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Examining the Association Between Different Forms of Childhood Maltreatment and Dissociative Symptoms and the Role of Borderline Personality Disorder

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Abstract

Childhood maltreatment is associated with dissociative symptoms in adulthood. However, there are only few empirical studies that differentiate between the different forms of childhood maltreatment which is why it continues to be unclear in what way they may have differing consequences. Moreover, the role of borderline personality disorder (BPD) symptoms in this context is not yet fully understood. In this study, the relationship between the severity of different forms of childhood maltreatment and dissociative symptoms was investigated. Further, it was investigated whether symptoms of BPD account for a significant part of these associations. Deepening this understanding may be helpful in improving prevention and intervention of dissociative disorders. Two datasets were used in this study. The first dataset was collected in The Netherlands and comprised n = 761 individuals. The second dataset was collected in Germany and comprised n = 426 individuals. Linear regression analysis was used to predict the severity of dissociation symptoms based on the severity of childhood maltreatment when accounting for BPD symptoms. Childhood maltreatment predicted dissociation in both datasets. In the first sample, emotional and physical abuse significantly predicted dissociation, with emotional abuse positively predicting dissociation and physical abuse negatively predicting dissociation. In the second dataset, emotional and sexual abuse positively predicted dissociation. In both samples, adding BPD scores accounted for up to 30% of explained variance in the dissociation scores. This study underlines the importance of childhood maltreatment and BPD in the understanding and exploration of dissociation.

"There are some who are in darkness

And the others are in light

And you see the ones in brightness

Those in darkness drop from sight"

Famous poet Berthold Brecht wrote these lines in 1931 about a sinister character wandering the streets unseen (Brecht, 1931). Although intended for a different context, the meaning of this poem can be interpreted in many ways. In the realm of clinical psychology, it can be applied to those who have experienced abuse or neglect in their childhood and who suffer from their experiences in darkness, not seen or heard by many because they may be afraid to open up or reach out for help. The aim of this research is to shed light on the different forms of childhood maltreatment and dissociation as well as borderline personality disorder (BPD) symptoms as two possible correlates. The research focus lies on the association between childhood maltreatment and dissociative symptoms which have been commonly found to be related (Dalenberg et al., 2012; Vonderlin et al., 2018). Furthermore, the role of BPD was investigated because it may provide a link in the relation between childhood maltreatment and dissociation (Khosravi, 2020; Tschoeke et al., 2020).

Over the last decades, childhood maltreatment has emerged as a significant public health problem with very severe and detrimental short-term and long-term consequences (Zamir et al., 2018). Experiencing childhood maltreatment can impact a person for the rest of his or her life and it is seen as a major risk factor for the development and maintenance of transdiagnostic psychopathology (Zamir et al., 2018). The most known forms of childhood maltreatment which will be in the focus of this research paper are physical abuse, emotional abuse, physical neglect, emotional neglect, and sexual abuse (Gilbert et al., 2009; Gilbert et al., 2012). Those different forms of child maltreatment often co-occur and are known to be

associated with similar deleterious consequences such as emotional wellbeing, poor relational functioning and behavioral disturbances (Vilariño et al., 2022). However, they still have distinct attributes. Physical and sexual abuse, for instance, both involve a violation of bodily integrity (DePanfilis & Dubowitz, 2000). Defined as non-accidental acts that results in a significant physical injury or the risk of such an injury, physical abuse is the most visible of all forms of maltreatment. Child sexual abuse is generally used to describe nonconsensual sexual acts, sexually motivated behaviours involving children and/ or sexual exploitation of children. Emotional abuse is a pattern of behaviour involving controlling the child by using emotions to criticize, embarrass, blame, shame, or otherwise manipulate them. It is also referred to as psychological abuse. Child neglect on the other hand is generally described as omissions in care that result in significant harm or the risk of significant harm to the child (DePanfilis & Dubowitz, 2000). Whereas physical neglect describes the failure to meet a child's basic physical needs such as food, clothing, personal hygiene and medical care, emotional neglect describes the failure to meet the basic developmental or emotional needs, such as sufficient nurturance and affection (Stoltenborgh et al., 2013). Individuals who have been exposed to any of the five types of interpersonal maltreatment in their childhood are at a high risk of developing various mental (and physical) health problems later in life, including dissociation (Krause-Utz, Dierick, et al., 2021; Vonderlin et al., 2018).

Dissociation is defined as "the disruption of and/ or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behavior" by the American Psychiatric Association (2013, p. 291). It is thought to serve the avoidance of traumatic experiences by creating a distance from the present moment in order to escape the traumatic memories and so the associated discomfort (Vonderlin et al., 2018). Children are especially vulnerable to the development of dissociative symptoms. In case of maltreatment, they have little possibility to fight back or escape the

perpetrator who is also in most cases an adult and thus superior in strength. Further, according to Vonderlin and colleagues (2018), abuse by a primary caregiver is associated especially strongly with dissociation. This learned helplessness may lead to a continuation of dissociative symptoms into adult life when the threat is no longer present. Furthermore, dissociation appears to disrupt emotional learning and mental functions (Bird et al., 2018). Perhaps as a consequence, dissociation may hinder successful psychotherapy, therefore prolonging the individual's suffering (Vonderlin et al., 2018). Severe forms of dissociation can also make it difficult for the individual to complete daily tasks and one's ability to maintain healthy relationships or following a regular profession. Despite the scientific consensus about symptomatology, the aetiology of dissociation and its causation is still a case of discussion (Vogel et al., 2011). There are currently two main approaches: socio-cognitive models and trauma models. The former focuses on cognitive predispositions such as fantasy-proneness, social factors like media influences and sleep disturbances (Krause-Utz et al., 2022). They influence how individuals, who are prone to dissociation, perceive stressful situations and how they regulate their emotions. The latter emphasizes psychological trauma as an important risk factor for developing dissociative symptoms. For those concerned, dissociation may be a way to cope with the unbearable experiences during the traumatizing event (Krause-Utz et al., 2022). In any case, various studies have previously linked general adverse childhood experiences to the development and maintenance of dissociation. However, childhood maltreatment experiences vary greatly between individuals (Vonderlin et al., 2018). Given the distinct differences between the forms of maltreatment, dissociation should be studied in relation to those differences. Furthermore, childhood trauma is likely not an absolute prerequisite of dissociative symptoms but rather one of many underlying causes.

For instance, dissociation is a core symptom of borderline personality disorder (BPD), which is a mental disorder characterized by severe instability of emotions, interpersonal

relationships, and identity (Cristea et al., 2017; Jaeger et al., 2017). Alongside several comorbid mental disorders including depression and anxiety disorders, problems with impulsivity are common (Barker et al., 2015). Individuals with BPD often exhibit recurrent suicidal behaviours and self-destructive behaviour, making the illness one of the most deadliest of all mental disorders (Pompili et al., 2005). It is therefore crucial to understand the illness and its symptoms in order to be able to help those suffering from it. Further, BPD has been identified as one of the most common personality disorders in the clinical population (Porter et al., 2020). Amongst other symptoms, patients with BPD may experience dissociative symptoms in periods of great stress (Krause-Utz, Frost, et al., 2021). What is defined as periods of great stress may differ from individual to individual. Stressors may be stimuli that trigger unwanted memories from adverse experiences. They can be sounds, smells, objects, or people. Stressors may also come in the form of unwanted emotions such as anger or rage, which people with BPD often struggle with. As these stimuli can be anything and potentially present during everyday tasks, they may set off dissociation at any point and thus be a major disruption of everyday life. Furthermore, when compared to other psychiatric groups, patients with BPD are found to have experienced higher rates of childhood maltreatment (Krause-Utz, Dierick, et al., 2021; Ball et al., 2009). Although it is still a debate whether childhood maltreatment is a causal factor of BPD there is no doubt that an association between the two is consistently shown across studies (Ball et al., 2009). It may therefore be interesting to investigate the role of BPD features in the context of childhood maltreatment and dissociation. The interconnectivity of childhood maltreatment, dissociative symptoms and BPD gives rise to the question whether BPD features may explain a part of the association between childhood maltreatment and dissociation.

Up to this date, previous research has primarily focused on either childhood maltreatment in general or on the forms of sexual and physical abuse. Physical and sexual

child abuse may be perceived as more severe and thus more research might have directed its focus on these forms. This may be due to the physically invasive natures of those forms of maltreatment. Furthermore, physical abuse is the most visible form of childhood maltreatment and might therefore attract more attention and research. However, emotional neglect and emotional abuse during childhood have been found to be equally disruptive to a child's development and have been demonstrated to negatively impact psychological, physical health and behaviour outcomes (Hughes & Cossar, 2016). In fact, there is growing recognition that emotional abuse and neglect might be the most common form of childhood maltreatment and that it underlies all others. It has been further identified that it might be the psychological component of childhood maltreatment that might have the most detrimental consequences on adult functioning (Hughes & Cossar, 2016).

To conclude, it is important to fill this gap and focus on all forms of childhood maltreatment equally. Hence, this study investigated the association between five forms of childhood maltreatment and dissociative symptoms. Furthermore, one of the most influential risk factors for developing BPD in adulthood is being exposed to childhood maltreatment (Mainali et al., 2020), underlining the importance of studying BPD's role in the relation between child abuse and dissociation.

The aim of this study was two-fold. Firstly, it was investigated whether different types of childhood maltreatment (sexual abuse, physical abuse, emotional abuse, physical neglect, emotional neglect) are associated with dissociative symptoms. The second aim was to investigate whether BPD symptoms account for part of this association when adding them to the model. It was hypothesized that in both samples dissociative symptoms would be positively predicted by child maltreatment scores. It was further hypothesized that BPD features would predict dissociative symptoms and that BPD scores account for a significant

part of the explained variance in the association between childhood maltreatment and dissociation.

Methods

To test the research questions, two existing datasets were analysed of which one focused more on BPD symptoms, and the other one assessed BPD based on diagnostic criteria. It is important to note here that only 74 people out of the first sample, so 9.7 per cent scored higher than the cut-off score 38 on the PAI-BOR, therefore presenting with clinically significant BPD features. As of this point, there is no evidence that personality disorders such as borderline personality disorder are categorical and that scores falling out of a clinical scope should be dismissed (Hopwood et al., 2018). In fact, there are known problems with categorical personality disorder diagnosis such as low reliability and heterogeneity. Using a dimensional approach in which the disorder manifests on a continuum is supported by a growing number of empirical research. In this context, it also makes sense to look at BPD on a continuum, especially because the sample is representative of the general population, and not purely clinical. Therefore, working with the dimensional approach to personality disorders few participants falling into the category of clinical BPD may not be a limitation but rather a realistic representation of the general public and thus, strengthen external validity. Moreover, excluding patients who do not fit into the category of BPD diagnosis would have led to a much smaller sample. This in turn would decrease the range and variability immensely and open the door to making a type two error, namely not spotting an effect that is actually there. The same is true for the second sample, in which it was decided to not extract the control group from the sample but analyse the data as a whole. A bigger sample yields more statistical power, and choosing to analyse only a small sample, such as the patient group by itself, decreases power and would heighten the possibility of making a type two error as well (Kaur & Stoltzfus, 2017).

Sample Description Dataset 1

Data was collected for a study by Krause-Utz and colleagues that focused on the effect of childhood sexual maltreatment on adult intimate partner violence (Krause-Utz, Dierick, et al., 2021; Krause-Utz, Mertens, et al., 2021). The participants were recruited via online platforms and Leiden University's research participation site. Inclusion criteria were being at least 18 years old and speaking English proficiently. Only data of participants who had a mean value of at least 0 in the Dissociative Experience Scale (DES), the Personality Assessment Inventory – Borderline Scale (PAI-BOR), and all five Childhood Trauma Questionnaire (CTQ) subscales were included in the analysis. With this exclusion criterion, n = 1,252 participants had to be excluded from the analysis because the DES was added only at a later point during a later wave of recruitment. Thus, the final sample that was analysed for this paper comprised n = 761 individuals of whom n = 519 were female (68.2%), n = 626 Western European (82.3%), and n = 412 had secondary school education (54.1%). Participants were between 18 and 75 years of age, with the majority being between 18 and 30 years old (89.1%). A descriptive analysis of the dataset shows a mean of 9.81 for emotional abuse (SD = 2.4, range = 5-22), a mean of 11.05 for physical abuse (SD = 2.5, range = 5-21), 7.97 for sexual abuse (SD = 2.2, range = 4-20), 16.6 for emotional neglect (SD = 2.4, range = 7-23), and 8.28 for physical neglect (SD = 1.4, range = 4-18). This means that most participants only reported low to moderate maltreatment (Bernstein & Fink, 1998). The average score in the PAI-BOR was 26.7 with a standard deviation of 8. The range of scores was from a minimum of 7 to a maximum score of 59. According to De Moor and colleagues (2009), a score of 38 or more indicates the presence of significant BPD features. For the CTQ sum it was 53.7 with a SD of 6.3 and a range from 31 to 81. There are no reported cut-off scores for the CTQ sum. The average mean of the DES was 18.4. The SD was 13.8 and the range was from a minimum of 0 to a maximum of 76. High and low scores reflect tendencies

of dissociative symptoms and high levels of dissociation are indicated by scores of 30 and more (Carlson & Putnam, 1993).

Sample Description Dataset 2

The second data set was recruited within the multi-centre Clinical Research Unit 256 (Schmahl et al., 2014). The focus on recruitment lay on the presence or absence of BPD diagnoses according to the DSM V (American Psychiatric Association, 2013). Participants were recruited by media advertisements such as online posts and in newspapers. Interested participants were then contacted by telephone and were screened briefly. The general inclusion criterion was being 16 years or older. Exclusion criteria were histories of severe organic or somatic illnesses. If eligible, participants were invited to institutes in either Mannheim or Heidelberg in Germany for an extensive intake interview. Participants were interviewed and diagnosed by a trained clinician using the International Personality Disorder Examination (IPDE) for personality disorders (Loranger et al., 1998). After this interview, participants completed the questionnaires (DES, CTQ, Borderline Symptom List 23 (BSL-23)) in a paper-and-pencil version. The questionnaires were then scanned and processed electronically. Only data of participants who had a mean value of at least 0 in the DES, the BSL-23, and all five CTQ subscales were included in the analysis. With this exclusion criterion, n = 55 participants were excluded from analysis. The final sample analysed in this paper comprised n=426 female participants between 15 and 52 years of age. Most of the participants were between 16 and 34 years of age (81.6%). Nationalities of the participants were not registered. The data yielded a mean of 12.03 for emotional abuse (SD = 6.8, range = 5-25), 7.59 for physical abuse (SD = 4.6, range = 5-25), 7.6 for sexual abuse (SD = 5.3, range = 5-25), 12.56 for emotional neglect (SD = 6.8, range = 5-25), and 8.18 for physical neglect (SD = 3.9, range = 5-25). Therefore, participants in this sample reported low to moderate maltreatment. The mean of the CTQ sum was 48, with a SD of 22.8 and a range from 25 to

125. A direct comparison of the mean scores in each subscale of the CTQ between the two datasets can be seen in Table 1. The average of the BSL-23 mean was .99 with a SD of 1.1 and a range from 0 to 3.65. This means that the majority in this sample has moderate BPD features (Kleindienst et al., 2020). The average mean of the DES was 13.4, with a SD of 13.4 and a range from 0 to 69.6.

Table 1

Comparison CTQ subscale means of both datasets

CTQ Subscale	Mean of Dataset 1	Mean of Dataset 2
Emotional Abuse	9.78	12.03
Physical Abuse	11.04	7.59
Sexual Abuse	7.96	7.61
Emotional Neglect	16.6	12.56
Physical Neglect	8.27	8.18

Note. Means of the CTQ subscales emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect of both datasets.

Material

Several questionnaires were used to collect data. To assess forms of childhood maltreatment, the short form of the Childhood Trauma Questionnaire (CTQ-SF) was used. The original Childhood Trauma Questionnaire is a self-administered inventory consisting of 70 items. It provides a reliable and retrospective assessment of childhood maltreatment (Bernstein et al., 2003). It is one of the most widely used scales and since its creation has been translated into various languages (Hagborg et al., 2022). Because the original form of the test with its 70 items can be burdensome for respondents to complete, Bernstein and colleagues developed a short version, the CTQ – short form, enabling a faster screening for childhood maltreatment (Bernstein et al., 2003). The CTQ-SF measures self-reported forms of abuse and neglect in childhood. The subscales being measured are: Physical abuse, emotional abuse, physical neglect, emotional neglect, and sexual abuse. It consists of twenty-eight items that are answered on a five-point Likert scale that ranges from (1) never true to (5) very often true. After reversing seven items, all subscales can thus vary between 5 and 25.

The 28 items are all constructed as statements starting with “When I was growing up…”. The CTQ has good psychometric properties. Cronbach’s alpha as measured by Cecen-Erogul (2012) is α = .91, for physical abuse α = .84, for emotional abuse α = .89, and for sexual abuse α = .70. In the first sample, Cronbach’s alpha for the overall score was α = .70 and α = .92 for the second sample. Test-retest correlation coefficient for the total score is r = .81, for physical abuse r = .82, for emotional abuse r = .80 and for sexual abuse r = .75. Discriminant validity was deemed satisfactory and it has convergent validity with therapist ratings (Krause-Utz, Dierick, et al., 2021).

In order to test borderline personality scores in the first sample, the Personality Assessment Inventory – Borderline Feature Scale was used (PAI-BOR, Jackson & Trull, 2001). The PAI-BOR is a self-report questionnaire with 24 items that are answered on a four-point Likert scale ranging from (0) false to (3) very true. There are four subscales measuring BPD features of Affective Instability, Identity Disturbance, Negative Relationships, and impulsive Self-Harm. It has six items per subscale. For this study, total scores were used as they indicate the overall level of BPD features. Psychometric properties of the PAI-BOR are good with an internal consistency (Cronbach’s α) of α = .81 and a six-month test-retest correlation of r = .78 (Distel et al., 2009). Cronbach’s alpha for this sample was α = .71.

To assess borderline personality symptoms in the second sample, the Short Version of the Borderline Symptom List (BSL-23) was used. The BSL-23 consists of 23 items that have been extracted from the long version, the BSL-95 (Bohus et al., 2009). Nine items with the highest borderline specificity and 14 items with the highest change sensitivity have been chosen (Wolf et al., 2009). All items are rated on a five-point Linkert scale ranging from (0) not at all to (4) very strong. Psychometric properties are good for the BSL-23. A study by Bohus and colleagues (2009) shows a high internal consistency with Cronbach’s α of α = .97. For the second sample, Cronbach’s α was α = .94. The test-retest reliability within one week

was high as well with $r = .82$, $p < .00001$. Convergent validity is also high as positive moderate to high correlations between the BSL-23 and depression as measure by Beck's Depression Inventory (BDI) have been found with $r = .83$. Correlation with the general severity of psychopathology as measure by the SCL-90-R GSI is moderate with $r = .48$ (Bohus et al., 2009).

To assess dissociation in both samples the dissociative experience scale II (DES, Bernstein & Putnam, 1986) was used. The DES is one of the most frequently used scales for the screening of dissociative symptoms. It's a self-report scale and includes 28 items such as "(…) finding yourself in a place and have no idea how you got there" that are rated on a 0-100% scale from 0% (never applied to me) to 100% (always applied to me). It measures the three subscales of trait dissociation (depersonalization/ derealization, absorption, amnesia). The DES has good psychometric properties as well, with a high convergent validity and internal consistency with an alpha of $\alpha = .93$ (Krause-Utz, Dierick, et al., 2021). Cronbach's alpha for the first dataset was $\alpha = .98$ and $\alpha = .96$ for the second sample. The DES can be administered both to clinically significant patient groups and to the general public (Tzikos et al., 2021). The DES does not precisely diagnose different dissociative disorders but rather measures the tendency of an individual to show dissociative symptoms in general. It is therefore a suitable instrument to use in this study because the two samples used in this study are both taken from the general population (dataset one) and a clinical population (dataset two).

Statistical analysis

Data was exported to and subsequently analysed with IBM SPSS Statistics 28.0.0. To compare the two samples and depict the performance of individuals on study measures and demographic characteristics, descriptive analyses were conducted. Continuing from this, the data was analysed with hierarchical multiple regression analyses. In the first round of

analyses, it was tested whether there is a main effect of CTQ on dissociation. The total score of CTQ was added as independent variable to predict the mean score in the DES, the dependent variable. In the second step, PAI-BOR total scores were added to the regression in the analysis of the first dataset, to investigate the effect borderline personality scores have on the association between childhood maltreatment and dissociation. In the analysis of the second dataset, BSL-23 total scores were added to the model at this second step.

In the second round of analyses, to see the unique effects of the childhood maltreatment subtypes, instead of the CTQ sum, the total scores of the five subtypes of the CTQ (emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect) were added as independent variables predicting the dependent variable, the mean score of the DES. As before, in the second block, PAI-BOR total scores of the first dataset were added to the model. BSL-23 scores were added in the second block to investigate the second dataset.

The second dataset, collected in Germany, comprises both a healthy control group and individuals diagnosed with BPD. In order to decrease chances of making a type two error, not finding an existing effect, and increasing power, analyses were conducted using the entire sample.

Furthermore, preliminary tests to check assumptions indicated that residuals were normally distributed in both datasets. Heteroscedasticity was slightly present for both datasets. Multicollinearity was not a concern in the first sample (CTQ sum, Tolerance = 1, VIF = 1; PAI total, Tolerance = .94, VIF = 1.04). Furthermore, multicollinearity was also no concern in the second sample (CTQ sum, Tolerance = .97, VIF = 1.04; PAI total, Tolerance = .97, VIF = 1.04).

Results

Dataset 1

Multiple Regression Analysis of CTQ sum and PAI-BOR predicting DES Mean

The total score of child abuse significantly predicts dissociation scores with F(1,759) = 12.94, $p < .001$, adj. $R^2 = .02$. When adding BPD scores to the model, dissociation was also significantly predicted, F(1, 758) = 229.03, $p < .001$, adj. $R^2 = .23$. The results can be seen in Tables 2 and 3.

Table 2

Model summary of CTQ sum and PAI-BOR predicting DES mean

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.13	.02	.02	13.65	.02	12.94	1	759	<,001
2	.49	.25	.24	11.97	.23	229.03	1	758	<,001

Note. Table shows results of regression analysis of the CTQ sum predicting DES mean in the first block and CTQ and PAI-BOR total scores predicting the mean of the DES in the second block.

Table 3

Coefficients of CTQ sum and PAI-BOR score

		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	CTQ Sum	.28	.08	.13	3.59	<,001	.13	.44
2	CTQ Sum	.08	.07	.04	1.11	.268	-.06	.22
	PAI total score	.83	.06	.49	15.13	<,001	.73	.94

Note. Abbreviations: CTQ = Childhood Trauma Questionnaire, PAI-BOR: Coefficients of CTQ total score in model one and CTQ total score and PAI-BOR score in model 2.

Multiple Regression Analysis of Individual CTQ subtypes predicting DES Mean

A multiple regression was run to predict DES scores from emotional neglect, physical neglect, emotional abuse, physical abuse and sexual abuse. The multiple regression model significantly predicted dissociation scores, F(5,755) = 21.79, $p < .001$, adj. $R^2 = .13$. Within this model, emotional abuse positively significantly predicted dissociation ($\beta = .35$, $p < .001$) and physical abuse also negatively significantly predicted dissociation ($\beta = -.16$, $p < .001$). Sexual abuse did not predict DES scores ($\beta = .02$, $p = .727$), and neither did emotional neglect ($\beta = -.02$, $p = .61$) and physical neglect ($\beta = .03$, $p = .49$).

Multiple Regression Analysis of Individual CTQ subtypes and PAI-BOR scores predicting DES Mean

In order to examine the effect of BPD scores on dissociation in people who have experienced childhood maltreatment, the total score of the PAI-BOR was added to the regression in block two. The multiple regression model significantly predicted dissociation scores, F(1,754) = 156.82, $p < .001$, adj. $R^2 = .27$. R^2 change was .15. As in the first model, emotional abuse positively significantly predicted dissociation scores and physical abuse negatively significantly predicted DES scores. Sexual abuse and emotional and physical neglect did not predict DES scores significantly. Coefficients and the model summary can be found in Table 4 and Table 5.

Table 4

Model summary of CTQ subscales and PAI-BOR predicting DES mean

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.36	.13	.12	12.89	.13	21.79	5	755	<,001
2	.53	.28	.27	11.74	.15	156.82	1	754	<,001

Note. Results of regression analysis with emotional abuse, physical abuse, emotional neglect, physical neglect, and sexual abuse predicting DES mean in block one and the CTQ subscales and PAI-BOR score predicting DES mean in block two.

Table 5

Coefficients of CTQ subscales and PAI-BOR score

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	Emotional Abuse	2.02	.24	.35	8.56	<,001
	Physical Abuse	-.90	.21	-.16	-4.32	<,001
	Sexual Abuse	.09	.27	.02	.35	.727
	Emotional Neglect	.13	.21	.02	.61	.543
	Physical Neglect	.26	.37	.03	.69	.487
2	Emotional Abuse	1.14	.23	.19	5.05	<,001
	Physical Abuse	-.62	.19	-.11	-3.24	.001
	Sexual Abuse	-.08	.24	-.01	-.32	.753
	Emotional Neglect	.19	.19	.03	.98	.323
	Physical Neglect	-.12	.34	-.01	-.37	.715
	PAI total score	.72	.06	.42	12.52	<,001

Note. Coefficients of CTQ subscales and PAI total score in regression analysis predicting DES scores.

Dataset Two

Multiple Regression Analysis of CTQ sum and BSL-23 predicting DES Mean

CTQ scores significantly predicted the mean dissociation scores in this dataset as well, F(1,424) = 205.27, $p < .001$. When adding the BSL mean to the model, the mean of the DES was significantly predicted with F(2, 423) = 304.78, $p < .001$. The results can be seen in Tables 6 and 7.

Table 6

Model Summary of Dataset 2

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.57	.33	.33	11.05	.33	205.27	1	424	<,001
2	.78	.61	.61	8.43	.28	304.78	1	423	<,001

Note. Table shows results of regression analysis of CTQ sum predicting DES mean in the first block and CTQ sum and BSL total scores predicting DES mean in the second block.

Table 7

Coefficients of CTQ total score and BSL score

		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	CTQ sum	.34	.02	.57	14.33	<,001	.29	.38
2	CTQ sum	.12	.02	.20	5.42	<,001	.08	.16
	BSL mean	8.23	.47	.65	17.46	<,001	7.3	9.16

Note. Coefficients of CTQ total score in model one and CTQ total score and BSL score in model two.

Multiple Regression Analysis of Individual CTQ subtypes predicting DES Mean

A multiple regression was run to predict DES mean scores from emotional neglect, physical neglect, emotional abuse, physical abuse and sexual abuse. The multiple regression model significantly predicted dissociation scores, F(5,420) = 46.68, $p < .001$, adj. $R^2 = .36$. Within this model, only emotional abuse and sexual abuse positively predicted dissociation scores significantly ($\beta = .93$, $p < .001$; $\beta = .28$, $p = .023$). Physical abuse, emotional and physical neglect did not significantly predict dissociation scores ($\beta = -.02$, $p = .884$; $\beta = .18$, $p = .285$; $\beta = -.04$, p = .870).

Multiple Regression Analysis of Individual CTQ subtypes and BSL-23 predicting DES Mean

When adding the average score of the BSL-23 to the model, dissociation scores were predicted significantly, F(6, 419) = 281.91, $p < .001$, adj. $R^2 = .61$. R^2 change was .26. As in the first model, only emotional abuse and sexual abuse significantly positively predicted dissociation scores ($\beta = .28$, $p = .033$; $\beta = .23$, $p = .014$). Although still not significant, the t-value of physical abuse changed from $t = -.15$, $p = .884$ to t = 1.96, $p = .051$ when adding BPD symptoms to the model. See Tables 8 and 9 for the exact values.

Table 8

Model summary of CTQ subscales and BSL mean predicting DES mean

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.59	.36	.35	10.84	.36	46.68	5	420	<,001
2	.79	.62	.61	8.39	.26	281.91	1	419	<,001

Note. Results of regression analysis with emotional abuse, physical abuse, emotional neglect, physical neglect, and sexual abuse predicting DES mean in block one and the CTQ subscales and BSL mean predicting DES mean in block two.

Table 9

Coefficients of CTQ subscales and BSL score

		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	Emotional Abuse	.93	.16	.47	5.78	<,001	.62	1.25
	Physical Abuse	-.02	.15	-.01	-.15	.884	-.32	.28
	Sexual Abuse	.28	.12	.11	2.29	.023	.04	.52
	Emotional Neglect	.18	.18	.09	1.07	.285	-.15	.51
	Physical Neglect	-.04	.22	-.01	-.16	.870	-.47	.40
2	Emotional Abuse	.28	.13	.14	2.13	.033	.02	.54
	Physical Abuse	.23	.12	.08	1.96	.051	-.00	.47
	Sexual Abuse	.23	.09	.09	2.47	.014	.05	.41
	Emotional Neglect	-.17	.13	-.09	-1.29	.196	-.43	.09
	Physical Neglect	.07	.17	.02	.39	.694	-.27	.41
	BSL mean	8.45	.50	.67	16.79	<,001	7.46	9.43

Note. Coefficients of CTQ subscales and BSL total score in regression analysis predicting DES scores.

Discussion

The aim of this study was to investigate the association between childhood maltreatment type and BPD features on the one hand and dissociative features on the other in two separate samples. The relationship between the general childhood maltreatment score, BPD and dissociation was examined first. In the next step, the association between individual childhood maltreatment subtypes and BPD and dissociative features were examined.

Multiple regression analyses revealed that, as expected, childhood maltreatment (as measured by the CTQ) significantly predicted dissociation scores as measured by the DES in both samples. In the first sample, only emotional abuse and physical abuse significantly predicted dissociation. Emotional abuse positively predicted dissociation which suggests that experiencing more emotional abuse during childhood leads to more dissociative symptoms. Physical abuse negatively predicted dissociation, suggesting that reporting more physical abuse in childhood may lead to a reduction in dissociative symptom during adulthood. BPD scores as measured by the PAI-BOR in the first sample accounted for a significant part of the association between childhood maltreatment and dissociative experiences.

Consistent with the first sample, analyses of the second sample revealed that childhood maltreatment positively predicted dissociation, suggesting that more adverse childhood experiences is associated with higher chances of experiencing dissociation in adulthood. Also in line with the findings from the analysis of the first sample, emotional abuse positively significantly predicted dissociation. A notable difference to the first sample is that sexual abuse significantly positively predicted dissociation. This suggests that more severe sexual abuse experiences during childhood predict more dissociative experiences in adulthood. Unlike in the first sample, physical abuse did not have a significant influence on dissociation. BPD scores explained a significant part of the variance in dissociation when added to the model.

Relation to previous literature

To sum it up, analyses of both samples indicated a significant association between childhood maltreatment and dissociative experiences. This observation agrees with findings from studies about dissociation and maltreatment (King et al., 2020; Mueller-Pfeiffer et al., 2013; Vonderlin et al., 2018). In fact, Vonderlin and colleagues (2018) conducted a meta-analysis investigating the relationship between childhood maltreatment and dissociation, also using the DES to measure dissociative experiences. Investigating 65 studies with a total of n=7352 abused or neglected individuals, they found that childhood maltreatment is predictive of dissociative symptoms (Vonderlin et al., 2018). High scores were especially found for sexual and physical abuse. This finding is partly in accordance with the findings in this study: Physical abuse was found to be significantly predictive in the first sample, and sexual abuse was significantly predictive in the second sample. A major difference in this study is the direction of the relation physical abuse has with dissociation. While in most other studies, as found by Vonderlin and colleagues, more physical abuse is associated with more dissociative experiences, this study found an inverse relationship. This data suggests that less physical abuse predicts more dissociation. To my knowledge, this is only the second study to find such an effect, the other study being by King and colleagues (2020). Most studies on the association between childhood physical abuse and dissociation found a positive association. This finding could be accounted for by unknown unique characteristics of the first sample. Unknown characteristics could be further psychopathological comorbidities that have not been registered, treatment effects or demographical variables. Another reason for why individuals who have reported physical abuse may experience less dissociation may be due to compensatory strategies or factors of resilience. These individuals may have a stronger body awareness due to the physical abuse they had to suffer and thus be less prone to dissociative symptoms. On the other hand, the results could be explained by unconscious response

tendencies such as minimizing or denial of their experiences. Furthermore, it might be an artifact of multiple regression modelling of colinear variables, although VIF statistics for the variables were within an acceptable range.

Moreover, previous research supports the finding of this study that emotional abuse positively predicts dissociative symptoms (Haferkamp et al., 2015; Watson et al., 2006). As King and colleagues (2020) state, emotional abuse might be as threatening to a child as any other form of maltreatment. Emotional abuse may even point towards existential danger, considering the reliance of a child on their parents, or caretakers. In turn this might then activate the child's stress response and dissociation may be used as a dysfunctional coping mode. As the CTQ is a retrospect measure - it assesses someone's memory of abuse or neglect - memories of emotional neglect can be just as painful and significant as memories of actual physical pain. Another explanation of why emotional abuse may lead to dissociative symptoms lies in a concept of social pain which assumes that threats to social integrity might evoke the same stress response as to physical integrity (MacDonald & Leary, 2005).

Furthermore, there is consensus in previous studies on the effect of childhood maltreatment on dissociation that sexual abuse is associated with dissociation. Sar et al. (2014) found significant correlations between sexual abuse and dissociative symptoms. Gillen (1995) found that sexual abuse predicted 15% of a dissociative disorder diagnosis in female college students. Runtz and Roche (1999) also found sexual abuse to predict 15% of variance in dissociation. Looking at it from an evolutionary perspective, sexual abuse may be especially threatening to survival due to its violation of bodily integrity. This is especially the case for children who may feel helpless and at the superior perpetrator's mercy (Vonderlin et al., 2018). Considering this, it is surprising that sexual abuse is not predictive of dissociative symptoms in the first sample. One possible reason for this could lie in the population that was studied. Compared to most studies about childhood maltreatment and dissociation, the first

sample was not specifically a clinical one. Often, studies take their participants from mental hospitals or sample them through GPs in order to only study one particular clinical subgroup (Jaeger et al., 2017; King et al., 2020; Mueller-Pfeiffer et al., 2013). This current approach was different and, instead of limiting the sample to individuals diagnosed with a certain mental disorder, people from all backgrounds and mental health states were sampled. On the one hand, this has many benefits such as a wider range of individuals, more variety in the sample, and thus a better ability to generalise results to the population. On the other hand, results may not be directly comparable to studies limiting their sample to clinical groups.

Limitations

When interpreting the results, one must be aware of the study's limitations. First of all, due to the use of linear regression, no causal interpretations can be made. Thus, it remains unclear whether childhood maltreatment *causes* dissociative symptoms, or whether dissociative symptoms influence the memory of maltreatment and in turn influence scoring on the CTQ, which is a retrospective instrument. The same could be said about the role of BPD scores. Due to the nature of the regression analysis, no conclusion can be drawn about whether BPD leads to more dissociation, only that it accounts for a proportion of the explained variance in dissociative symptoms. Another limitation of the study is the usage of two different measurement instruments for BPD. Since the first sample used the PAI-BOR and the second sample used the BSL-23, the comparability of the two is limited. Both are widely used and reliable instruments to assess BPD but they are still two distinct questionnaires. Another limitation, which has been mentioned in the discussion already, is the non-clinical population group of the first sample. Since participants were not sampled from a mental health clinic or from GPs, the results might not be comparable to other studies who have studied childhood maltreatment and dissociation in purely clinical populations. Although the second sample comprised of clinically diagnosed patients, I chose to include the

control group in the analysis in order to keep statistical power as high as possible. The samples' lower averages on the questionnaires may also account for different results compared to participants who score high on the questionnaires. Further, it is possible that a confounding variable, such as another mental health problem that has not been measured, may be responsible for the results.

Implications for further research

There are several implications for further research and treatment. It is important to investigate the association between childhood maltreatment and dissociation more closely because a better understanding on childhood maltreatment and its relation to dissociation can lead to finding more suitable treatments for those suffering from it. The continuously high prevalence of childhood maltreatment adds to this need. According to the Dutch National Youth Institute, between 90,000 and 120,000 children were exposed to some form of child abuse in The Netherlands in 2019 (Nederlands Jeugdinstituut, 2019). This accounts for about three percent of all children in The Netherlands. As with many reports, there is likely to be a high number of unreported cases, making three percent the lower limit of child abuse cases. Experiencing any form of childhood maltreatment has severe consequences for the individuals physical and mental health for the rest of their life (Krause-Utz, Frost, et al., 2021; Vonderlin et al., 2018; Zamir et al., 2018). Experiencing dissociative symptoms is especially detrimental to an individual's quality of life because it may hinder successful psychotherapy and disrupt everyday life (Vonderlin et al., 2018).

In the context of childhood maltreatment, dissociative responses may at first be an adaptive response to the unavoidable threat (King, 2020). However, later, when the threat is removed, dissociative symptoms are dysfunctional and may lead to a worsened psychopathology and less successful psychotherapy. Understanding the relationship between child maltreatment and dissociation may be important to find the best possible treatment to

survivors. Understanding which subtype of childhood maltreatment is associated with dissociation may help in finding treatment tailored to an individual with these experiences.

In this study, general dissociative symptoms were predicted. There are, however, two types of dissociation: state dissociation, which is the acute phase of dissociation, and trait dissociation, which depicts differences between individuals in the way they experience dissociation (Seitz et al., 2021). There are considered to be three subscales of trait dissociation which are based on the widely used, revised version of the Dissociative Experience Scale (DES-II; Carlson & Putnam, 1993; Soffer-Dudek et al., 2015). These are depersonalization/ derealization, amnesia, and absorption. Depersonalization is described as a sense of detachment from oneself and a feeling of unreality (Hunter et al., 2004). Symptoms include feelings of dreaming, losing empathy and sensing a disconnection with bodily parts. Depersonalization is also characterized by a disconnection between oneself and one's body and/ or thoughts (Gómez, 2019). Dissociative amnesia on the other hand refers to the inability to access autobiographical memories that are of traumatic nature (Mangiulli et al., 2021). Absorption refers to the tendency to be totally immersed in one single stimulus while neglecting all other stimuli (Soffer-Dudek et al., 2015). To explore the association between child maltreatment and dissociation further, future studies could focus on the differing effects childhood maltreatment has on the different forms of dissociation described above. Clearer results could help find suitable treatments tailored to a patient's individual clinical picture. Lastly, since this is only the second study to date that finds an inverse relationship between physical abuse and dissociation, further studies should examine this more closely and explore these results in different populations. Furthermore, as the data was analysed using linear regression, no conclusions can be made about cause and effect. Longitudinal studies may give researchers a clearer picture of the cause and effect.

In conclusion, the findings suggest that childhood maltreatment and BPD features are significant predictors of dissociation and show that different forms of childhood maltreatment have distinct associations with dissociation. The findings add towards a better understanding and exploration of dissociation. Ultimately, they may help developing more suitable treatments for those affected.

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