative sample. Further, the detailed structured interview data enabled us to include all maltreatment subtypes, personality diagnoses and covariates in one analysis, which is necessary to understand the specificity but has not been done previously. Our results are highly generalizable, provide evidence for specific effects of emotional abuse and neglect that have been lacking from the literature, and are more reliable than previous studies because we accounted for co-occurrence. Further, we obtained population-based effect size estimates and were the first to ascertain differential effects by gender.

In conclusion, our study increases the current knowledge by identifying the unique effects of childhood sexual abuse, physical abuse, emotional abuse, physical neglect and emotional neglect on the 10 DSM-IV PDs in a general population sample. Each maltreatment type demonstrated substantial impact, with several associations modified by gender. Results are useful in defining high-risk groups and informing design of theoretically coherent

interventions and underscore the need for researchers and clinicians to consider the role of child gender in shaping long-term consequences of childhood maltreatment.

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Table 1

Associations between childhood maltreatments and personality disorders

Personality disorders	Odds ratio (99% confidence interval) ¹				
	Sexual abuse ²	Physical abuse ²	Emotional abuse ²	Physical neglect ²	Emotional neglect ²
Antisocial	1.80 [1.01–3.21] *	2.27 [1.23–4.18] **	1.70 [0.85–3.41]	1.74 [0.84–3.63]	0.62 [0.27–1.43]
Avoidant	1.25 [0.95–1.66]	0.91 [0.66–1.25]	1.13 [0.82–1.54]	1.01 [0.76–1.34]	1.75 [1.26–2.42] ***
Borderline	2.31 [1.89–2.83] ***	1.40 [1.13–1.73] ***	1.53 [1.17–1.99] ***	1.37 [1.10–1.70] **	1.12 [0.86–1.47]
Dependent	1.18 [0.62–2.26]	0.95 [0.49–1.86]	1.01 [0.47–2.13]	1.25 [0.64–2.42]	1.43 [0.65–3.17]
Histrionic	1.14 [0.78–1.66]	1.32 [0.89–1.95]	1.20 [0.81–1.77]	0.82 [0.55–1.22]	1.24 [0.79–1.92]
Narcissistic	1.47 [1.21–1.79] ***	1.09 [0.88–1.37]	1.49 [1.17–1.89] ***	1.41 [1.14–1.74] ***	0.88 [0.68–1.14]
Obsessive-compulsive	1.19 [0.97–1.45]	1.07 [0.86–1.34]	1.05 [0.83–1.32]	1.12 [0.92–1.35]	1.01 [0.79–1.28]
Paranoid	1.05 [0.82–1.33]	1.17 [0.91–1.49]	1.04 [0.81–1.35]	1.29 [1.05–1.60] *	1.33 [1.01–1.73] *
Schizoid	1.02 [0.78–1.32]	1.06 [0.81–1.40]	1.07 [0.80–1.44]	1.08 [0.84–1.39]	1.66 [1.27–2.17] ***
Schizotypal	2.15 [1.69–2.74] ***	1.34 [1.02–1.74] *	1.40 [1.06–1.84] *	1.48 [1.15–1.91] **	0.96 [0.73–1.26]

¹ Adjusted for demographics (age, gender, race/ethnicity and education), other maltreatment types, parental psychopathology and co-occurring personality disorders.² Reference group: respondents without this maltreatment* $p < 0.01$;** $p < 0.001$;*** $p < 0.0001$.

Table 2

Synergistic effects of maltreatment and gender on personality disorders

	Odds ratio (99% confidence interval) ^I			Attributable proportion due to interaction
	Risk gender, no maltreatment ²³	Other gender with maltreatment ²⁴	Risk gender with maltreatment ²⁵	
Antisocial				
Sexual abuse	6.17 (2.70–14.12)	5.05 (1.71–14.96)	12.31 (3.71–40.82)	0.17
Physical abuse	4.02 (1.62–9.93)	5.05 (1.94–13.18)	14.15 (6.03–33.23)	0.43**
Emotional abuse	4.22 (1.74–10.22)	4.71 (1.60–13.88)	13.74 (5.51–34.22)	0.42**
Physical neglect	4.14(1.53–11.19)	4.31 (1.41–13.13)	10.70(3.68–31.11)	0.30
Emotional neglect	3.86 (1.89–7.87)	2.64 (0.85–8.18)	3.82 (1.47–9.95)	–0.44
Narcissistic				
Sexual abuse	1.92 (1.63–2.25)	1.73 (1.39–2.16)	3.60 (2.64–4.89)	0.26**
Physical abuse	1.79 (1.48–2.15)	1.62 (1.29–2.02)	2.86 (2.33–3.50)	0.16
Emotional abuse	1.80 (1.52–2.14)	1.86 (1.50–2.30)	3.49 (2.74–4.45)	0.24**
Physical neglect	1.77 (1.46–2.14)	1.68 (1.33–2.13)	3.16 (2.50–3.99)	0.22**
Emotional neglect	1.80 (1.52–2.14)	1.30 (0.96–1.75)	2.27 (1.63–3.16)	0.08
Schizotypal				
Sexual abuse	1.38 (1.11–1.71)	2.59 (2.01–3.32)	4.35 (2.93–6.46)	0.32**
Physical abuse	1.16 (0.93–1.46)	2.12 (1.63–2.76)	2.61 (1.97–3.46)	0.13
Emotional abuse	1.25 (1.00–1.56)	2.39 (1.84–3.10)	2.83 (2.11–3.80)	0.07
Physical neglect	1.21 (0.96–1.52)	2.16 (1.62–2.88)	2.56 (1.92–3.41)	0.08
Emotional neglect	1.26 (1.01–1.57)	1.79 (1.32–2.41)	1.82 (1.26–2.63)	–0.12
Avoidant				
Sexual abuse	1.38 (1.03–1.85)	1.22 (0.72–2.08)	2.00 (1.43–2.78)	0.20
Physical abuse	1.42 (1.05–1.91)	1.06 (0.68–1.66)	1.84 (1.31–2.59)	0.20
Emotional abuse	1.43 (1.04–1.97)	1.23 (0.79–1.92)	2.01 (1.42–2.85)	0.17
Physical neglect	1.26 (0.93–1.71)	0.84 (0.53–1.34)	1.95 (1.38–2.76)	0.44**
Emotional neglect	1.38 (1.02–1.85)	1.51 (0.83–2.74)	2.83 (2.01–3.98)	0.33*
Borderline				
Sexual abuse	0.95 (0.79–1.15)	2.89 (2.08–4.00)	3.07 (2.50–3.76)	0.07
Physical abuse	1.22 (1.01–1.48)	2.46 (1.93–3.13)	2.95 (2.38–3.65)	0.09
Emotional abuse	1.13 (0.93–1.37)	2.51 (1.95–3.23)	3.13 (2.51–3.90)	0.16
Physical neglect	1.17 (0.97–1.43)	2.12 (1.64–2.73)	2.64(2.11–3.31)	0.13
Emotional neglect	1.16 (0.97–1.39)	2.05 (1.43–2.95)	2.23 (1.73–2.87)	0.01
Dependent				
Sexual abuse	1.95 (0.87–4.37)	2.05 (0.50–8.43)	2.16 (0.85–5.51)	–0.39
Sexual abuse	1.95 (0.87–4.37)	2.05 (0.50–8.43)	2.16 (0.85–5.51)	–0.39
Physical abuse	1.80 (0.87–3.76)	1.20 (0.46–3.11)	2.16 (0.98–4.77)	0.07
Emotional abuse	1.77 (0.77–4.05)	1.23 (0.40–3.77)	2.25 (0.86–5.91)	0.11
Physical neglect	1.45 (0.59–3.54)	0.90 (0.24–3.30)	2.48 (1.00–6.19)	0.46

	Odds ratio (99% confidence interval) ¹			Attributable proportion due to interaction
	Risk gender, no maltreatment ²³	Other gender with maltreatment ²⁴	Risk gender with maltreatment ²⁵	
Emotional neglect	1.58 (0.79–3.17)	1.03 (0.29–3.71)	2.92 (1.33–6.39)	0.45*
Paranoid				
Sexual abuse	1.45 (1.19–1.76)	1.48 (1.00–2.19)	1.67 (1.27–2.19)	–0.16
Physical abuse	1.34 (1.08–1.66)	1.23 (0.90–1.70)	2.10 (1.61–2.73)	0.25**
Emotional abuse	1.34 (1.08–1.65)	1.22 (0.89–1.68)	2.03 (1.54–2.69)	0.23*
Physical neglect	1.35 (1.09–1.67)	1.35 (0.97–1.87)	2.20 (1.69–2.87)	0.23*
Emotional neglect	1.39 (1.15–1.69)	1.49 (0.97–2.31)	2.27 (1.65–3.13)	0.17

¹ Adjusted for demographics, parental psychopathology and co-occurring personality disorder.

² Risk gender: male for antisocial, narcissistic and schizotypal personality disorder (PD); female for avoidant, borderline, dependent and paranoid PD. Reference group: people of non-risk (opposite) gender without specified maltreatment.

³ Increased risk of personality disorder from risk gender, without specified maltreatment.

⁴ Increased risk of personality disorder from specified maltreatment; non-risk gender.

⁵ Increased risk of personality disorder from risk gender plus specified maltreatment.

* $p < 0.05$;

** $p < 0.01$.