Traumatic foundations and intersecting paths

Change mechanisms and treatment of childhood trauma, childhood-related posttraumatic stress disorder, and borderline personality disorder

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Chapter 1 |

General Introduction

The road to healing is long; at the end, you may forgive them, when you do not feel defective anymore. But first you must stand up for yourself and vent the feelings you have buried.

—Jeffrey E. Young and Janet S. Klosko, Reinventing Your Life: The Breakthrough Program to End Negative Behavior…and Feel Great Again, 1994

A Historical Overview and Introduction to Posttraumatic Stress Disorder

The adverse effects of traumatic experiences first became visible to the wider scientific and clinical field in soldiers who experienced a range of stress and fear symptoms in response to the horrific incidents they were exposed to during the First World War. This condition was known as shell shock, referring to exposure to explosive blasts on the battlefield. During the Second World War and Vietnam War, the same set of symptoms re-emerged after which the terms combat or battle fatigue and Vietnam syndrome appeared. Initially, these trauma-related stress responses were traditionally seen as a military condition, but the attention later also shifted to sexual and physical abuse incidents, mainly with the help of women's movements. Reports of the occurrence of child abuse and its negative consequences were eventually also recognized. Therefore, many other terms emerged to describe the same set of symptoms after exposure to significant stressors and traumata, such as battered women's syndrome and child abuse syndrome. However, eventually, these syndromes were combined and made place for the trauma-related syndrome we know and use in the field of psychology today: posttraumatic stress disorder (PTSD) (Friedman et al., 2007, 2011; Shively & Perl, 2012).

PTSD was officially recognized as a mental disorder in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980). Currently, as described in the DSM-5, PTSD is a trauma- and stressor-related disorder, in contrast to previous editions of the DSM, in which PTSD was categorized under anxiety disorders (American Psychiatric Association, 2000). Criterion A of PTSD stipulates what types of experiences are a requirement for the diagnosis, namely: exposure to actual or threatened death, sexual or physical abuse, or injury. Exposure to the event can occur through either directly experiencing, witnessing an event, learning about it happening to a family member or friend, or through work-related exposure to traumatic events. The diagnostic criteria of PTSD consist of four symptom clusters: intrusive memories, such as vivid flashbacks of past experiences (i.e., criterion B), avoidance of internal stressors or external triggers (i.e., criterion C), negative thinking and mood (i.e., criterion D) and alterations in mood and cognitions (i.e., criterion E), such as hyperarousal (American Psychiatric Association, 2013). The prevalence of PTSD in the general population is estimated at around 5.6% with twice as many females receiving the diagnosis than men (Frans et al., 2005) and the prevalence of PTSD in primary care ranges from 2% to 15%, which increased to 39.1% when high-risk groups were also taken into account (Greene et al., 2016). It must be noted that individuals who have been exposed to traumatic events frequently exhibit initial stress-related responses that are natural and usually subside over time. However, in some cases, these symptoms persist, and one view is that PTSD can therefore be seen as a failure to adapt to such events (Brewin et al., 2009).

Childhood Trauma

When PTSD develops after traumatic childhood events, we often refer to it as childhood-related PTSD (Ch-PTSD). Two main types of childhood trauma (CT) are sexual and physical abuse, but CT also refers to a broader variety of traumata that do not all meet the A-criterion of PTSD. According to common definitions, CT is generally divided into five main categories: sexual, physical, and emotional abuse (i.e., SA, PA, and EA), and physical and emotional neglect (i.e., PN and EN) (Bernstein et al., 2003; Bernstein & Fink, 1998; Kong & Bernstein, 2009; Lobbestael et al., 2009, 2010; World Health Organization, 2022a, 2022b). Sexual abuse constitutes inappropriate sexual behaviors ranging from non-contact abuse (such as sexual comments, threats of abuse, and indecent exposure) and contact sexual abuse involving behaviors such as inappropriate touching, kissing, or forced intercourse. Physical abuse refers to any acts that can cause physical harm or injury. Emotional abuse refers to any acts that cause psychological harm, such as verbal abuse and threats, or humiliation. In contrast, neglect constitutes a more passive category, such as the absence of active care and support or expression of love (i.e., EN), and providing food, clean clothes, shelter, or sufficient care in case of illness (i.e., PN) (Gerdner & Allgulander, 2009; Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013; World Health Organization, 2022a). Unfortunately, exposure to CT is not uncommon, with the lowest prevalence found for SA (11.8%) and the highest prevalence found for EA (26.7%) (Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013; Stoltenborgh et al., 2012).

While only A-criterion events can officially result in a PTSD diagnosis, a lot of research is currently focused on determining how the full spectrum of CT subtypes, including the non-A-criterion events (i.e., EA, EN, and PN), is related to PTSD, other DSM-5 disorders, and general psychopathology. While the definition of the A-criterion has been broadened over the past editions of the DSM, its current definition implies that it is still widely believed that childhood emotional and psychological traumas are not as traumatic or harmful in the way that sexual and physical traumas are. While studies focusing on EA and neglect are more scarce compared to childhood abuse (Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013; Stoltenborgh, Bakermans-Kranenburg, van IJzendoorn, et al., 2013; Stoltenborgh et al., 2011, 2012), the emphasis on non-A-criterion trauma types has increased significantly over the past years. This development is interesting considering the debate surrounding the validity of the implicit statement of the A-criterion in the DSM-5 that the experience of a traumatic event is the primary etiological factor for PTSD (Friedman et al., 2011).

Based on the conceptualization of PTSD in the DSM-5, a higher exposure to A-criterion traumas (and not non-A-criterion type traumas), particularly in a population who received a PTSD diagnosis after childhood traumas that meet the A-criterion, would be expected to be related to a higher severity of PTSD complaints. Indeed, a higher trauma frequency (earlier in life) and exposure to CT are related to a higher severity of

PTSD and PTSD symptom complexity (i.e., a higher number of reported PTSD symptom clusters). However, CT is also associated with various other mental health complaints, such as personality disorders, depression, general psychopathology, and additional difficulties in affect regulation and interpersonal functioning (Briere et al., 2008; Carr et al., 2013; Classen et al., 2001; Cloitre et al., 2009; Martins et al., 2014; Messman-Moore & Bhuptani, 2017; Ogle et al., 2013; Sayyah et al., 2022). Studies focusing on CT subtypes indicate that non-A-criterion CT types such as EN and EA are related to the onset and recurrence, as well as to the severity and chronicity of depressive symptoms and anxiety disorders (Gibb et al., 2007; Hovens et al., 2012, 2015), and surprisingly, to the severity of PTSD (Grassi-Oliveira & Stein, 2008; Spertus et al., 2003). However, one limitation of these studies is that they often do not examine the full spectrum of CT. Interestingly, studies in which other abuse and neglect types were also included frequently conclude that EA and to a lesser extent EN are in fact the strongest predictors of PTSD severity (Hoeboer et al., 2021; Sullivan et al., 2006). Thus, contradicting the A-criterion and the current conceptualization of PTSD, the literature indicates that non-A-criterion events in childhood may also play a role in the development of PTSD (and psychopathology in general). Therefore, it is crucial to research the impact of CT in general but to also focus on the individual CT types, in particular EA. While EA is the most prevalent CT type (Stoltenborgh et al., 2012), the danger is that EA is often less conspicuous than other types of abuse, possibly leading to biased prevalence rates or underreporting, especially in the absence of PA or SA (Campbell & Thompson, 2015). Moreover, individuals who experience PTSD complaints after exposure to childhood events that do not meet the A-criterion are currently excluded from receiving the diagnosis, which could prevent these individuals from receiving the necessary treatment and support.

Interestingly, while traditionally PTSD was associated with the experience of fear, certain traumas - mainly interpersonal traumas - can trigger a range of other emotions (Badour et al., 2017). The DSM-5 has already been adjusted to reflect these findings. For example, unlike the DSM-IV, it is no longer necessary for individuals to respond to a traumatic event with "intense fear, helplessness or horror" and as noted previously, PTSD is no longer classified as an anxiety disorder (American Psychiatric Association, 2013). In addition, studies have shown that feelings of shame, guilt, anger, and disgust are related to PTSD severity (Badour, Feldner, Babson, et al., 2013; Beck et al., 2011; Harman & Lee, 2010). Moreover, when individuals are exposed to interpersonal traumas or have a PTSD diagnosis, shame and anger play a large role in addition to fear or distress (Grey & Holmes, 2008; la Bash & Papa, 2014). Interestingly, according to a study conducted by Øktedalen et al. (2015), changes in shame and guilt not only predicted PTSD severity but also preceded changes in PTSD symptomatology during treatment. However, the role of these emotions during treatment has not been replicated yet and has not yet been investigated for other non-fear emotions such as anger and disgust. Therefore, it

is essential to study the associations and impact of non-fear emotions because they may also play a role in the development and treatment of Ch-PTSD.

In this dissertation, we will not focus on the concept of "complex PTSD" as we worked with DSM diagnoses and DSM definitions of PTSD. Complex PTSD is a diagnosis in the International Classification of Diseases 11 (ICD-11) and shares many similarities with the DSM-5 PTSD diagnosis (Brewin et al., 2017; World Health Organization, 2019). Complex PTSD is comparable to Ch-PTSD in terms of the core symptoms of PTSD, namely reexperiencing, avoidance, and hypervigilance. However, other complex PTSD ICD symptoms, such as the experience of difficulties in emotion regulation, impairments in interpersonal functioning, and a negative self-view, are also observed in Ch-PTSD but are not officially part of the DSM PTSD diagnosis (Cloitre, 2020).

The Treatment of PTSD

Ch-PTSD can be treated with non-trauma-focused treatments (non-TFT) or trauma-focused treatments (TFT). However, there is still much debate among healthcare professionals about whether TFT is an appropriate treatment option for patients with Ch-PTSD. During TFT, patients are repeatedly exposed to trauma memories, and it has been suggested that the complexity of their symptoms creates a risk for treatment. Treatment should therefore first prioritize stabilization because directly starting with trauma processing may exacerbate the symptoms and have detrimental effects (Dorrepaal et al., 2010). Moreover, higher dropout rates have been reported after trauma-focused cognitive behavioral therapy (CBT) (McDonagh et al., 2005), which was thought to be caused by prolonged exposure to the trauma memory which patients did not tolerate well. However, according to the findings of a meta-analysis comparing treatments for Ch-PTSD, TFT was found to be more effective compared to non-TFT and no differences were found in the dropout rates between TFT and non-TFT (Ehring et al., 2014), indicating that TFT is suitable for the treatment of Ch-PTSD.

Two promising TFTs are eye movement desensitization and reprocessing (EMDR) (Shapiro, 2001) and imagery rescripting (ImRs) (Arntz & Weertman, 1999). The goal of EMDR is to alleviate symptoms associated with trauma by reducing the vividness and valence or distress of traumatic memories and to install positive or alternative cognitions. EMDR involves the patient recalling a traumatic memory while simultaneously performing a distracting task (i.e., in our studies, patients followed the horizontal finger movements made by therapists). According to the Working Memory (WM) account of EMDR (van den Hout & Engelhard, 2012), WM is taxed because both tasks compete for its limited capacity. As a result, the vividness and the distress of these memories decrease before they are reconsolidated.

During ImRs, trauma memories are rescripted to treat trauma symptoms and PTSD. This involves changing the outcome or story of memories in such a way that it meets the needs of the patient as a child, which were unmet at the time of the original trauma. The therapist guides the patient through the different phases of rescripting. During the first phase, the therapist steps into the image to rescript the memory while patients experience the rescripting from the perspective of their child self, which reactivates the trauma memory. In the second and third phase of the treatment, the patient steps in with the support of the therapist. During the second phase, patients experience rescripting from the perspective of their adult self. During the third phase, patients imagine from the perspective of their child self that their adult self steps in. This rescripting process is believed to activate a change in the meaning of the traumatic experience (Arntz & Weertman, 1999). Many studies investigate the change in the meaning of memories using encapsulated beliefs, which are the currently held beliefs that are experienced after activation of the trauma memory, which can take the form of beliefs about the self, others, and the world (e.g., "I am weak").

One of the first trials to compare the effectiveness of these treatments for Ch-PTSD in a randomized controlled trial (RCT) was the IREM trial (Boterhoven de Haan et al., 2017, 2020). The main outcomes of this trial were published in 2020. According to the findings, EMDR and ImRs were similarly effective in the long term. Participants received up to 12 treatment sessions with a frequency of two sessions a week. A follow-up trial, the IREM-Freq trial, started in 2018 and is currently still ongoing (Wibbelink et al., 2021) and aims to replicate the findings of the IREM trial while also testing the effect of treatment frequency: one vs. two sessions a week (with the same maximum of 12 sessions). Furthermore, while EMDR and ImRs are thought to work via different mechanisms, this has not yet been directly tested in a clinical trial comparing EMDR and ImRs. Based on the completed data of the IREM trial and baseline data of the IREM-Freq trial, several secondary analyses included in this dissertation were conducted to elucidate the mechanisms underlying PTSD symptom change and the treatment mechanisms.

Childhood Trauma, Dissociation, and Borderline Personality Disorder

As previously discussed, CT is also more generally associated with psychopathology. One disorder in particular that has strong links to CT and PTSD is borderline personality disorder (BPD). The additional impairments in interpersonal- and affective functioning reported by patients with Ch-PTSD are also characteristic of BPD (American Psychiatric Association, 2013). To receive a BPD diagnosis, patients need to experience impaired functioning and meet at least five of the following nine criteria: (1) Efforts to avoid abandonment (real or imagined), (2) Unstable/intense interpersonal relationships

characterized by idealization and devaluation, (3) Identity disturbance, (4) Impulsivity that is potentially damaging to the self, (5) Suicidality, (6) Affective instability, (7) Feelings of emptiness, (8) Difficulty controlling anger, and (9) Paranoid ideation or dissociation (American Psychiatric Association, 2013). Based on two meta-analyses, the lifetime prevalence of BPD in college samples was pooled at 9.7% (Meaney et al., 2016) and the prevalence of BPD in the general population was pooled at 1.8% (Winsper et al., 2020). In a sample of psychiatric outpatients, the prevalence was estimated to be as high as 22.6% (Korzekwa et al., 2008). Another review found a prevalence between 10-12% in outpatient settings and between 20-22% in inpatient settings (Ellison et al., 2018).

In contrast to PTSD, trauma exposure is not required for a BPD diagnosis (American Psychiatric Association, 2013), while individuals with BPD report more exposure to CT compared to other clinical groups and non-clinical controls (Porter et al., 2020). BPD is often comorbid to PTSD (Golier et al., 2003) and an epidemiological study estimated the comorbidity between BPD and PTSD at 42.2% (Pagura et al., 2010). Two other studies found comorbidity rates of PTSD in BPD patients ranging from 31.6% (Grant et al., 2008) to 34% (Slotema et al., 2018). In addition, the combination of PTSD and BPD is related to higher exposure to traumas in childhood compared to PTSD or BPD alone, as well as a higher severity of BPD pathology, a higher occurrence of substance use disorders, mood and anxiety disorders, a lower quality of life, and a higher risk of lifetime suicide attempts (Pagura et al., 2010). However, not all studies find a higher degree of impairment for patients with comorbid PTSD and BPD (Zlotnick et al., 2002). Moreover, the relationship between CT and BPD is not necessarily specific to BPD but is also found in other personality disorders and, as previously mentioned, psychopathology in general (Carr et al., 2013; Frías & Palma, 2015; Golier et al., 2003; Messman-Moore & Bhuptani, 2017; Sayyah et al., 2022).

In addition, another factor that is related to CT and BPD is dissociation. Dissociation is a disruption in the integration of different aspects of functioning, such as memory and perception, and can take forms such as memory loss, depersonalization and derealization, and identity disturbances (Spiegel et al., 2011). While dissociation is a characteristic of BPD, it can also manifest in several other (dissociative) disorders (American Psychiatric Association, 2013). During the development of the DSM-5, it was even suggested to place PTSD, dissociative disorders, and BPD under one category because of the similar links of dissociation with trauma and BPD (Scalabrini et al., 2017; Vermetten & Spiegel, 2014). Moreover, the exposure to more trauma types in childhood is related to higher levels of dissociation (Álvarez et al., 2015) which in turn can negatively impact treatment effectiveness (Arntz et al., 2015). Therefore, therapists must be able to effectively address dissociation during the treatment of BPD, which may be particularly important in the presence of CT.

Thus, both CT and dissociation have strong links with BPD and may negatively influence treatment outcomes. Studying these constructs in relationship to treatment outcomes for BPD is mainly important when we compare treatments that deal with CT and dissociation differently.

Treatment of Borderline Personality Disorder

Several treatments for BPD are available, but four treatments that are specifically designed to treat BPD are schema therapy (ST), dialectical behavior therapy (DBT), mentalization-based treatment (MBT), and transference-focused psychotherapy (TFP). Additionally, many other treatments are often offered, such as cognitive behavior therapy (CBT), psychodynamic treatment, and interpersonal therapy. In some cases, pharmacological treatments are offered to BPD patients. However, pharmacotherapy has been found ineffective in treating the core symptoms of BPD, including identity disturbance and feelings of emptiness (Stoffers et al., 2010). Therefore, psychological treatment, as recommended by the guidelines of the National Institute for Health Care and Excellence (NICE, 2009), remains the treatment of choice.

Given the strong link between CT, dissociation, and BPD, it is important to consider if trauma processing in addition to BPD treatment is feasible and effective. One treatment that has recently been developed to treat comorbid BPD and PTSD is DBT-PTSD (Bohus et al., 2013; Steil et al., 2011). However, the only psychological treatment that always incorporates trauma processing irrespective of whether PTSD is a comorbid disorder is ST. ST can be offered in different formats, ranging from an exclusively individual, exclusively group, or a combined individual and group format. It is often thought that ST formats with a larger group component are more cost-effective and that the processes within the group act as a catalyst for more effective treatment outcomes (e.g., group support or practicing with interactions). However, ST with a larger individual component concentrates more on the processing of traumatic memories and is thought to be able to deal with dissociation more effectively. Therefore, individual and combined ST may be more effective for patients who have been exposed to high levels of CT and experience severe dissociation. One study found that individual ST, compared to TFP, was more effective when patients experienced higher levels of dissociation and were exposed to more PA in childhood (Arntz et al., 2015). Moreover, a meta-analysis found that on average, ST is related to less dropout per quarter after one year (22%), with the average dropout after one year across treatments being 43%. In addition, group treatments were associated with less treatment retention compared to the average including combined and individual formats (Arntz et al., 2023).

So, the question is whether ST in general and ST with a larger individual component is more effective than ST with a larger group component and other BPD treatments.

While many for BPD are available, not many of them are compared in RCTs. Therefore, it is difficult to compare all treatments, including the specialized treatments, in a conventional meta-analysis. For this reason, other approaches are needed to comprehensively summarize the findings from the field regarding treatment effectiveness for BPD.

Research Aims

Thus, we can conclude that there are strong links between CT, PTSD, and BPD. The overall aim of the present dissertation is to shed light on the mechanisms of the link between CT and PTSD, the treatment of PTSD, and the link between CT and the treatment effectiveness of different ST formats for BPD. Also, we conducted a meta-analytic review of the effectiveness of treatments for BPD. What follows is an elaborate overview of the content of the five different chapters included in this dissertation.

Chapter 2

In **Chapter 2**, we aimed to examine the unique relationships between the five different types of CT and the severity of PTSD. While only SA and PA meet the A-criterion for PTSD in the DSM-5, several studies suggest that other CT types, such as EA and EN, are also related to a higher severity of PTSD symptomatology. However, not all findings regarding these relationships are consistent and many studies fail to include and test all CT types simultaneously. Therefore, we examined the unique relationships between the different CT types and PTSD severity in adult patients with Ch-PTSD. Additionally, we used a model selection procedure to examine which CT type(s) were the optimal predictors of PTSD severity. This study was conducted on the baseline data of the IREM-Freq study. All participants included in the IREM-Freq study received a PTSD diagnosis according to an A-criterion trauma before the age of 16. It is relevant to study this research question in this specific patient population, as most participants were often exposed to a range of other Criterion-A and non-criterion-A events in childhood.

We did not define any hypotheses and therefore this study was exploratory. The five CT types (i.e., SA, PA, EA, PN, and EN) were measured with the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). We included two different measures of PTSD severity: the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers, Blake, et al., 2013), a semi-structured interview, and the PTSD Checklist for DSM-5 (PCL-5; Weathers, Litz, et al., 2013), a self-report scale. While the CAPS-5 is focused on all traumatic experiences, the PCL-5 has the same set of questions focused on two different types of experiences: the index trauma (the worst traumatic event before the age of 16), and all other traumatic experiences. These three different outcomes allowed us to generalize between the type of administration (i.e., interview-based vs. self-report) and the type

of trauma that PTSD severity was based on. We conducted three mixed multiple linear regression analyses to examine the unique relationships between individual CT types and the three PTSD outcomes (i.e., CAPS-5 and the two PCL-5 self-report scales). As a model selection procedure, we ran all possible combinations of predictors and chose the optimal model based on several selection criteria.

The findings of this study are important to gain more knowledge about the developmental pathways of PTSD and the possible importance of traumas that do not satisfy the A-criterion.

Chapter 3

The aim of the study as described in the **third chapter** was to investigate the potential role of non-fear emotions in the treatment of Ch-PTSD. As already stated previously, PTSD and traumas are traditionally associated with the experience of fear and horror. However, other non-fear emotions, in particular shame and guilt, might also play an important role in PTSD, although the role of other emotions, such as disgust and anger, is still unclear. To our knowledge, the role of non-fear emotions has also not been studied yet during ImRs and EMDR.

We hypothesized that during treatment, changes in shame and guilt would precede changes in PTSD symptoms. We explored the same research question for anger and disgust. This study was conducted using the IREM study data. We assessed the severity of PTSD with the CAPS-5 (Weathers, Blake, et al., 2013) and the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997). The IES-R measures posttraumatic responses and similarly to the PCL-5, the IES-R was administered twice: once for items focused on the index trauma, and once for items focused on all other traumas. Four individual emotion items were added to the IES-R subscales to measure shame, guilt, anger, and disgust. In addition, we also used more extensive self-report scales to assess shame, guilt, and anger (for disgust, no separate questionnaire was included in the study measures). Self-reported shame, guilt, and anger were measured with the Trauma-Related Shame Inventory (TRSI; Øktedalen et al., 2014), the Trauma-Related Guilt Inventory (TRGI; Kubany et al., 1996), and the hostility subscale of the Symptom Checklist 90-R (SCL-90-R; Derogatis & Unger, 2010) respectively.

To test our research question, we conducted Granger causality analyses (Granger, 1969), which allowed us to test whether changes in non-fear emotions preceded changes in PTSD symptoms, whether changes in PTSD symptoms preceded changes in non-fear emotions, or whether the relationship between changes in non-fear emotions and PTSD symptoms was reciprocal. Based on the timing of the assessments and administration of the instruments, we conducted two sets of analyses (involving different instruments): session-by-session analyses and assessment-by-assessment analyses. Comparable to the

first study, we repeated the analyses for all three PTSD outcomes (i.e., the CAPS-5 and both IES-R scales).

The findings of this study provide more insight into the role of non-fear emotions in the maintenance of PTSD and the treatment process across sessions and assessments (and thus longer-term processes).

Chapter 4

In **Chapter 4**, we studied the underlying working mechanisms of EMDR and ImRs. As previously described, both treatments are hypothesized to work through different mechanisms. The three candidate mechanisms were operationalized as changes in vividness, distress, and encapsulated belief strength. We hypothesized that changes in PTSD severity would be preceded by changes in the vividness of the index trauma during EMDR, while during ImRs, these changes would be preceded by changes in the encapsulated beliefs linked to the index trauma. We did not define a prior hypothesis about distress, as symptom change via changes in the distress related to the index trauma could be a mechanism for both treatments.

This study was also conducted using the IREM study data. During each study assessment (from pre-treatment to the last follow-up), participants rated the vividness, distress, and encapsulated belief strength. PTSD severity was measured with the CAPS-5 (Weathers, Blake, et al., 2013) and with the two IES-R scales referring to both the index trauma and all other traumas (Weiss & Marmar, 1997). We included both PTSD measures as the IES-R compared to the CAPS-5 was administered at one additional time point (i.e., mid-treatment), and as this allowed us to study the generalizability across outcomes. Again, we conducted Granger causality analyses (Granger, 1969), which allowed us to test whether changes in the three treatment mediators preceded changes in subsequent PTSD symptoms at the next assessment and whether these relationships were moderated by treatment.

This study is, to our knowledge, the first to directly compare these frameworks as part of a complete treatment instead of experimental studies in which only one or several sessions were examined, and its findings will provide more insight into the process behind these treatments and the theoretical frameworks of EMDR and ImRs.

Chapter 5

The fourth study as described in **Chapter 5** aimed to examine the moderating effects of CT and dissociation on different ST formats: combined individual-group ST (IGST), predominantly group ST (PGST), and optimal treatment-as-usual (TAU). More specifically, we hypothesized that a higher exposure to CT and dissociation were related to a higher

treatment effectiveness (as measured with changes in BPD symptomatology and treatment retention rates per quarter) for IGST compared to PGST and TAU. Exploratory, we also compared PGST to TAU.

This study was based on the Group Schema Therapy trial (Arntz et al., 2022). All participants (N = 495) were allocated to one of the three treatment groups and received two years of treatment. There were six assessments taking place every 6 months. Exposure to CT was measured with the Interview for Traumatic Events in Childhood (ITEC) (Lobbestael et al., 2009). Dissociation was measured with a subscale from the BPD Checklist (Bloo et al., 2017), a self-report questionnaire. BPD severity was measured with the Borderline Personality Disorder Severity Index-IV (BPDSI-IV) (Arntz et al., 2003). For BPD severity, we used gamma general linear-mixed models to test the three-way interactions of group*time*CT/dissociation. For the analyses involving treatment retention, we conducted survival analyses using binomial regression with a complementary log-log link, with the dropout rates per quarter as the outcome variable.

These findings will give insight into the impact of CT and dissociation on BPD treatment outcomes of ST and may explain why individual or combined ST is more effective than predominantly group formats. In addition, by examining treatment effectiveness, both in terms of changes in BPD pathology and treatment retention, we can generalize these findings across different aspects of the treatment process.

Chapter 6

The aim of the fifth study as described in **Chapter 6** was to examine the treatment effectiveness of treatments for BPD in a meta-analysis. Instead of only including RCTs and analyzing between-group effect sizes, we included all design types and analyzed within-group treatment effects. This allowed us to include a significantly larger number of studies, as not many direct RCTs with direct treatment comparisons were conducted and many other important studies would otherwise be excluded. Additionally, we included a range of possible predictors of treatment outcomes, including but not limited to treatment type, BPD symptom domains, treatment format, treatment duration, study quality, and publication year.

To include multiple effect sizes from each study(arm) and to control for dependency in effect sizes, we conducted a multilevel meta-analysis. We first conducted a model selection procedure to determine an optimal set of predictors of treatment outcomes to include in our final models. To limit the number of comparisons between treatment categories, we conducted deviation contrasts to compare the mean effect size of each treatment (and predictors included in the final models) to the average of all treatments and all levels of the predictors.

The findings of this meta-analysis provide an elaborate summary of studies reporting on the treatment effectiveness of BPD. By including all design types, the generalizability and clinical utility of the findings are greater than traditional meta-analyses.