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University of Southampton

Faculty of Environmental and Life Sciences

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**Investigation into the Relationships Between Childhood Trauma and Borderline
Personality Disorder**

by

Katherine Hannah Smart

Thesis for the degree of Doctorate in Clinical Psychology

June 2021

Word count: 11,610

University of Southampton

Abstract

Faculty of Environmental and Life Sciences

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Investigation into the Relationships Between Childhood Trauma and Borderline

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Both chapters of this doctoral thesis focus on investigating the relationships between experiences of childhood trauma and the development of Borderline Personality Disorder pathology.

The first chapter is a systematic review which aimed to identify, summarise, and critically evaluate research that examined potential psychological mediators of the association between childhood trauma and Borderline Personality Disorder. After conducting a thorough database search, seventeen papers were selected comprising a total of 7,804 participants. Due to the heterogeneity of identified mediators, a narrative integration approach to data synthesis was taken. The indirect effect of childhood trauma on Borderline Personality Disorder pathology via emotion dysregulation and insecure attachment styles was most frequently examined. Limitations of this systematic review and future research directions were discussed.

The second chapter is an empirical paper which aimed to explore the mediating effects of maladaptive schema modes and dissociation on the relationship between childhood trauma and Borderline Personality Disorder traits. A total of 344 young people aged between 16 and 25 years old completed online survey measures. Mediation analyses indicated a significant indirect effect of childhood trauma on Borderline Personality Disorder through maladaptive schema modes and through dissociation. These results provide preliminary evidence regarding the mechanisms which may underlie the association between childhood trauma and Borderline Personality Disorder.

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Research Thesis: Declaration of Authorship

Print name: Katherine Hannah Smart

Title of thesis: Investigation into the Relationships Between Childhood Trauma and Borderline Personality Disorder

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission.

Signature: Katherine Smart Date: 04/06/2021

Acknowledgements

I would like to thank my supervisors Dr Kate Willoughby and Dr Fiona Kennedy for their continuous support, encouragement, advice, and patience during my thesis preparation. Their knowledge and experience has been invaluable.

Chapter 1 Psychological Mediators of the Relationship Between Childhood Trauma and Borderline Personality Disorder: A Systematic Review

This paper has been prepared in a similar format required by the 'Journal of Personality Disorders'.

1.1 Abstract

The aim of this systematic review was to identify, summarise, and critically evaluate research that examined potential psychological mediators of the association between childhood trauma (CT) and Borderline Personality Disorder (BPD). After conducting a database search (MEDLINE, PsycINFO, Web of Science) to find eligible studies published between January 1980 and November 2020, seventeen papers were selected, comprising a total of 7,804 participants. A narrative synthesis was undertaken which suggested a number of psychological factors as possible mediators in the relationship between CT and BPD, for example: emotion dysregulation, insecure attachment style, and reflective functioning. These processes represent potentially valuable prevention and intervention targets for those who have experienced CT and present with BPD symptoms. The importance of the mediators considered in the current study should be explored by future research using suitable modelling methods to further understand and disentangle the contribution of these different mechanisms.

1.2 Introduction

Borderline Personality Disorder (BPD) is a severe psychiatric disorder characterised by a pervasive pattern of emotional dysregulation, an unstable sense of self, difficult interpersonal relationships, and impulsive behaviour (American Psychiatric Association [APA], 2013). The prevalence rates of BPD are estimated to be around 1% in the general community, and, with regards to mental health services, 10% of outpatients and between 15-20% among inpatients (Crowell et al., 2009; Lieb et al., 2004). The serious nature of BPD is evident in the high incidence of comorbid mental health problems and suicidal and self-injurious behaviour (Grant et al., 2008; Ha et al., 2014); with one review finding that up to 10% of those with a diagnosis complete suicide (Paris, 2002). Whilst there has been controversy over the borderline label, particularly with regards to the surrounding stigma and prejudice, as well as whether it can truly be disentangled from other, similar, disorders (Crowell et al., 2009), the borderline diagnosis remains.

Chapter 1

Linehan (1993) proposed a biosocial aetiological model of BPD which implicates exposure to aversive childhood experiences, such as invalidating and distressing environments marked by traumas, as integral to the development of the disorder. With this model in mind, there is substantial empirical evidence to suggest that childhood trauma (CT), for example, abuse and neglect, is associated with the development of BPD (e.g., Bandelow et al., 2005; MacIntosh et al., 2015; Winsper et al., 2016). It is posited that an emotionally sensitive child is at risk of developing BPD and this vulnerability is likely maintained and intensified within an invalidating environment (e.g., one characterised by abuse and neglect). The child may not be taught how to regulate their emotional arousal or cope with distress and any expression of emotion may be dismissed and rejected (Crowell et al., 2009).

Statistics from those with the diagnosis show considerably high incidences of sexual abuse (40 – 76%), physical abuse (25 – 73%), and neglect (92%) (Zanarini, 2000). A recent meta-analysis found that BPD was associated with significantly elevated rates of CT, with neglect and emotional abuse showing the largest effects (Porter et al., 2020). Additionally, individuals with BPD were three times more likely to report CT than those with other psychiatric disorders, and over 13 times more likely when compared to non-clinical groups (Porter et al., 2020). However, despite these high prevalence rates, not every individual exposed to maltreatment during childhood develops BPD. This implies individual differences in vulnerability factors and highlights the importance of understanding the mechanisms by which CT leads to BPD (Belsky & Pluess, 2009; Caspi et al., 2014).

Increasingly, advances in research techniques and statistical analyses allow for more robust methods of isolating and distinguishing complex underlying mechanisms in the association between two variables. Mediation analysis, for example, is a statistical methodology that allows pathways of direct and indirect effects to be disentangled and tested (Hayes, 2017). This form of analysis can therefore help to elucidate the association between CT and BPD and ascertain the underlying processes that might account for this relationship.

However, the specific mechanisms that are responsible for the relationship between CT and BPD still remain uncertain. This has led to a growing body of research attempting to understand potential underlying psychological processes mediating the relationship between childhood adversity and the later development of BPD. There are currently a number of proposed pathways, including: emotion dysregulation (e.g., Gaher et al., 2013; Kuo et al., 2015), negative schematic models (e.g., Mertens et al., 2020), mentalising (e.g., Quek et al., 2017), dissociation (e.g., van Dijke et al., 2018), and insecure adult attachment styles (e.g., Frias et al., 2016; Pourshahriar et al., 2018).

It is clear that the relationship between CT and BPD is complex, and, while a number of potential psychological mediators have been empirically considered, to the authors' knowledge, there has

been no systematic review of the evidence-base to date. Such a summary of the literature appears warranted in order to identify both potentially vulnerable populations and psychological mechanisms by which CT links to BPD, and, ultimately, to inform potential preventative and therapeutic interventions. This paper therefore aims to: (i) systematically appraise the existing evidence on potential psychological mediators of the relationship between CT and BPD, and (ii) evaluate the quality of this evidence.

1.3 Method

1.3.1 Search Strategy

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021), and was registered with PROSPERO (Moher, Booth, & Stewart, 2014) in December 2020 (registration number: CRD42020218880). Searches were subsequently conducted in December 2020.

Initial scoping searches were carried out using a variety of websites and online databases, including: PROSPERO, the Cochrane Library, and the EBSCOhost platform. These preliminary searches were beneficial to ensure the current review was novel and had not been recently conducted, as well as generating ideas for relevant search terms.

A systematic search of published studies was then conducted on MEDLINE, PsycINFO, and Web of Science. Medical Subject Headings (MeSH) and keywords related to (a) childhood trauma, (b) BPD, and (c) mediation were connected by the Boolean operator 'OR'. These three groups were then connected to each other using the Boolean operator 'AND'. Table 1 presents a full list of search terms used. An additional forward search was conducted following examination of reference lists in eligible studies.

Table 1

MeSH and Keywords for Childhood Trauma, BPD, and Mediation

Factor	Search Term
Childhood trauma	"abus*" OR "child abuse*" OR "neglect*" OR "bully*" OR bullied OR "maltreat*" OR "advers*" OR "trauma*" OR "victim*" OR "adverse childhood experience*" OR "ACE*"

	MH: "child abuse" OR "adverse childhood experience*" OR "ACE*" DE: trauma OR bullying OR adversity OR "child abuse"
AND	
Borderline Personality Disorder	"borderline personality disorder" OR BPD OR "emotionally unstable personality disorder" OR EUPD MH: "borderline personality disorder" DE: "borderline personality disorder"
AND	
Mediation	"mediat*" OR "indirect effect" OR regression OR pathway OR "path analysis" OR "structural equation model*" OR SEM MH: "latent class analysis" OR "regression analysis" DE: "structural equation modelling" OR "statistical regression"

Note. MH and DE are terms used to indicate that a subject heading or keyword has been searched. They stand for MeSH Terms and Descriptors respectively.

1.3.2 Inclusion and Exclusion Criteria

Studies were eligible for inclusion if they: (1) were published in the English language in a peer reviewed journal between 1980 (in line with advancements in statistical techniques for mediation analysis) and December 2020; (2) had a cross-sectional, case-control, or cohort design; (3) conducted a mediation analysis or another similar modelling approach; and (4) investigated the association between childhood trauma (traumatic exposures such as sexual abuse, physical abuse, neglect occurring prior to 18 years of age) and BPD/BPD symptoms, and the mediating effect of at least one psychological factor on this relationship. Studies were only deemed eligible if they utilised validated methods and scales to measure trauma, BPD, and mediator variables. Studies that investigated other personality disorders in addition to BPD were only included if data for the BPD group was reported separately. Exclusion criteria included: (1) studies not published in English; (2) dissertations, conference extracts, and case studies; (3) studies conducted with a specific,

homogenous sample (e.g., forensic settings or drug abuse services due to the level of complexity and higher incidence rate of comorbidity); and (4) the investigation of non-psychological mediators.

1.3.3 Screening and Selection

The PRISMA Flow Diagram (Page et al., 2021) was used to clearly document the different stages of the systematic review and aid reporting of the screening and selection process. This diagram is presented in Figure 1. The systematic search identified a total of 1,498 potentially relevant records. Of these, 637 duplicates were removed, leaving 861 to be assessed for eligibility. Following title and abstract screening, 806 studies were excluded, leaving 55 to be read in full. Due to a variety of reasons (presented in Figure 1), 38 papers were excluded at this stage, leaving 17 studies to be included in this review.

1.3.4 Data Extraction and Quality Assessment

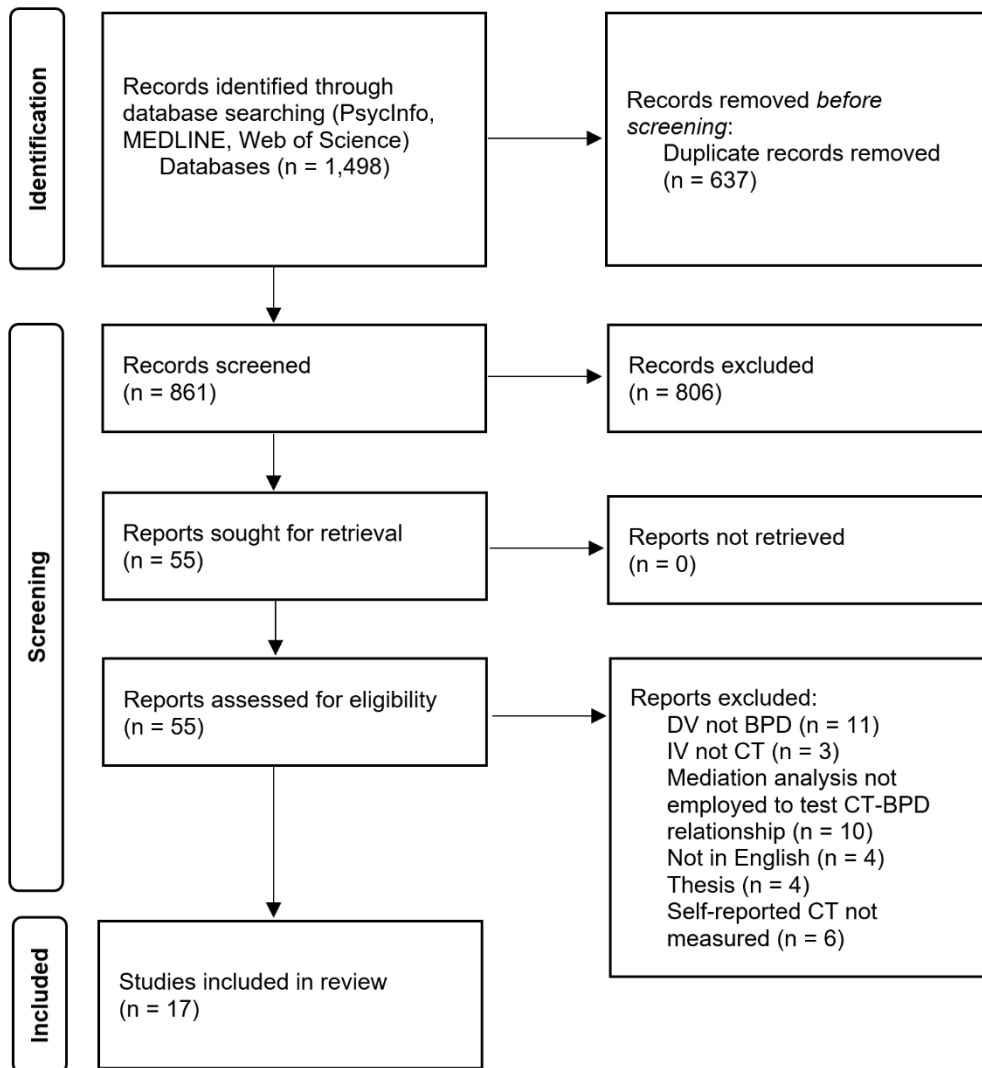
Information regarding study details (e.g., authors, year, country), study design, participant characteristics, outcomes, and statistical analyses were extracted and presented in Table 2.

Due to the heterogeneity of described mediators, predictor and outcome variables across studies, a narrative integration approach to data synthesis was taken rather than a meta-analysis (e.g., Sterne et al., 2008). A narrative synthesis relies primarily on the use of text to summarise and elucidate findings, and can be used with systematic reviews exploring a variety of topics and questions, not only those focused specifically on a particular intervention (e.g., Popay et al., 2005; Popay et al., 2006). As per guidelines developed by Popay et al. (2006), findings are initially subject to a preliminary synthesis. This involves describing and organising findings in order to facilitate the exploration of relationships both within and between studies. The final step is to assess the robustness (quality) of included studies and the synthesis itself.

The quality of included papers was assessed using an adapted version of the Quality Assessment Tool for Quantitative Studies, developed by the Effective Public Health Practice Project (EPHPP; Thomas et al., 2004). Four domains from the tool were included in the quality assessment (selection bias, study design, data collection methods, and withdrawals and dropouts), and rated as either 'strong', 'moderate', or 'weak'. In addition to the assessment tool itself, a detailed set of guidelines are also provided to support the judgements on quality being made. Each of the four domains assessed were given specific criteria by which to determine a rating, for example: a 'strong' rating was assigned to Randomised Controlled Trials and Controlled Clinical Trials; a 'moderate' rating to cohort analytic studies, case control studies, a cohort design, or an interrupted time series; and a 'weak' rating to studies that use any other method or did not state the method used.

Figure 1

PRISMA Flow Diagram



Note. DV = Dependent Variable; IV = Independent Variable.

The statistical mediation methods employed in each included study were quality assessed separately based on recommendations from previous systematic reviews (Aafjes-van Doorn et al., 2020; Williams et al., 2018). A ‘weak’ rating was assigned where mediational effects were inferred (e.g., Baron & Kenny, 1986) instead of being based upon direct statistical observation (Hayes, 2009). If a study reported using any additional tests to determine indirect effects (e.g., a Sobel test), a ‘moderate’ rating was given. Finally, a ‘strong’ rating was applied to studies that employed analyses estimating direct and indirect effects such as PROCESS (Hayes, 2017) or Structural Equation Modelling (SEM; e.g., Hoyle, 2014).

1.4 Results

1.4.1 Study Characteristics

Seventeen studies were included in this review and an overview of their characteristics can be found in Table 2. Publication dates for the papers included ranged from 2009 (Carr & Francis, 2009) to 2021 (Peng et al., 2021). The majority of studies were conducted in the USA ($n = 5$; 29%), with two from Australia ($n = 12\%$) and two from the Netherlands ($n = 12\%$), and one from each of the following countries: Canada, China, Finland, France, Germany, Iran, Italy, and Spain.

The majority of studies used a cross-sectional design ($n = 15$; 88%), thus receiving weak quality ratings for study design. One study used a longitudinal design (Bounoua et al., 2015) and was therefore able to assess for withdrawals and dropouts, and another was case-controlled (Frias et al., 2016); these received moderate quality ratings.

1.4.1.1 Participants

Reported sample sizes were relatively large, ranging from 51 (Quek et al., 2017) to 2,551 (Bujalski et al., 2019). The total sample size of all included studies was 7,804. The majority of participants were female (67%) with an average age of 27.33 years (range $M_{age} = 15 - 42$ years).

There was a mixture of non-clinical and clinical levels of psychopathology. Nine studies used non-clinical samples (53%), six of which were drawn from student populations, and six employed clinical samples (35%). Two studies (12%) utilised a mixture of both clinical and non-clinical populations; Mertens et al. (2020) sample consisted of 30% clinical patients, and Quek et al. (2017) 51%. Clinical patients were recruited from a range of outpatient clinics, day-hospitals, and inpatient units, and non-clinical patients from universities, high schools, and the general community.

Just over half the studies did not include participants with a confirmed diagnosis of BPD (53%) and two studies (12%) included only participants with a confirmed diagnosis. The remaining studies (35%) included a mixture of diagnosed BPD and undiagnosed, with proportions ranging from 10% meeting criteria to 51%. The majority of studies (82%) only measured BPD, however three studies also included other personality disorders. These were still included in the current review as they provided separate data and statistical analysis for BPD.

With regards to selection bias, the majority of studies ($n = 12$; 71%) were given a weak quality assessment rating due to employing a self-selecting sample.

1.4.2 Measures

1.4.2.1 Measures of Childhood Trauma

Eight different measures of childhood trauma were used across the seventeen included studies and six received a strong quality rating for demonstrating evidence of both reliability and validity. Some studies explored all types of CT assessed by a measure ($n = 12$; 71%), whereas others chose to look only at specific subscales, for example, emotional abuse ($n = 4$). The most commonly used measure was the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998), which is one of the most widely utilised measures of adverse childhood experiences (Tonmyr et al., 2011). The CTQ demonstrates good internal consistency and adequate convergent and discriminant validity (Bernstein & Fink, 1998; Scher et al., 2001). The CTQ was used in six studies. The Childhood Trauma Questionnaire – Short Form (CTQ-SF; Bernstein et al., 2003) was used in five studies and possesses similar psychometric properties to the full version (Bernstein et al., 2003). The remaining six measures of childhood trauma were each used in one study.

1.4.2.2 Measures of Borderline Personality Disorder

A total of nine different measures related to BPD were used across the studies included in this review; of these, seven earned a strong quality rating. The most commonly used were the Borderline Symptom List (BSL-23; Bohus et al., 2009) ($n = 3$), the Borderline Features subsection of the Personality Assessment Inventory (PAI-BOR; Morey et al., 1991) ($n = 3$), and the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; American Psychiatric Association, 1994; First et al., 1997) ($n = 3$). The Borderline Personality Features Scale for Children (BPFSC; Crick et al., 2005) was utilised by two studies, as was the Borderline Personality Inventory (BPI; Leichsenring, 1999a). The remaining four measures of BPD were each used in one study.

1.4.2.3 Measures of Psychological Mediators

A variety of possible mediators ($n = 9$) were assessed by a range of different measures ($n = 15$), with two studies assessing more than one mediator. Of these fifteen measures, six received a strong quality rating. The most commonly investigated psychological mediator was emotion dysregulation ($n = 7$), and five studies examined it as the sole mediator. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was the most commonly used measure ($n = 5$). The DERS has shown adequate construct and predictive validity, as well as good test-retest reliability (Gratz & Roemer, 2004). One study used both the Bermond Vorst Alexithymia Questionnaire (BVAG; Vorst & Bermond, 2001) and the Structured Interview for Disorders of Extreme Stress Not Otherwise Specified – Revised (SIDES-R; Ford & Kidd, 1998) to measure emotional dysfunction. The remaining Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002) was used in one study.

Attachment style was measured by four studies, with two examining it as the sole mediator. Each study used a different measure. Two studies investigated reflective functioning, both utilising the Reflective Function Questionnaire for Youth (RFQY; Sharp et al., 2009)

Six potential mediators were each examined by one study: anxiety sensitivity using the Child Anxiety Sensitivity Index (CASI; Silverman et al., 1991), core beliefs using the Personality Belief Questionnaire (PBQ-B; Butler et al., 2002), empathy using the Interpersonal Reactivity Index (IRI; Davis, 1983), hostile rumination using the Dissipation-Rumination Scale (DRS; Caprara, 1986), rejection sensitivity using the Rejection Sensitivity Questionnaire (RSQ; Berenson et al., 2009), and schema modes using the Schema Mode Inventory (SMI; Lobbestael et al., 2010).

1.4.3 Evidence of Mediators

A range of different mediation analyses were conducted to explore mediation effects in the selected studies. Eight studies employed SEM or PROCESS analysis and therefore earned a strong quality rating ($n = 8$; 47%). Just one study reported only utilising the Baron and Kenny (1986) approach (Carr & Francis, 2009); thus receiving a weak rating. However, its publication date was notably less recent than the other studies included in this review, which date between 2013 and 2020. The remaining eight studies received a moderate quality rating for using another statistical method alongside Baron and Kenny's (1986) recommendations (e.g., bootstrapping, hierarchical regression).

1.4.3.1 Emotion Dysregulation

Emotion dysregulation can be defined as a lack of acceptance and/or awareness of emotional states, in addition to difficulties accessing or utilising effective regulation strategies (Gratz & Roemer, 2004). It is well established in the literature, and reflected in the diagnostic criteria, that individuals with BPD struggle to regulate emotions and can engage in unhelpful and maladaptive regulation strategies (e.g., Hughes et al., 2012; Linehan, 1993). Furthermore, evidence suggests that emotion regulation difficulties may arise as a result of childhood trauma (e.g., Shields & Cicchetti, 1998; Shipman et al., 2000).

Seven studies included in this review explored the role of emotion dysregulation in the relationship between CT and BPD. Of these, six studies found a significant positive indirect effect of CT on BPD via emotion dysregulation. More specifically, four studies demonstrated this relationship using an emotional abuse subscale (Fossati et al., 2016; Kuo et al., 2014; Pourshahriar et al., 2018; Rosenstein et al., 2018), one combined each CT subscale to form an overall score (Peng et al., 2020), and one study specified trauma event by a primary care-giver (van Dijke et al., 2013).

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Hope and Chapman (2019) were the only study not to find a significant indirect effect of CT on BPD via emotion dysregulation. There was, however, a direct impact of CT on BPD, independent of emotion regulation difficulties. Interestingly, Hope and Chapman (2019) also investigated the mediating effect of parental invalidation of emotions on the association between CT and BPD and found some significant indirect effects.

1.4.3.2 Attachment Style

Attachment styles refer to how individuals relate and respond to others, and, according to Attachment Theory, are formed during early interactions with care-givers (Bowlby, 1969; Holmes, 2014). Numerous studies have provided evidence that insecure attachment patterns have a strong association with both early adverse experiences (e.g., Waldinger et al., 2006; Waters et al., 2000), and BPD (e.g., Agrawal et al., 2004; Fonagy et al., 2000).

Four studies included in this review explored the role of attachment style in the relationship between CT and BPD. Using survey-based designs, each study found a significant positive indirect effect of CT on BPD via an insecure attachment style. More specifically, Frias et al. (2016) and Pourshahriar et al. (2018) demonstrated this relationship using an emotional abuse subscale, whereas Baryshnikov et al. (2016) and Peng et al. (2020) amalgamated each CT subscale to form an overall score. As described earlier, each study also utilised a different measure of attachment. This means that, although each falls into the 'insecure' category, they are all titled slightly differently and prescribe to different theories of attachment, for example: attachment anxiety, preoccupied-anxious attachment, insecure attachment, insecure anxious attachment (Baryshnikov et al., 2016; Frias et al., 2016; Peng et al., 2020; Pourshahriar et al., 2018 respectively).

Table 2*Summary of Data Extracted from Studies Included in Systematic Review*

Author, Year, Country	Study Design	Sample	Measures			Data Analysis	Key Findings
			CT	Mediator(s)	BPD		
Baryshnikov et al., 2017; Finland	Case-control	<i>N</i> = 282 (<i>M</i> = 42.2 years; <i>SD</i> = 13.1) Clinical patients recruited from 10 community mental health centres, 3 psychiatric inpatient units, and 1 day hospital 74% female	TADS	ECR-R (<i>Attachment style</i>)	MSI	Mediation analysis using MacKinnon and colleagues (2004) Bootstrapping	Significant positive indirect effect of childhood trauma on BPD symptoms via attachment anxiety Indirect effect = 0.02; CI = 0.01 to 0.03

Chapter 1

Bounoua et al., 2015; USA	Longitudinal	<p>$N = 277$</p> <p>($M = 15$ years; $SD = 0.91$)</p>	<p>CTQ-SF</p> <p>(<i>Emotional abuse subscale</i>)</p>	<p>CASI</p> <p>(<i>Anxiety sensitivity</i>)</p>	PAI-BOR	Structural Equation Modeling	<p>Significant positive indirect effect of childhood emotional abuse on BPD symptoms via anxiety sensitivity</p> <p>Indirect effect = 0.04, $SE = 0.02$ (95% CI = 0.001 to 0.070)</p>
Bujalski et al., 2019; USA	Cross-sectional	<p>$N = 2,551$</p> <p>(53% aged 18 or 19 years old)</p>	<p>CCMS-A</p> <p>(<i>Physical abuse, sexual abuse, and neglect subscales</i>)</p>	<p>IRI</p> <p>(<i>Empathy</i>)</p>	SCID-II	<p>Mediation analysis using Baron and Kenny (1986)</p> <p>Sobel test</p>	<p>Significant negative indirect effect of childhood physical abuse on BPD symptoms via cognitive empathy</p>
		<p>Community sample recruited through the use of media outreach, mailings, and public programmes</p> <p>44% female</p>					
		<p>Undergraduate students recruited from a previous study</p>					

		74% female					$F(2, 2135) = 55.03, p < .01$
Bungert et al., 2015; Germany	Cross-sectional	$N = 167$ ($M = 28.1$ years; $SD = 5.9$) Clinical and non-clinical patients recruited via a pre-existing database as well as through newspaper advertisements and posting in online BPD groups	CTQ	RSQ (<i>Rejection sensitivity</i>)	BSL-23	Mediation analysis using Baron and Kenny (1986) Bootstrapping Sobel test	No significant indirect effect of CT on BPD symptoms via rejection sensitivity $z = .93; p = .353$
Carr & Francis, 2009; Australia	Cross-sectional	100% female $N = 178$ ($M = 27.2$ years; $SD = 10.6$)	CTQ	PBQ-B (<i>Core beliefs</i>)	PDQ4+	Mediation analysis using Baron and Kenny (1986)	Significant positive indirect effect of childhood emotional abuse

	Community sample recruited from various locations, but primarily from Melbourne university (62%)					on BPD symptoms via core beliefs
	66% female					
Duval et al., 2018; Cross-sectional France	N = 263 (M = 17.1 years; ET = 4.45; range = 12 – 21 years)	CECA.Q	RFQ-Y <i>(Reflective functioning)</i>	BPFS-C	Structural Equation Modeling	Significant negative indirect effect of childhood emotional abuse on BPD symptoms via reflective functioning Indirect effect = .160; 95% CI = 0.048 to 2.993

		78% female					
Fossati et al., 2016; Italy	Cross-sectional	<i>N</i> = 354 (<i>M</i> = 34.3 years; <i>SD</i> = 14.9) Community sample recruited from a large industrial facility in Milan	CATS <i>(Physical abuse, sexual abuse, emotional abuse subscales)</i>	DERS <i>(Emotion dysregulation)</i>	BPI	Mediation analysis using Shrout and Bolger (2002) Bootstrapping	Significant positive indirect effect of childhood emotional abuse on BPD symptoms via emotion dysregulation Indirect effect = .14; 95% CI = .09 to .20
		58% female					
Frias et al., 2016; Spain	Case-control	<i>N</i> = 70 (<i>M</i> = 37.7 years; <i>SD</i> = 9.5) Clinical patients referred by clinicians from an adult outpatient	CTQ	AAQ <i>(Attachment style)</i>	SCID-II	Hierarchical binary logistic regression Effect sizes estimated	Significant positive indirect effect of childhood emotional abuse on BPD symptoms via preoccupied-anxious attachment

		mental health center					Indirect effect = 0.93; 95% CI = 0.87 to 1.00
		100% female					
Hope & Chapman, 2019; USA	Cross-sectional	N = 357 (M = 20.5 years; SD = 2.0; range = 18 – 30 years)	CTQ-SF	DERS <i>(Emotion dysregulation)</i>	PAI-BOR	Structural Equation Modeling	No significant indirect effect of childhood trauma on BPD symptoms via emotion dysregulation Non-significant effect not reported
		Community sample recruited from a university research participation system (78%) and the local area via flyers and online advertisements					
		63% female					
Kuo et al., 2015; Canada	Cross-sectional	N = 243	CTQ-SF	DERS	BSL-23	Structural	Significant positive indirect

(*M* = 20.1 years; *SD* = 4.7)
 Undergraduate students recruited from a psychology class as part of a subject pool
 86% female

(*Sexual abuse, physical abuse, emotional abuse subscales*)
 (*Emotion dysregulation*)

Equation Modeling

effect of childhood emotional abuse on BPD symptoms via emotion dysregulation

Indirect effect = .52; *p* < .001

Mertens et al., 2020; the Netherlands

Cross-sectional

N = 120
 (*M* = 34.4 years; *SD* = 10.5; range = 18 – 61 years)

Clinical (72%) patients recruited from various outpatient and inpatient settings, and non-clinical

ITEC

SMI
 (*Schema modes*)

SCID-II

Structural Equation Modeling

Significant positive indirect effect of childhood emotional abuse on BPD symptoms via child and coping schema modes

patients recruited from hospital staff and the general population via means of advertisement in local papers, and approaching staff personally in clinic

$F(5,114) = 14.80$,
 $p < 0.001$,
 adjusted $R^2 = 0.37$

61% female

Peng et al., 2020; Cross-sectional
 China

$N = 619$
 ($M = 25.0$ years;
 $SD = 11.2$; range =
 18 to 83 years)

CTQ-SF

ASQ
 (*Attachment
 style*)

BSL-23

Path analyses

Bootstrapping

Random forest
 regression

Significant
 positive indirect
 effect of
 childhood trauma
 on BPD
 symptoms via
 emotion
 regulation and
 insecure
 attachment

Clinical patients
 recruited from
 the psychological
 outpatient units
 of two hospitals

CERQ
 (*Emotion
 dysregulation*)

		56% female					(Emotion regulation) – indirect effect = .015; 95% CI = .002 to .033 (Insecure attachment) – indirect effect = .022; 95% CI = .001 to .044
Pourshahriar et al., 2018; Iran	Cross-sectional	N = 312 (M = 22.9 years; SD = 3.1; range = 18 to 31 years) Undergraduate students recruited from one university 59% female	CTQ <i>(Emotional abuse and emotional neglect subscales)</i>	DERS <i>(Emotion dysregulation)</i> RAAS <i>(Attachment style)</i>	BPI	Structural Equation Modeling	Significant positive indirect effect of childhood emotional abuse on BPD symptoms via emotion regulation and insecure anxious attachment (Emotion regulation) – indirect effect

							<p>= .44; 95% CI = .34 to .48 (Insecure anxious) – indirect effect = 48; 95% CI = .46 to .59</p>
<p>Quek et al., 2017; Australia</p>	<p>Cross-sectional</p>	<p><i>N</i> = 51 <i>M</i> = 15.4 years; <i>SD</i> = 1.4; range = 12-18 years)</p> <p>Clinical and non- clinical patients recruited from either the community or a psychiatric inpatient unit</p> <p>84% female</p>	<p>CTQ</p>	<p>RFQY <i>(Reflective functioning)</i></p>	<p>BPFSC</p>	<p>'Product-of- coefficients' approach (MacKinnon et al., 2002)</p> <p>Bootstrapping</p>	<p>Significant negative indirect effect of childhood emotional abuse on BPD symptoms via reflective functioning</p> <p>Indirect effect = 0.14; BCa CI = 0.02 to 0.34</p>

Rosenstein et al., 2018; USA	Cross-sectional	N = 964 (M = 39.7 years; SD = 14.4) Clinical patients recruited from an outpatient psychiatric care facility 57% female	CTQ-SF <i>(Physical abuse, sexual abuse, emotional abuse subscales)</i>	DERS <i>(Emotion dysregulation)</i>	SIDP-IV	Structural Equation Modeling	Significant positive indirect effect of childhood emotional abuse on BPD symptoms via emotion dysregulation Indirect effect = 0.48; p < .01
van Dijke et al., 2013; the Netherlands	Cross-sectional	N = 472 (M = 34.7 years; SD = 10.1) Clinical patients recruited from two adult inpatient psychotherapy treatment centers	TEC	BVAQ SIDES-R <i>(Emotion dysregulation)</i>	BPDSI	Mediation analysis using Baron and Kenny (1986)	Significant positive indirect effect of childhood trauma by primary caregiver on BPD symptoms via emotion dysregulation Indirect effect = 1.09;

		69% female					bootstrapped 95% CI = 0.03 to 2.64
Zielinski et al., 2015; USA	Cross-sectional	N = 524 (M = 23.1 years; SD = 2.9; range = 21 to 35 years)	CTQ	DRS <i>(Hostile rumination)</i>	PAI-BOR	PROCESS	Significant positive indirect effect of CT on BPD symptoms via hostile rumination
		Community sample recruited via flyers and newspaper advertisements					Indirect effect = .78; BC 95% CI = .23 to 1.42
		50% female					

Note. AAQ = Adult Attachment Questionnaire; ASQ = Attachment Style Questionnaire; BPFSC = Borderline Personality Features Scale for Children; BPI = Borderline Personality Inventory; BPDSI = Borderline Personality Disorder Severity Index; BSL = Borderline Symptom List; BVAQ = Bermond Vorst Alexithymia Questionnaire; CASI = Child Anxiety Sensitivity Index; CATS = Childhood Abuse and Trauma Scale; CCMS-A = Child Maltreatment Scale – Adult Version; CECA.Q = Childhood Experience of Care and Abuse Questionnaire; CERQ = Cognitive Emotion Regulation Questionnaire; CTQ = Childhood Trauma Questionnaire; CTQ-SF = Childhood Trauma Questionnaire – Short Form; DERS = Difficulties in Emotion Regulation Scale; DRS = Dissipation-Rumination Scale; ECR-R = Experiences in Close Relationships – Revised; IRI = Interpersonal Reactivity Index; ITEC = Interview of Traumatic Experiences in Childhood; MSI = McLean Screening Instrument; PAI-BOR = Personality Assessment Inventory – Borderline Features; PBQ = Personality Belief Questionnaire; PDQ-4+ = Personality Diagnostic Questionnaire; RAAS = Revised Adult Attachment Scale; RFQY = Reflective Function

Questionnaire for Youth; RSQ = Rejection Sensitivity Questionnaire; SCID-II = Structured Clinical Interview for DSM-IV Axis II Personality Disorders; SIDP-IV = Structured Interview for DSM-IV Personality; SMI = Schema Mode Inventory; TADS = Trauma and Distress Scale; TEC = Traumatic Experiences Checklist.

Note. If information in the table is missing it was not reported in the respective paper.

1.4.3.3 Reflective Functioning

Mentalising, operationalised as reflective functioning for research purposes, refers to the capacity to understand and consider the meanings behind our own and others' behaviour in terms of underlying mental states (Fonagy & Bateman, 2008). Two studies included in this review explored the role of reflective functioning in the relationship between CT and BPD (Duval et al., 2018; Quek et al., 2017). Using a survey-based design, both studies found a significant negative indirect effect of childhood emotional abuse on BPD symptoms via reflective functioning. These findings build upon previous research positing reflective functioning as a mechanism and a potential resilience factor linking the relationship between CT and BPD (Fonagy & Luyten, 2009).

1.4.3.4 Anxiety Sensitivity

Anxiety sensitivity refers to a fear of experiencing anxiety-related symptoms themselves (e.g., bodily sensations, cognitive appraisals), rather than a specific situation or stressor (Reiss & McNally, 1986). One study included in this review examined the role of anxiety sensitivity in the relationship between CT (specifically emotional abuse) and BPD (Bounoua et al., 2015). Using a longitudinal approach, Bounoua and colleagues (2015) found a significant positive indirect effect of childhood emotional abuse on BPD symptoms via anxiety sensitivity. It was therefore hypothesised that experiences of childhood emotional abuse may predispose individuals to anxiety-sensitivity, and, the subsequent emotional reactivity resembles patterns of instability characteristics of those with BPD (APA, 2013; Bounoua et al., 2015; Lilienfeld & Penna, 2001).

1.4.3.5 Core Beliefs

Core beliefs refer to the deep-seated beliefs we hold about ourselves, other people, and the world itself (Beck, 1976). Research has posited that personality disorders are characterised by a specific set of dysfunctional core beliefs (e.g., Beck & Freeman, 1990; Linehan, 1993; Young, 1999). In BPD, for example, these may include: "I am helpless" and, "others will hurt me" (Arntz, 2004). One study included in this review explored the role of dysfunctional core beliefs in the relationship between CT and BPD (Carr & Francis, 2009). Using a survey-based design, Carr and Francis (2009) found a significant positive indirect effect of childhood emotional abuse on BPD symptoms via core beliefs. Expanding on research by Arntz et al. (1999), the authors propose that early childhood experiences of emotional abuse increase the risk of developing negative, dysfunctional beliefs, which are associated with more BPD pathology.

1.4.3.6 Empathy

Empathy, subdivided into two types (affective and cognitive), has been proposed to explain the relationship between CT and BPD pathology (e.g., Bujalski et al., 2019). Affective empathy refers to the ability to comprehend someone else's emotions and emotional experience, whereas cognitive empathy is the capacity to understand something from their perspective (Davis, 1983). One study included in this review examined the role of cognitive and affective empathy in the relationship between CT and BPD (Bujalski et al., 2019). Using a survey-based design, Bujalski and colleagues (2019) found a significant negative indirect effect of childhood physical abuse on BPD symptoms via cognitive empathy. These findings extend previous research suggesting that experience of CT reduces cognitive empathy, which, in turn, predicts more BPD pathology (e.g., Locher et al., 2014; New et al., 2012).

1.4.3.7 Hostile Rumination

Rumination refers to the passive process of negative repetitive thinking and replaying past upsetting emotions or experiences (e.g., Nolen-Hoeksema et al., 2008), and specific forms of rumination can be identified based upon the primary cognition or affect involved (Caprara, 1986). One study included in this review explored the role of hostile rumination in the relationship between CT and BPD (Zielinski et al., 2015). Using a survey-based design, Zielinski and colleagues (2015) found a significant positive indirect effect of CT on BPD symptoms via hostile rumination. These findings expand upon previous research suggesting that rumination may be a maladaptive strategy that arises in an attempt to manage and make sense of CT, which ultimately contributes to BPD symptomatology (Repetti et al., 2002).

1.4.3.8 Rejection Sensitivity

Rejection sensitivity refers to a cognitive-affective disposition that influences emotions and behaviours, and perceptions and expectations of social rejection (Downey & Feldman, 1996; Downey et al., 2004). One study included in this review explored the role of rejection sensitivity in the relationship between CT and BPD (Bungert et al., 2015), however, did not find a significant indirect effect of CT on BPD traits via rejection sensitivity. Bungert and colleagues (2015) queried whether using a global measure of CT, rather than specific subscales, might have influenced the lack of mediational effects observed.

1.4.3.9 Schema Modes

Schema modes reflect moment-to-moment mental states and coping strategies that can be triggered by stressful situations (Lobbestael et al., 2008; Young et al., 2003). Individuals with BPD

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are posited to experience greater frequency and intensity of maladaptive modes (i.e., coping modes, parent modes, and child modes) than those in the general population (Lobbestael et al., 2008; Young et al., 2003). Coping modes refer to fluctuating states that individuals may apply to protect or distance themselves from perceived ill-treatment, parent modes contain unhelpful and critical early messages from others, and child modes involve ways of seeing the world and other people similar to the perception of children.

One study included in this review explored the role of schema modes in the relationship between CT and BPD (Mertens et al., 2020). Using a survey- and interview-based design, Mertens and colleagues (2020) found a significant positive indirect effect of childhood emotional abuse on BPD symptoms via child and coping schema modes which may help to explain the high prevalence of dissociation, impulsivity, and fear of abandonment seen in BPD. In keeping with previous research (Lobbestael et al., 2008), the association found specifically between child modes and BPD supports Young and colleagues' (2003) suggestion that the vulnerable child mode ought to be a focus of therapy when working with individuals with BPD.

1.4.4 Summary of Studies

In total, nine possible mediators in the relationship between CT and BPD were explored. Emotional dysregulation was most commonly assessed (37%), followed by attachment style (21%) and reflective functioning (11%). The remaining mediators were assessed by one study each. The majority of studies found significant indirect effects (89%) with just two non-significant effects being reported (emotion dysregulation and rejection sensitivity).

1.5 Discussion

1.5.1 Summary of Findings

The objectives of this review were to conduct a comprehensive systematic appraisal and synthesis of quantitative research exploring the potential psychological mediators of the relationship between CT and BPD traits. A systematic literature search identified a total of 17 eligible studies published over the last 30 years. The majority of these were conducted from 2015 onwards, suggesting that this specific area of research has only recently begun to grow. Collectively, the included studies reflected a wide range of both childhood trauma experiences and psychological mediators that may be involved in the development of BPD pathology. Despite these differences, the majority of studies reported significant mediation effects.

The most robust evidence was found in support of emotion dysregulation as a potential mediator of the link between CT and BPD. This finding was replicated across six of the included studies and demonstrated significant effects not only when a global measure of CT was used as the predictor variable, but also specifically for emotional abuse and CT by a primary-care giver. Although one study (Hope & Chapman, 2019) did not endorse this conclusion, when CT was inputted into the model, they did find a significant positive indirect effect of parental invalidation of emotions on BPD symptoms via emotion dysregulation. This finding is congruent with Linehan's (1993) biosocial developmental model of BPD and poses an interesting question regarding how CT and invalidation are measured, and the potential differences between the two constructs.

There was also relatively robust evidence for attachment style mediating the CT-BPD relationship. All four of the included studies that examined this found a significant positive indirect effect via insecure attachment style. Attachment style is a key component in affect regulation systems, and could, therefore, be considered together with emotion dysregulation as part of an affective 'route' or pathway connecting CT and BPD traits. However, attachment security could equally fit within a cognitive process route and include other mediators examined in the studies included within this review, such as core beliefs (Carr & Francis, 2009) and rumination (Zielinski et al., 2015). Similarly, there are significant ties between emotion regulation, attachment style, and schema modes (Mertens et al., 2020). This highlights the challenges of attempting to group psychological mediators into different themes as each can easily overlap, potentially interacting and reinforcing one another. There is also the potential for important distinctions between mechanisms to be lost if reasons behind the categorisation are not clearly defined and delineated.

There were three studies investigating mediators that might function as a protective mechanism between CT and BPD traits. Both reflective functioning (Duval et al., 2018; Quek et al., 2017) and cognitive empathy (Bujalski et al., 2019) demonstrated a significant negative indirect effect. Though any of the mediators included in this review could be flipped and viewed instead as a resilience factor (e.g., emotion dysregulation to emotion regulation), there may be benefits to adopting a more strengths-based approach, particularly when considering the needs and experiences of those with a BPD diagnosis.

Whilst this narrative synthesis indicates that several mediating processes are likely implicated in the association between CT and BPD, due to six of the included studies each investigating a different mediator, it is difficult to draw any robust conclusions from this. However, the need for further research to be conducted in this area is clear and there is value in highlighting where gaps in the literature may lie.

1.5.2 Limitations

The findings of this systematic review should be considered in the light of some limitations that were highlighted during the quality assessment process. First, the majority of included papers employed a cross-sectional design which limits the ability to draw conclusions regarding causality. Second, there were potential methodological limitations related to recruitment strategy, participant demographics and characteristics, and data collection, all of which may have influenced the representativeness and ability to generalise findings. The majority of included studies had a self-selecting sample and relied exclusively on self-report measures which may be subject to recall and reporting biases (Donaldson & Grant-Vallone, 2000).

There are also some limitations of the review process itself to take into account. Papers eligible for inclusion in this review were restricted to those published in peer-reviewed journals and written in the English language. This may have resulted in selection and cultural biases, alongside potentially relevant studies being missed, thus limiting the generalisability of findings. Unpublished reports were also excluded from the current review, and it would be beneficial for future systematic reviews to include an investigation into available grey literature.

Finally, due to unforeseen recruitment difficulties, no second ratings of searches, screening, or quality appraisals were undertaken and therefore completed only by the author. Whilst queries or uncertainties about papers during all stages of the systematic review process were discussed as a research team, no formal ratings or agreement levels were measured. It is therefore important to consider the possibility of bias, errors, and missed studies when interpreting the results of this review.

1.5.3 Clinical Implications

The findings of the current systematic review suggest that the association between CT and BPD is mediated by a number of different psychological processes, including: emotion dysregulation, affective symptoms, and insecure attachment. These findings support NICE (2009) guidelines discussion on the aetiology of BPD and should form part of the assessment recommendations so that CT and the aforementioned mechanisms can be included in psychological formulations. In turn, psychological interventions encompassing these processes should also be offered. Many of the mediators explored in this review could be targeted with already established therapies, for example: Dialectical Behaviour Therapy, trauma-focused Cognitive Behaviour Therapy, and Eye Movement Desensitisation and Reprocessing therapy. Evidence suggests that psychological therapy can improve attachment security (Taylor et al., 2015), which, in turn, may lead to improvements

regulating emotions (Mikulincer, 1998). The findings from the current review suggest these interventions have the potential to improve outcomes for individuals experiencing BPD.

1.5.4 Future Directions

This systematic review found preliminary evidence for a range of potential mediators, however in a number of cases there was only one study identified that explored its influence on the CT-BPD link. These findings need to be replicated, preferably with longitudinal studies, to elucidate underlying mechanisms further and address issues of causality. Similarly, given that the majority of included studies considered only one mediator, it would be beneficial for future research to simultaneously explore additional mediators as it is likely that several variables will be implicated. The current review also focused only on the role of psychological mediators on the relationship between CT and BPD, and there are likely other significant correlates of BPD that it will be important to consider such as genetic and neurobiological factors.

Chapter 2 Borderline Personality Disorder Traits in Young People: The Relationships Between Childhood Trauma, Maladaptive Schema Modes, and Dissociation

This paper has been prepared in a similar format required by the 'Journal of Personality Disorders'.

2.1 Abstract

There is a wealth of empirical evidence to suggest that experience of childhood trauma (CT) increases the likelihood of developing Borderline Personality Disorder (BPD). However, there remains a limited understanding about the possible underlying mechanisms involved in this association. The current study aimed to build upon existing research and explore the mediating effects of maladaptive schema modes and dissociation on the relationship between CT and BPD traits. A total of 344 young people aged between 16 and 25 years old completed online survey measures of CT, BPD traits, schema modes, and dissociation. Mediation analyses indicated a significant indirect effect of CT on BPD through maladaptive schema modes and through dissociation. These results provide preliminary evidence regarding the mechanisms which may underlie the association between CT and BPD. Limitations of the current study and future directions are discussed.

2.2 Introduction

Borderline Personality Disorder (BPD) is a severe psychiatric disorder characterised by identity disturbance, emotional and relational instability, impulsivity, and self-harm (American Psychiatric Association, 2013). The prevalence rates are relatively high: 1 – 3% of the general population, 11% of outpatients, and 33 – 49% in clinical samples (Johnson et al., 2008; Tomko et al., 2014; Zanarini et al., 2011). Research has consistently found that BPD is associated with severe impairment in daily functioning, increased rates of psychiatric comorbidity, high lifetime risk of suicide, and intensive use of services (e.g., Bender et al., 2001; Chanen et al., 2007; Chesney et al., 2014; Ha et al., 2014; Winograd et al., 2008).

Retrospective accounts from adult BPD patients suggest that symptoms of the disorder are present from an early age (Clarkin et al., 2004; Zanarini et al., 2006), and it is therefore becoming increasingly

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understood as a life-span developmental condition (Tackett et al., 2009). Common to other studies focusing on BPD in youth, the age group specified is often between 16 and 25 years of age (Blum et al., 2008; Arens et al., 2013; Frías et al., 2017) and the current study will use the same time span. Terms to describe this time period will be used interchangeably (e.g., adolescence, young adulthood, youth) throughout this paper.

Whilst there is a growing body of evidence to support both diagnosis and treatment of BPD in adolescence and young adulthood (Chanen et al., 2008; Miller et al., 2008; Zanarini et al., 2006), this has been controversial (Griffiths et al., 2011; Laurensen et al., 2013). Concerns regarding the stability of personality, for example, have been raised; alongside whether adolescent BPD traits may instead be temporary, albeit more severe, variations of typical developmental processes, rather than a psychiatric disorder (Miller et al., 2008). Further concerns about the potential for stigmatisation amongst young people 'labelled' with a personality disorder diagnosis have also been highlighted (Chanen et al., 2008). However, whilst it is important to recognise these issues, there is considerable evidence regarding the parallels between BPD in adolescence and adulthood (Miller et al., 2008). As a consequence, BPD in young people has recently gained diagnostic recognition and therefore warrants further empirical attention (Cristea et al., 2017; Kaess et al., 2014).

Similar to the adult BPD population, prevalence rates during adolescence and young adulthood is relatively high, with estimates of 1.4% at 16 years and 3.2% at 22 years, 11% of outpatients, and up to 50% of inpatients (Becker et al., 2002; Coid et al., 2006; Johnson et al., 2008). A number of studies have found that young people affected by the disorder experience more comorbidity, as well as higher levels of functional impairment when compared to those with other personality or psychiatric disorders (Chanen et al., 2007; Ha et al., 2014). Further, an earlier onset of symptoms has been associated with poorer outcomes and a negative long-term prognosis (Bozzatello et al., 2019; Winsper et al., 2020).

Childhood trauma (CT), such as emotional, physical, and sexual abuse, and neglect, has been well researched and there is a wealth of empirical evidence recognising these experiences as important risk factors for the development of BPD in adults. Both retrospective and prospective studies have consistently found robust associations in the CT-BPD link (Johnson et al., 1999; Zanarini et al., 1997). This relationship has been reinforced by research with adolescent populations; for example, a recent meta-analysis found that CT (specifically neglect, verbal abuse, or sexual abuse) was associated with a nearly five-fold increased risk of developing BPD (Winsper et al., 2016). However, despite significant associations between CT and BPD in both adults and young people, there

remains a lack of empirical evidence regarding the specific underlying mechanisms by which CT may indirectly influence the development of BPD.

Maladaptive schema modes have been posited as one such mechanism linking CT to BPD. Schema modes are a key component of Schema Therapy (Young et al., 2003), and integrate a variety of mental states that can be activated during stressful situations, including: emotion regulation systems, reactive coping strategies, and early attachment styles (Lobbestael et al., 2008). Four overarching groups of schema mode, each with their own subtypes, have been identified: *maladaptive coping modes*, *child modes*, *parent modes*, and *healthy modes* (Lobbestael et al., 2008; Young et al., 2003). Coping modes refer to fluctuating states that individuals may apply to protect or distance themselves from perceived ill-treatment, child modes involve ways of seeing the world and other people similar to the perception of children, parent modes contain unhelpful and critical early messages from others, and healthy modes effectively perform appropriate adult tasks (e.g., working, parenting, healthy lifestyle) and combat and moderate unhelpful modes.

Whilst it is typical for everyone to possess multiple schema modes, evidence suggests that the cognitive processes of individuals with BPD tend to be characterised by *maladaptive* schema modes, and that these are activated more frequently and with greater intensity than in the general population (Bach & Farrell, 2018; Bamelies et al., 2011). Young and colleagues (2003) have proposed that specific schema modes play predominant roles in BPD, including: *punitive parent*, *vulnerable child*, *angry/enraged child*, *impulsive child*, and *detached protector*, in addition to a lack of *healthy adult mode*. Correspondingly, Puri and colleagues (2021) recently found that, when compared to a healthy control group, BPD patients scored higher for all schema modes with *child modes* being the most common.

There is also a growing body of evidence exploring the direct relationship between CT and maladaptive schema modes. Schema Therapy/Theory posits that mistreatment during early years increases the likelihood of maladaptive modes developing during adolescence and into adulthood (Young et al., 2003), whilst simultaneously inhibiting the development of healthy modes (Sempértegui et al., 2013). Mertens and colleagues (2020) found that childhood trauma not only showed significant correlations with the presence of maladaptive schema modes, but also a significant indirect effect of emotional abuse on BPD through *child modes* and *maladaptive coping modes*.

Dissociation is another psychological factor proposed to mediate the relationship between CT and BPD. Dissociation involves complete or partial disruption of the typical integration of an individual's consciousness, identity, perception, and/or memory, and is often conceptualised as a protective defence mechanism or coping style to manage distressing cognitions and affect (for example, the

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effects of CT) (e.g., Ross-Gower et al., 1998; Spiegel & Cardeña, 1991; Van Den Bosch et al., 2003). There is evidence for a robust relationship between traumatic events and dissociation (e.g., Chu et al., 1999; Gershuny & Thayer, 1999), and experiences of CT have been found to predict the severity of dissociative symptoms (e.g., Vonderlin et al., 2018; Watson et al., 2006). Prevalence rates amongst maltreated young people range from 19 – 73% (Silberg, 2000).

In the short-term, dissociation can function as a natural, adaptive buffer against traumatic experiences, however, over time, it can become automatic and instead negatively impact on several areas of daily functioning (Kisiel et al., 2020). For example, empirical evidence suggests that dissociative experiences are among the most prevalent symptoms in BPD, occurring in almost 75% of individuals (Skodol et al., 2002). Additionally, research has found that dissociation in BPD is consistently rated as more severe than in healthy controls, general psychiatric populations, and other personality disorders (e.g., Barnow et al., 2012; Herman et al., 1989; Ross, 2007; Simeon et al., 2003; Zanarini et al., 2000).

Recently, van Dijke and colleagues (2018) found a significant positive indirect effect of CT on BPD symptom severity through a specific subset of dissociative experiences. However, to the authors' knowledge, the only existing study that draws together maladaptive schema modes and dissociation with reference to CT suggested that it was the maladaptive schema modes, not childhood trauma, that explained dissociative experiences in BPD (Johnson et al., 2009). More recently, Barazandeh and colleagues (2018) also explored the relationship between maladaptive schema modes and dissociation in a sample of young people diagnosed with BPD and found similar results, however, did not include CT as a variable in their investigation.

Evidently, there remains a limited understanding of the specific underlying mechanisms by which CT may influence the development of BPD in young people. It is clear that more robust empirical support is required to elucidate the interrelationships between CT, BPD traits, maladaptive schema modes, and dissociation. The current study therefore aimed to build upon existing research investigating the associations between CT and BPD, and explore whether maladaptive schema modes and dissociation mediate this relationship. It was hypothesised that: (1) CT would be associated with BPD traits, (2) there would be an indirect effect of CT on BPD traits through maladaptive schema modes, and (3) there would be an indirect effect of CT on BPD traits through dissociation.

2.3 Method

2.3.1 Study Design

This study employed a cross-sectional, survey-based design. Participants were recruited through two UK universities, social media (Facebook, Twitter, and Instagram), and participant advertisement platforms (Call for Participants and MQ Mental Health Research). Participants aged between 16 and 25 who had experienced 'difficult or stressful times' in their life were invited to complete an online survey estimated to take up to forty minutes.

A link to an information sheet was provided and participants were required to tick a box to indicate informed consent and confirm their age and whether they had experience of 'difficult or stressful times' before being given access to a battery of online self-report questionnaires.

Upon completion, participants were presented with a 'mood repair' task (adapted from Pennebaker, 1997) which involved expressive writing and has been demonstrated to alleviate distress and promote emotional wellbeing (Pennebaker, 2004), and then a debriefing form. The debriefing form acknowledged that the questionnaires covered topics of a sensitive nature and offered signposting and resources that participants might find beneficial if they had been affected (e.g., GP, Childline, Samaritans, Young Minds, and the Mix). Contact details for the research supervisor of the study were also included should participants have any further questions. Finally, if a participant wished to enter the prize draw, they were taken to a separate survey in which they could submit their email address.

Ethical approval was granted by the University of Southampton Ethics Committee (ERGO Number 55759).

2.3.2 Participants

Four hundred and seventy-four young adults consented to take part in the study, and, of these, 130 did not complete all of the questionnaires and were therefore not included in the analyses. The final sample therefore consisted of 344 young people aged between 16 and 25 ($M = 19.94$, $SD = 1.95$), the majority of which self-identified as female (84.6%) and white (78.8%).

Table 3*Summary of Demographic Information*

		<i>n</i>	%
Gender	Male	46	13.4
	Female	291	84.6
	Prefer not to answer	1	0.3
	Other	6	1.7
Age	16	5	1.5
	17	10	2.9
	18	67	19.5
	19	85	24.7
	20	68	19.8
	21	44	12.8
	22	27	7.8
	23	16	4.7
	24	7	2.0
	25	15	4.4
Ethnicity	White	271	78.8
	Mixed/Multiple Ethnic Groups	21	6.1
	Asian/Asian British	29	8.4
	Black/African/Caribbean/Black British	11	3.2
	Prefer not to answer	2	0.6

2.3.3 Measures**2.3.3.1 Demographics**

A brief demographics questionnaire was used to gather participant information related to age, sex, and ethnicity.

2.3.3.2 Childhood Abuse and Trauma Scale (CATS; Sanders & Becker-Lausen, 1995)

The CATS is a 38-item questionnaire that measures retrospective reports of childhood emotional, physical, and sexual abuse, and neglect. Participants are required to indicate how frequently they

experienced a range of traumatic events during their childhood on a four-point Likert scale (ranging from 'never' to 'always'). The overall CATS score is calculated from the mean of all 38 items, with higher numbers reflecting more frequent traumatic experiences. The measure has been shown to have adequate psychometric properties with concurrent validity ($r = .24$ to $.41$), test-retest reliability ($r = .71$ to $.91$), and internal consistency ($\alpha = .57$, $.63$ to $.88$; Kent & Waller, 1998; Sanders & Becker-Lausen, 1995). For the current study, the internal consistency of the total score was 0.95.

2.3.3.3 Borderline Personality Questionnaire (BPQ; Poreh et al., 2006)

The BPQ is an 80-item questionnaire that measures BPD traits based on the nine DSM-IV criteria (APA, 1994), including: abandonment, unstable relationships, identity disturbance, impulsivity, self-mutilation, affective instability, emptiness, intense anger, and quasi-psychotic states. The true/false questions are totaled to calculate an overall score, where higher numbers indicate a greater number of BPD symptoms. The BPQ has been found to have excellent psychometric properties with test-retest reliability (ICC = 0.92) and internal consistency ($\alpha = 0.92$; Chanen et al., 2008). For the current study, the internal consistency of the total score was 0.95.

2.3.3.4 The Wessex Dissociation Scale (WDS; Kennedy et al., 2004)

The WDS is a 40-item questionnaire that measures dissociation on the perceptual, experiential, and personality (or structural) levels. Participants are required to indicate how frequently they experienced a range of dissociative symptoms on a six-point Likert scale (ranging from 0 'never' to 6 'all the time'). The overall WDS score is the mean of all 40 items, with higher scores reflecting more frequent dissociative experiences. The measure has been found to have satisfactory psychometric properties with regards to internal consistency and convergent and concurrent validity (Kennedy et al., 2004). For the current study, the internal consistency of the total score was 0.95.

2.3.3.5 Schema Mode Inventory (SMI-1; Young et al., 2007)

The SMI-1 is a 124-item questionnaire that assesses for the presence of fourteen different schema modes. Participants are required to indicate how they think, feel, or behave in line with a list of statements on a six-point rating scale (ranging from 'never or hardly ever' to 'always'). An overall 'adaptive' and 'maladaptive' schema mode strength can be totaled, with higher scores reflecting more frequent activation of modes. The SMI has been found to have good psychometric properties with regards to internal consistency ($\alpha = .79$ to $.96$), and adequate construct validity and test-retest reliability (Lobbestael et al., 2010). For the current study, the internal consistency of the total maladaptive schemas score was 0.96.

2.3.4 Statistical Analysis

All data analyses were carried out using IBM SPSS Statistics for Windows, Version 26.0. To investigate the strength and direction of relationships between CT, BPD traits, maladaptive schema modes, and dissociation, a correlation analysis was undertaken. Next, two separate mediation analyses were conducted using Model 4 from the PROCESS macro for SPSS (Hayes, 2017) to examine (i) the direct effect of CT (predictor variable) on BPD traits (outcome variable), (ii) the indirect effect of CT on BPD traits through maladaptive schema modes (mediator variable), and (iii) the indirect effect of CT on BPD traits through dissociation (mediator variable). To test the statistical significance of the indirect effects, bootstrapped bias-corrected confidence intervals were used, with 10,000 bootstrap samples. The indirect effect is significant if the 95% CIs do not include zero. All reported coefficients are unstandardised.

2.4 Results

2.4.1 Descriptive Statistics

In total, 344 self-selected eligible participants aged between 16 and 25 years old took part in the study. The mean (*SD*) overall score on the childhood trauma scale was 1.13 (0.63), which was slightly lower (i.e., slightly fewer traumatic experiences or fewer occurrences) than reported in previous research using non-clinical samples where, for example, $M = 0.77$ ($SD = 0.66$; Kent & Waller, 1998) and $M = 0.78$ ($SD = 0.42$; Sanders & Becker-Lausen, 1995). The mean (*SD*) total score on the measure of BPD traits was 1.45 (0.20) which was slightly lower (i.e., slightly less reported symptoms) than Fonseca-Pedrero and colleagues (2011) found in their sample of non-clinical young adults ($M = 1.89$). The mean (*SD*) score of the maladaptive schema modes on the SMI was 2.80 (0.57), and the mean (*SD*) total score on the dissociation measure was 1.60 (0.74).

Table 4

Descriptive Statistics

	<i>M</i>	<i>SD</i>	Observed Range	Possible Range
Trauma (CATS)	1.13	0.63	0.05 – 2.97	0 – 4
BPD (BPQ)	1.45	0.20	1.00 – 1.91	1 – 2
Dissociation (WDS)	1.60	0.74	0.03 – 4.55	0 – 5
Maladaptive Schema Modes (SMI)	2.80	0.57	1.44 – 4.45	1 – 6

2.4.2 Correlational Analysis

Table 5 presents the Pearson's correlation coefficients for the four variables of interest (i.e., childhood trauma, BPD traits, dissociation, and maladaptive schema modes). There were large, significant, positive correlations found between each of the variables, with association strengths varying between $r = .50$ and $r = 0.82$ ($p < .01$). CT was positively correlated with BPD traits, maladaptive schema modes, and dissociation symptoms. Similarly, BPD was positively correlated with maladaptive schema modes, and dissociation symptoms. Maladaptive schema modes were positively correlated to dissociation symptoms.

Table 5

Correlation Matrix to Show Coefficients Between the Research Variables

	1	2	3	4
1. BPQ total	-			
2. CATS total	.50**	-		
3. WDS total	.72**	.55**	-	
4. SMI maladaptive	.82**	.53**	.76**	-

** $p < 0.01$.

2.4.3 Mediation Analysis

A simple mediation analysis was conducted to examine any mediating effects of dissociation and maladaptive schema modes on the relationship between CT and BPD traits. In this instance, CT was the predictor variable (X), and BPD traits were the outcome variable (Y). Dissociation and maladaptive schema modes were entered as two separate mediators (M).

2.4.3.1 Direct Relationship Between CT and BPD

When neither mediator variable was included in the model, CT significantly predicted BPD traits, $b = 0.16$, 95% CI [0.13, 0.19], $t = 10.61$, $p < .001$; the more CT experienced, the more BPD traits reported. This model explained 24.75% of the variance in BPD traits.

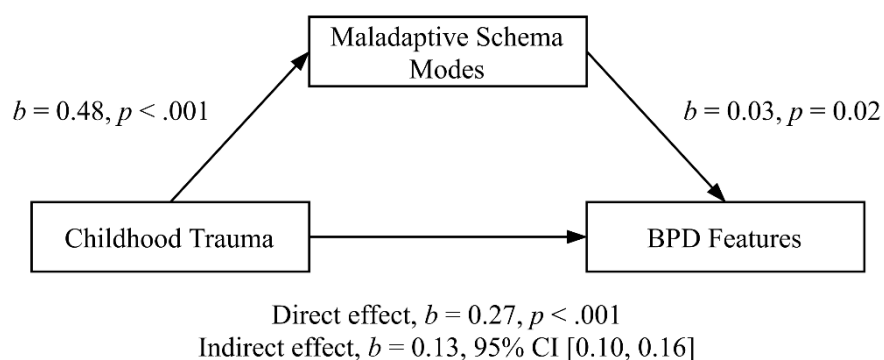
2.4.3.2 Maladaptive Schema Modes

The first analysis explored the indirect effect of CT on BPD traits through maladaptive schema modes. There was a significant positive relationship between CT and maladaptive schema modes, $b = 0.48$, 95% CI [0.40, 0.56], $t = 11.59$, $p < .001$; suggesting that those scoring higher on CT reported

more maladaptive schema modes. There was also a significant positive relationship between maladaptive schema modes and BPD traits, with higher maladaptive schema modes scores associated with more reported traits of BPD; $b = 0.03$, 95% CI [0.01, 0.05], $t = 2.37$, $p = 0.02$. There remained a significant positive relationship between CT and BPD traits, even when accounting for the mediator (maladaptive schema modes); $b = 0.27$, 95% CI [0.25, 0.29], $t = 21.43$, $p < .001$. Finally, there was a significant indirect effect of childhood trauma on BPD traits through maladaptive schema modes, $b = 0.13$, 95% BCa CI [0.10, 0.16]. Figure 2 presents these results diagrammatically. Those scoring higher on CT reported increased maladaptive schema modes, which predicted more BPD traits. Overall, CT and maladaptive schema modes explained 67.93% of the variance in BPD traits.

Figure 2

Path Model of the Relationship Between Childhood Trauma, Maladaptive Schema Modes, and Borderline Personality Traits

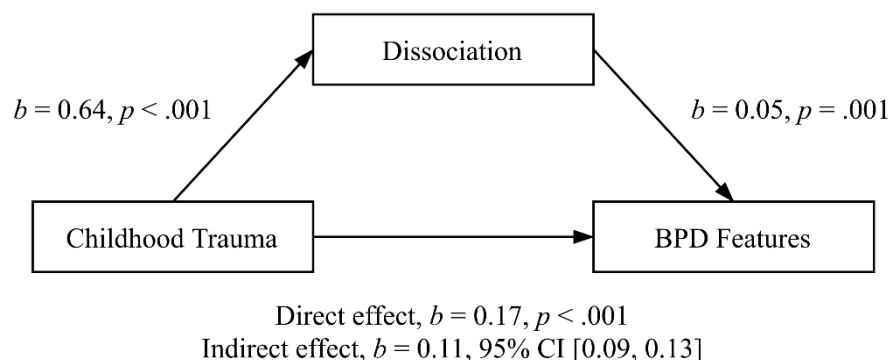


2.4.3.3 Dissociation

The second analysis explored the indirect effect of CT on BPD traits through dissociation. There was a significant positive relationship between CT and dissociation, $b = 0.64$, 95% CI [0.54, 0.75], $t = 12.01$, $p < .001$; suggesting that those scoring higher on CT experienced more dissociation. There was also a significant positive relationship between dissociation and BPD traits, with more dissociation associated with more traits of BPD; $b = 0.05$, 95% CI [0.02, 0.08], $t = 3.43$, $p = .001$. There remained a significant positive relationship between CT and BPD traits, even when accounting for the mediator (dissociation); $b = 0.17$, 95% CI [0.15, 0.19], $t = 14.33$, $p < .001$. Finally, there was a significant indirect effect of childhood trauma on BPD traits through dissociation, $b = 0.11$, 95% BCa CI [0.09, 0.13]. Figure 3 presents these results diagrammatically. Those scoring higher on CT reported increased dissociative experiences, which predicted more BPD traits. Overall, CT and dissociation explained 53.02% of the variance in BPD traits.

Figure 3

Path Model of the Relationships Between Childhood Trauma, Dissociation, and Borderline Personality Traits



2.5 Discussion

The current study examined the indirect effects of maladaptive schema modes and dissociation on the relationship between childhood trauma and BPD traits in a community sample of young people. The results offer support for increased BPD traits, maladaptive schema modes, and dissociation as a result of childhood trauma. As expected, the current findings support previous research highlighting CT as a significant predictor of BPD traits. This is in line with both the already substantial adult (e.g., Johnson et al., 1999; Porter et al., 2020; Zanarini et al., 1997) and the gradually increasing adolescent (e.g., Infurna et al., 2016; Winsper et al., 2016) literature.

CT was also positively associated with maladaptive schema modes and dissociative symptoms, suggesting that as severity of CT increased, so did frequency of maladaptive schema modes and experiences of dissociation. Similarly, higher levels of both dissociation and maladaptive schema modes were associated with more BPD traits. Together, these findings replicate and extend evidence found in adult samples (e.g., Bach & Farrell, 2018; Puri et al., 2021; Sempértegui et al., 2013; Zanarini et al., 2000).

Results from the mediation analyses indicated that there was a significant positive indirect effect of CT on BPD traits through maladaptive schema modes, suggesting that the more CT reported, the higher the incidence of maladaptive schema modes, which predicted greater BPD pathology. This is in line with Mertens et al. (2020), albeit more specific, results that showed significant path estimates from emotional abuse to BPD through child mode and coping mode clusters in an adult sample.

The finding that dissociation also mediated the association between CT and BPD traits posits that higher incidences of CT resulted in more dissociative symptoms experienced, which predicted

greater BPD pathology. van Dijke and colleagues (2018) found that, in an adult psychiatric sample, only one specific type of dissociation (positive symptoms of psychoform dissociation, such as flashbacks) mediated the relationship between CT and BPD symptomatology.

The mediation analyses therefore suggest that maladaptive schema modes and dissociation may be two mechanisms through which CT increases the risk of developing symptoms akin to BPD. These findings build upon previous research implying that the development of BPD is not a direct consequence of CT; perhaps instead the result of how individuals have learned to try and manage and respond to childhood maltreatment. However, it is important to note the finding that CT still significantly predicted traits of BPD, even after separately accounting for maladaptive schema modes and dissociation. This suggests that they are only one of several potential mechanisms in this complex relationship. There are likely other factors contributing to the indirect effect of CT on BPD pathology. Further research is required to expand upon and delineate other possible underlying processes.

2.5.1 Limitations

There are some limitations to be considered when interpreting the findings of the current study. First, a cross-sectional design was utilised, which means that it is not possible to establish causal links. Future prospective studies would therefore have a role in developing this area of research. Second, the generalisability of results from the current study are limited by its participant characteristics, for example utilising a non-clinical sample with no formal diagnoses. There would be benefits of replicating these findings in a clinical sample, perhaps with a non-clinical control group to act as a comparison. Additionally, an online sampling strategy was employed which has implications regarding self-selection biases and may also limit the generalisability of reported findings. Evidence suggests that, although efficient, recruitment through online platforms is associated with specific demographic characteristics such as gender and ethnicity (e.g., Benedict et al., 2019; Duggan & Brenner, 2013). Additionally, self-report measures of key variables were utilised which may be subject to recall and reporting biases (Donaldson & Grant-Vallone, 2002). It is also worth highlighting that because of the remote nature of completing online surveys, there is no control over where or how respondents participate in the study. Drawing these points together, it is therefore important that the current findings are replicated using alternative recruitment and data collection approaches that will minimise the impact of these potential limitations.

2.5.2 Clinical Implications

The findings of the current study raise several important clinical implications. In light of the direct and indirect relationships found between CT, BPD traits, maladaptive schema modes, and dissociation, it appears prudent to more readily incorporate these constructs into psychological work with young people presenting with these difficulties. This is of particular importance when considering these results were found in a non-clinical sample (Thompson et al., 2019).

When working with a young person presenting with BPD traits and/or with a history of CT, it is important for clinicians to have an awareness of maladaptive schema modes and dissociation in order to manage their impact on therapeutic outcomes as both may be triggered due to the nature of topics discussed in therapy. Dissociative symptoms in particular have been associated with a poorer response to interventions due to their interference with learning and assimilating new information (e.g., Kleindienst et al., 2011). Maladaptive schema modes, on the other hand, may instead negatively influence the development of a successful therapeutic relationship (Vyskocilova & Prasko, 2013; Young et al., 2003).

The findings of the current study also justify giving attention to maladaptive schema modes and dissociation as potential intervention targets for young people with BPD traits, particularly those who have a history of CT. Dialectical Behaviour Therapy (DBT) is an empirically supported treatment for BPD that includes components on dissociative experiences, and has demonstrated positive outcomes in adolescent samples (Flynn et al., 2018; James et al., 2008; Linehan, 1993). Whilst there is limited research on Schema Therapy for young people, there is a growing evidence base regarding its effectiveness for adults with BPD (e.g., Jacob & Arntz, 2013; Sempértegui et al., 2013).

2.5.3 Future Research

Alongside the aforementioned suggestions, it would be beneficial for future research to utilise other robust analytical approaches, such as structural equation modeling. The current study combined different forms of childhood trauma experiences into one global measure, however, by employing a structural equation modeling approach, it would be possible to simultaneously consider each type of CT and explore whether significant indirect effects remain present. There would be similar benefits associated with using this approach to explore schema modes as separate entities rather than grouped together in a single maladaptive cluster.

Future research could also expand on the current findings by considering the impact of both dissociation and schema modes together in the context of CT and BPD. It has been hypothesised that maladaptive schema modes function in a dissociated manner, which helps to explain the

Chapter 2

intense and rapid shifting from one mode to another (Lobbestael et al., 2007, 2008; Young et al., 2003). Additionally, it has been proposed that the greater the dissociation between schema modes, the more BPD symptomatology experienced (Young et al., 2003). Given the relationships between CT, BPD, maladaptive schema modes, and dissociation found, both in the current study and in previous literature, investigating these two mediators together now appears to be an important step forward.

Appendix A ERGO Ethical Approval

55759 - Borderline Personality Disorder Features in Young Adults: The Relationships Between Trauma, Dysfunctional Schema Modes, and Dissociation

[Submission Overview](#) [Submission Questionnaire](#) [Attachments](#) [History](#)

Details

Status	Approved
Category	Category 4
Submitter's Faculty	Faculty of Environmental and Life Sciences (FELS)

Appendix B Systematic Review Quality Assessment Table

First Author, Publication Year	Selection Bias	Study Design	Data Collection Methods			Withdrawals and Dropouts	Analyses
			Predictor	Outcome	Mediator		
Baryshnikov, 2017	M	W	S	M	S	N/A	M
Bounoua, 2015	W	M	S	S	S	W	S
Bujalski, 2019	W	W	S	S	S	N/A	M
Bungert, 2015	W	W	S	S	M	N/A	M
Carr, 2009	W	W	S	M	M	N/A	W
Duval, 2018	W	W	S	S	M	N/A	S
Fossati, 2016	W	W	S	S	S	N/A	M
Frias, 2016	M	M	S	S	M	N/A	M
Hope, 2019	W	W	S	M	S	N/A	S
Kuo, 2015	W	W	S	M	S	N/A	S
Mertens, 2020	M	W	M	S	S	N/A	S
Peng, 2020	W	W	M	M	M	N/A	M
Pourshahriar, 2018	W	W	S	M	S	N/A	S
Quek, 2017	M	W	S	S	S	N/A	M
Rosenstein, 2018	W	W	S	S	M	N/A	S
van Dijke, 2013	M	W	S	S	S	N/A	M
Zielinski, 2015	W	W	W	M	M	N/A	S

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