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 7

Discussion and Concluding Remarks

Traumatic childhood events can have severe, complex, and intricate consequences, which is the reason why the term childhood-related posttraumatic stress disorder (Ch-PTSD) was introduced. Childhood and adolescence are the periods of our life during which we develop our sense of self, self-view, and personality, and where we lay the foundations for our future relationships. When this important developmental period coincides with traumatic experiences, they most likely have a broad impact on the rest of our lives, both directly and indirectly. This explains why a higher exposure to traumas in childhood is so often related to more severe PTSD symptoms, other forms of general psychopathology, and personality disorders including borderline personality disorder (BPD). However, as many of the mechanisms and pathways involved are still unknown and need to be unraveled, there is a need for a closer examination of these mechanisms and possibilities (and obstacles) for treatment. In five chapters, we have explored the links between childhood trauma (CT), PTSD, BPD, underlying change mechanisms, and treatment effectiveness. In the following discussion, I will elaborate on the interconnectedness of the most important findings, and I will expand on the most important conclusions, nuances, and broader implications for clinical practice, treatment, and research.

Summary of the Findings

In **Chapter 2**, we examined the links between exposure to various types of CT, including sexual abuse (SA), physical abuse (PA), emotional abuse (EA), physical neglect (PN), and emotional neglect (EN), and PTSD symptomatology in adulthood in a group of participants who received a primary diagnosis of PTSD related to A-criterion events in childhood. We investigated the associations of all CT types simultaneously to control for the presence of other CT types to examine their unique associations with PTSD severity. Our findings showed that only higher exposure to EA in childhood was robustly associated (across outcomes and analyses) with increased PTSD symptomatology in adulthood. In addition, when we conducted a model selection procedure, EA was the only CT type that was selected in an optimal model to predict the severity of PTSD. In contrast to what would be expected based on the A-criterion of PTSD, but largely consistent with findings from the literature, higher exposure to SA, PA, PN, and EN in childhood were not related to PTSD severity. These findings are particularly noteworthy as all participants had a primary PTSD diagnosis according to an A-criterion trauma in childhood.

In **Chapter 3**, we examined the role of non-fear emotions as mechanisms of change during PTSD treatment. In the short term, changes in PTSD symptoms preceded changes in anger. Shame and disgust were reciprocally related to PTSD symptom change, as changes in shame and disgust both preceded and followed changes in PTSD symptoms. In contrast, guilt played a more central and causal role as changes in guilt preceded changes in PTSD symptoms at the next treatment session. Interestingly, when we examined the longer-term follow-up processes, only anger was related to PTSD symptom change. This relationship was reciprocal, so changes in anger both preceded and followed changes in PTSD severity. However, this was only found for the scale assessing exposure to all other traumas excluding the index trauma. We also found that changes in PTSD symptoms preceded changes in shame and guilt at the next assessment. In addition, no relationships between changes in disgust and PTSD symptoms between assessments were found. Thus, our findings indicated that the short-term associations between non-fear emotions and PTSD symptoms may differ from the long-term associations, as shame, disgust, and guilt played a larger role in the session-by-session change in PTSD symptoms, whereas anger played a larger role in the long-term including treatment and follow-up assessments.

In **Chapter 4**, we compared the changes in vividness, distress, and encapsulated belief strength over time between eye movement and desensitization and reprocessing (EMDR) and imagery rescripting (ImRs). In addition, we directly compared these variables as underlying treatment mechanisms. We hypothesized that for EMDR, changes in PTSD symptoms would be more strongly predicted by changes in the vividness of the trauma memory and that changes in PTSD symptoms during ImRs would be more strongly predicted by changes in the strength of encapsulated beliefs related to the trauma memory. For distress, we had no prior hypotheses as it may act as a change mechanism for both treatments. Interestingly, we observed initially stronger changes in all variables for EMDR. Moreover, we found that during ImRs, PTSD symptom change was predicted by changes in distress and encapsulated beliefs (and thus the meaning of the trauma memory). Contrary to the hypotheses, changes in vividness were not more strongly related to changes in PTSD symptoms in EMDR compared to ImRs. Thus, while for EMDR no support for vividness (or the other variables) as a treatment mechanism was found, the findings supported the hypothesis that ImRs works by changing the meaning of trauma memories, in addition to decreases in the distress related to the trauma.

In **Chapter 5**, we examined CT and baseline dissociation as possible moderators of treatment effectiveness of combined individual and group schema therapy (IGST) compared to predominantly group schema therapy (PGST) and specialized treatment as usual (TAU) for BPD. We hypothesized that IGST would be more effective than PGST when participants with BPD were exposed to more CT in childhood and experienced more severe dissociative symptoms at the start of treatment. The findings showed that total CT exposure and none of the individual CT subtypes were associated with a higher BPD symptom severity at the start of treatment, while more dissociative symptoms at baseline were related to a higher BPD severity. Moreover, higher exposure to CT (and CT subtypes) and baseline dissociation did not moderate the differences in decreases in BPD symptoms over time in IGST compared to PGST and TAU, or between PGST and TAU. In contrast, these factors moderated treatment retention, as the treatment retention in IGST was higher than in PGST when participants experienced more CT and dissociation, and higher dissociation (and not CT) predicted higher treatment retention in IGST compared to TAU. Therefore, CT and dissociation partly explain the superiority of ST formats with a larger individual component compared to ST formats with a larger group component or specialized TAU We therefore concluded that IGST is the most suitable treatment option for patients who have been exposed to high levels of CT and experience severe dissociation.

In **Chapter 6**, we examined the treatment effectiveness of psychotherapies for BPD through a multilevel meta-analysis studying within-group effect sizes including all study designs and treatments for BPD. Based on the outcomes of all analyses (i.e., the main analyses and the sensitivity analyses), the findings indicated that several specialized treatments, i.e., ST, reduced dialectical behavior therapy (DBT), and mindfulness-based treatment (MBT), and to a lesser extent cognitive behavior therapy (CBT), were associated with higher treatment effectiveness compared to the average of all included treatments. In contrast, TAU and to a lesser extent community treatment by experts (CTBE), were associated with relatively lower treatment effectiveness. Across all treatments, improvements were observed for all BPD outcome domains, with the strongest changes being observed for general BPD severity and affective instability, and the weakest changes being observed for impulsivity, suicidality/self-injury, anger, and dissociation. This study provides an overall summary of the field, and we can conclude that within a broad diversity of effective BPD treatments, specialized treatments for BPD such as ST, reduced DBT and MBT are the most effective when they are compared to the average of all available treatments.

The Underlying Mechanisms of EA as a Common Risk Factor for Psychopathology

In the literature, the focus on EA has grown over the years. While we did not find associations between exposure to childhood EA and BPD severity, relatively robust associations between CT and BPD pathology are often found in mixed clinical and non-clinical samples (Bornavalova et al., 2006; Kuo et al., 2015; Lobbestael et al., 2010). In addition, the findings related to the impact of EA and a lesser extent EN on psychopathology in a broad sense, including depression, suicidality, hopelessness, anxiety, impulsivity, personality pathology (Carr et al., 2013; Martins et al., 2014; Nelson et al., 2017; Sayyah et al., 2022) and most importantly PTSD (Burns et al., 2010; Cecil et al., 2017; Grassi-Oliveira & Stein, 2008; Hoeboer et al., 2021; Sullivan et al., 2006), are consistent with the findings from **Chapter 2** and relatively robust. Thus, EA (and EN) in childhood is associated with psychopathology and PTSD in adulthood and in some cases, EA may even have more detrimental effects than other (traditional A-criterion) types of CT, such as SA and PA. This raises the question of what underlying mechanisms are at play.

Several pathways may explain the association between EA and the risk of developing psychopathology in adulthood. For example, the development of schemas is strongly linked to childhood experiences of EA, as well as EN. Consistent with Young's schema theory (Young et al., 2003), meta-analyses have found associations between EA, EN and specific maladaptive schemas in both adolescents and adults (May et al., 2022; Pilkington et al., 2021). Additionally, a recent study found that maladaptive schema modes mediated the association between EA and BPD (Mertens et al., 2020). EA might also affect psychopathology via other pathways, such as attachment, coping skills, resilience, and affect regulation (Cicchetti, 2016). For example, EA is thought to be related to insecure attachment in infants, which in turn has links with emotion dysregulation, negative self-views, maladaptive coping strategies, and dysfunctional interpersonal relationships (Riggs, 2010). Moreover, the relationships between EA and PA, and PTSD symptoms was partially mediated by emotion regulation (Burns et al., 2010). Emotion dysregulation is also an important characteristic of BPD and has similarly been found to partly explain the relationship between EA and EN, and BPD (Carvalho Fernando et al., 2014; Kuo et al., 2015).

Social support may also play a role, as the absence of social support or insufficient social support in response to traumatic events or aversive experiences can be regarded as a form of EA or EN. Hitchcock et al. (2015) found that when children exposed to single incident traumatic events reported lower social support from their parents, they experienced more severe PTSD symptoms in the short term and after six months. This relationship was mediated by negative appraisals, suggesting that not receiving (sufficient) social support following a traumatic event may lead to the development of negative appraisals of both the traumatic event and the posttraumatic symptoms children experience in response to the trauma, which in turn might increase the vulnerability to develop PTSD symptoms. Interestingly, sufficient perceived support was related to adaptive appraisals, indicating that support also serves as an important protective factor. No or insufficient social support may prevent children or adolescents from talking about the event with their caretakers or may lead them to blame the event on themselves. In line with this finding, Iffland et al. (2012) found that EA mediated the relationship between PA and both social phobia and general psychopathology. Clinically, it has also been observed that survivors of EA and EN show overlap in symptoms with survivors of A-criterion events, but that EA and EN may have more broad detrimental effects related to the self and identity (Grossman et al., 2017). Thus, psychological maltreatment may also serve as an aggravating factor when individuals are exposed to other childhood traumas.

While we mainly found support for the role of EA in psychopathology, in some studies, both EA and EN appear to have similar effects, while other studies point to differential effects of both trauma types. For example, Taillieu et al. (2016) found stronger associations between EA and various mental disorders compared to EN. EA may have a stronger impact on maladaptive emotion regulation strategies, as was found for depression and anxiety, while EN may have a stronger impact on adaptive regulation strategies, as such adaptive strategies might not have been modelled by caregivers (Huh et al., 2017). Future studies should further investigate the differential effects of EA and EN, as other mechanisms may also be involved. Furthermore, the effects of EA relative to EN may also depend on the studied outcome and this should therefore be investigated for different types of psychopathologies, including but not limited to disorders such as PTSD and BPD.

In summary, these studies demonstrate the many potential pathways linking childhood EA to psychopathology. Exposure to EA can negatively impact the development of maladaptive schemas, insecure attachment, difficulties with emotion regulation, and negative appraisals. Compared to other abuse types, EA is more strongly characterized by explicit negative and insulting comments about the individual (e.g., you are worthless), which may explain why it is more broadly related to the individual's self-concept, schemas, and negative attributions which predisposes individuals to develop psychopathology later in life (van Harmelen et al., 2010). However, more research is required to disentangle the different pathways involved.

Future Directions and Considerations for Studying Emotional Abuse

An important strength of the studies in **Chapters 2** and **5** is that we included all CT subtypes and were therefore able to estimate their unique associations with PTSD and BPD symptomatology. This allowed us to provide a comprehensive and nuanced overview of these associations, which many studies fail to achieve. However, despite our efforts to quantify exposure to individual CT types and disentangle their individual impact, the reality is often much more complex. Therefore, it is crucial to elaborate on the challenges faced by researchers studying this topic.

First, we should consider how the different types of CT relate to each other and to psychopathology. While different types of CT can be experienced simultaneously (e.g., SA and EA), they can also occur as separate events. When an individual is only exposed to EA in his or her youth, this may have a different effect than when EA is experienced alongside abuse of a different nature. While EA is the most commonly experienced CT type (Stoltenborgh et al., 2012), it also regularly co-occurs with other types of CT, such as PA and SA (Chamberland et al., 2005). However, it may be less likely that EA is absent in the presence of SA and PA. For example, in the absence of EA, between 29% and 27% of children were exposed to either one or two other forms of abuse respectively, although the nature of these other experiences was not reported (Chamberland et al., 2005). These combined trauma types and their possible differential impact create a challenge in studying the truly unique relationships between CT subtypes and psychopathology.

The existing instruments that are often used in the literature, as well as in our studies (e.g., ITEC and CTQ), fail to measure combined types of abuse and they do not allow us to assess if different types of CT were experienced as part of one event or multiple separate events. Although possibly challenging, developing new, more elaborate instruments to examine exposure to different CT types in more detail would improve our knowledge about the distinctive effects of different CT types on psychopathology. While we could also test the interactions between certain subscales to study the interplay between different types of experiences, this would not provide a clear picture of the nature of exposure to these events. Another limitation of this approach is that it would make the statistical models more complex. When more predictors and interactions are included, this may cause convergence problems. It can also result in overfitting the models, which does not always result in more accurate estimations. If the model predicts the observed data too well, this also reduces its generalizability (Babyak, 2004; Hawkins, 2004).

Second, the instruments that measure CT also differ in the extent to which they measure objective or subjective experiences of trauma, which complicates the comparison between studies that use different instruments. For example, the subjective experience of EA or EN is dependent on individual or cultural differences and parenting norms, which can influence what is perceived as normal or abnormal (Riggs & Kaminski, 2010). Individuals from collectivist cultures in which harsh emotional punishment is more frequent could be exposed to more severe EA while at the same time, such experiences may be considered more normal within the existing cultural norms, decreasing the likelihood to disclose such experiences (Stoltenborgh et al., 2012). Therefore, future studies should take the differences between instruments into account, as well as the possible influence of cultural norms and individual differences. Furthermore, it is worthwhile to study the difference between objective and subjective ratings as both types of ratings refer to different aspects of trauma exposure. While subjective ratings may be more sensitive to bias, these measures also have the advantage of better representing the true impact of an event compared to objective ratings.

Third, the factors that are often studied as possible mechanisms (e.g., schemas, attachment, emotion regulation) are highly interrelated, part of the same pathways, and interact with each other. Therefore, more complex models testing parallel and sequential relationships should be investigated, although this relies on more complex statistical methods. An advantage of testing multiple mediators or moderators is that it is both economically more efficient and gives more insight into the relative importance of different factors. However, this also requires replication studies to learn which factors most often emerge as contenders (Kazdin, 2007).

Fourth, while research has focused on examining the possible mechanisms between CT, EA, and psychopathology, recall of these past experiences is vulnerable to certain biases and errors. For example, recall can be biased by memory and situational factors, even though research has suggested that recall of past abuse was reliable (Hardt & Rutter, 2004). Fifth, the correlational nature of these studies poses another difficult problem to solve. Evidently, purely causational designs for such research questions are non-ethical. Longitudinal designs in which certain cohorts are followed for longer periods of time also introduce additional challenges such as high costs and dropout rates and difficulties to recruit participants (i.e., both children and families), although such studies are necessary to examine the natural course and development of certain symptoms and mechanisms.

Thus, since some traumatic experiences take place at such a young age, many different factors and pathways are at play which become more difficult to disentangle when we become older. Therefore, we face many challenges in quantifying CT and investigating its possible pathways to psychopathology. To gain a more detailed overview and understanding of exposure to CT and EA, we should strive to develop instruments that measure exposure to CT in greater detail, considering possible combinations of subtypes, perpetrators, and time periods. Lastly, we suggest disentangling and studying the relationships between the different pathways and factors involved in more complex models. In addition, longitudinal cohort studies can provide important knowledge and insights. These methods and study designs will help us to gain a more comprehensive understanding of these mechanisms. While these suggestions will tackle several issues, some of them will remain a challenge due to the nature and complexity of this topic.

The A-criterion Debate and How to Navigate Forward

Increasingly more researchers advocate the need for a stronger recognition of the impact of EA in childhood. For example, Rees (2010) argues that EA should be higher on the research agenda and that its early recognition and prevention should be improved. Unfortunately, the impact of EA compared to A-criterion events is currently still underrecognized not only in the DSM-5, but also in clinical practice and research (Grossman et al., 2017) and therefore the difficulties and symptoms that EA victims experience are still severely misunderstood and overlooked. Especially in the absence of A-criterion events, this can lead to stigma and injustice. For instance, when individuals experience difficulties in response to EA, others (including family members, clinicians, and other health care providers) can attribute these to the individuals' personalities or other personal defects and weaknesses. A stronger emphasis on EA would therefore also help victims to recognize and validate their symptoms and difficulties. In addition, EA is less likely to be detected than other abuse types (Chamberland et al., 2005; Sheehan, 2006) and in most cases, child protective services do not focus on EA, especially when it co-exists with other CT types (Sheehan, 2006; Trickett et al., 2009). By continuing to underestimate the consequences of EA, individuals, both as adults and children, are also withheld effective treatment. An essential question that we will therefore focus on is whether individuals exposed to EA in childhood are rightly excluded from receiving a PTSD diagnosis.

Indeed, the A-criterion is controversial and has been under a lot of discussion. One perhaps unintended but widely held implicit assumption of the A-criterion is that the experience of a traumatic event is the primary etiological factor of PTSD. Interestingly, while PTSD has strong overlap and comorbidity with many other disorders, such as mood, substance use, and anxiety disorders, it is the only DSM disorder that is defined by such an etiological factor (Brewin et al., 2009). According to Brewin et al. (2009), this view contradicts the idea that the interaction between an individual's genetic makeup and temperament, and exposure to certain experiences, determine the vulnerability to develop PTSD (and psychopathology in general). In addition, this may also detract from the fact that traumatic experiences may also lead to a range of other disorders. Thus, while exposure to trauma is a necessary precondition - PTSD symptoms will not develop in the absence of exposure to an event experienced as traumatic - it is not a sufficient precondition. One idea, raised by Brewin et al. (2009), is that we should cease working on definitions of the A-criterion and instead conceptualize PTSD as a consequence of traumatic experiences that are not processed correctly while increasing the focus on its resulting underlying symptoms. Therefore, they propose to abandon the A-criterion and focus on the core symptoms that are specific to PTSD (i.e., reexperiencing, avoidance, and hyperarousal), which would also help to reduce the overlap with other diagnoses.

A common criticism of broadening the A-criterion or abandoning it altogether is that it would increase the number of PTSD diagnoses as it lowers the threshold to receive a diagnosis. However, while some studies confirm this idea, findings are mixed and Brewin et al. (2009) state that this is mainly caused by methodological limitations. In these studies, PTSD symptoms or diagnoses only developed in response to events that could be regarded as traumatic or after long periods of stress (Brewin et al., 2009; Friedman et al., 2011) and therefore they disregard this argument. In addition, the fear amongst researchers and clinicians is that abandoning the A-criterion would lead to a trivialization of people exposed to highly traumatic events. However, certain traumatic events are still more likely to lead to PTSD symptoms and most people generally recover and do not develop PTSD (Brewin et al., 2009; Friedman et al., 2011; Weathers & Keane, 2007). Another argument against changing the A-criterion is that when individuals are not exposed to A-criterion events but do experience significant stress responses, they can receive an adjustment disorder (AD) diagnosis. The issue with AD is that the classification is relatively vague and is assumed to be temporary. As such, symptoms that will persist over time will be denied. However, AD can be classified as chronic when symptoms persist longer than six months (American Psychiatric Association, 2013). However, in those cases, it is difficult to distinguish AD from PTSD, which brings its clinical utility into question (Friedman et al., 2011). These issues illustrate the complexity of the debate.

Regarding the conceptualization of PTSD, future changes should have the aim of improving its validity and clinical usefulness with an emphasis on the constituent symptoms and the consequences experienced in response to these symptoms, without unnecessarily increasing its complexity. Considering the findings that underline the role of EA, the A-criterion may currently be too narrow, and the field should therefore reconsider which events are classified as traumatic. If the A-criterion is abandoned or broadened in upcoming revisions of the DSM (irrespective of whether the symptom criteria of PTSD will be adjusted), this will allow us to diagnose individuals who develop PTSD symptoms in response to severe EA in childhood and offer better prevention and treatment options. However, more research on childhood EA and the consequences of possible changes to the A-criterion and its validity is needed given the mixed findings and methodological differences between studies. Therefore, no definite conclusion can currently be made.

Lastly, although the association between EA and PTSD may be stronger compared to other disorders (Gibb et al., 2007), this relationship is not specific for PTSD. Not in all cases individuals develop PTSD or PTSD symptoms in response to EA, while they may still experience other difficulties and symptoms. We should therefore not only focus on recognizing and treating EA in light or as part of PTSD treatment but also view it as an important common risk factor for psychopathology in general and for other disorders.

Non-Fear Emotions and Treatment Mechanisms

As indicated by the findings from **Chapter 2** and previous studies (e.g., Allard et al., 2018; Cooper et al., 2017; Øktedalen et al., 2015; Schumm et al., 2015), non-fear emotions, including shame, guilt, anger, and disgust, and negative cognitions play a role in the PTSD treatment process. Although we have gained more insight into the relative roles of non-fear emotions, some important questions remain unanswered. For example, it is unclear if specific traumatic experiences in childhood have unique links with these emotions. Given the possible mechanisms that may explain the impact of EA, such as schemas, attachment, and emotion dysregulation, it would be interesting to investigate if we could also link these processes to the development of non-fear emotions and their specific impact on treatment. Similar questions for other CT types such as SA and PA are also highly relevant, as these interpersonal experiences have also been found to trigger non-fear emotions (e.g., Badour & Feldner, 2018). However, all participants in our study received a diagnosis based on A-criterion events, so we were unable to disentangle these relationships in our patient population. Furthermore, as we did not assess fear in the original study, this did not allow us to compare the role of fear to non-fear emotions during treatment. Therefore, we should further investigate the role of fear and non-fear emotions in a mixed clinical population exposed to a wider range of CT and include individuals without a (full) PTSD diagnosis to investigate their possible differential impact and role in the development and treatment of PTSD.

The experience of interpersonal traumas in childhood is associated with emotion regulation difficulties in adulthood (Ehring & Quack, 2010). The inability to regulate strong non-fear emotions in response to such experiences could therefore lead to rumination and avoidance and therefore also prevent the processing of such emotions and experiences. In addition, high levels of non-fear emotions can be indicative of avoidance of underlying, more painful thoughts and emotions (Clifton et al., 2017). Moreover, when individuals experience high anger or guilt, patients can become less engaged or too emotional during treatment, decreasing its effectiveness (Held et al., 2011). When such emotions are activated and addressed during treatment, they may therefore lead to a decrease in symptoms.

ImRs and EMDR both focus on the specific experiences and needs of patients during the sessions and both fear and non-fear emotions are addressed during treatment. A surprising and exploratory finding from **Chapter 3** suggested that the relationship between changes in PTSD symptoms and subsequent non-fear emotions was stronger for ImRs compared to EMDR. During ImRs, the unmet needs of the patient may be more intensively addressed compared to EMDR, thereby possibly also having a stronger influence on these emotions following a decrease in PTSD symptoms. This idea is interesting considering the findings in **Chapter 4**, where we investigated the underlying working mechanisms of both treatments. The findings of **Chapter 4** showed a relationship between changes in distress and encapsulated beliefs with changes in subsequent PTSD symptoms for ImRs and **Chapter 3** showed that the relationships between changes in PTSD symptoms and subsequent non-fear emotions were stronger for ImRs compared to EMDR. As such, addressing important beliefs and reducing the distress related to the trauma memory during ImRs is followed by a decrease in PTSD symptoms. In turn, this may trigger non-fear emotions, which when addressed by the therapist, could further lead to subsequent decreases in PTSD symptoms.

Therefore, the findings from **Chapters 3** and **4** may be indicative of a more overall treatment mechanism of ImRs involving the interplay of changes in distress and beliefs on PTSD symptoms and non-fear emotions. However, while all non-fear emotions were assessed at the start of each treatment session, the theorized mechanisms of change (i.e., valence, distress, and encapsulated beliefs) were only assessed during the assessments before, mid-way, and after treatment. To further study this hypothesis and to gain more understanding of the relative role of fear and non-fear emotions during treatment, future studies should assess the working mechanisms, fear, and non-fear emotions during treatment sessions. This would also allow us to further compare the different mechanisms of ImRs and EMDR.

An Overview of the Processing of Emotional Memories in EMDR and ImRs

Whereas the Working Memory (WM) account of EMDR is used as an explanation for the beneficial effects of taxing WM, the Adaptive Information Processing (AIP) model of EMDR (Shapiro, 2001) is used more generally to explain the development of PTSD. According to this model, the emotions, bodily sensations, and fears or cognitions are stored in the same way as they were experienced during the original trauma. Solomon & and Shapiro (2008) also describe these memories as "frozen in time", causing them to not fade over time like other memories as they are not connected with other memory networks. Negative thoughts or expectations are therefore state-specific, which causes them to be triggered by new stimuli. Symptoms triggered by such stimuli, such as intrusions, are therefore seen as a direct consequence of the dysfunctionally stored memory. EMDR allows the formation of new, more adaptive, and positive cognitions when the trauma memory is activated. During a process called reconsolidation, the activated memory becomes labile and can be adaptively changed and integrated with already existing positive memory networks, changing its isolated state. However, no direct restructuring of dysfunctional or negative beliefs takes place or is seen as a mechanism of change. Instead, the negative cognitions triggered by the activation of the memory are theorized to automatically change during the treatment process, leading to the formation of positive alternative cognitions and new associations. Thus, the mechanism according to the AIP model is the integration of the trauma memory with other networks and not extinction as a result of exposure or cognitive restructuring. Lastly, this process can help patients experience a sense of mastery, as they learn to realize that they can cope with the sensations, emotions, and cognitions when the memory is triggered and observe a decrease in these sensations (Oren & Solomon, 2012; Solomon & Shapiro, 2008).

While ImRs has no specific theory regarding the development of PTSD, as is the case for EMDR and the AIP model, it is based on similar cognitive theories of PTSD. Similar to the AIP model, trauma memories are assumed to be fragmented and not integrated with other memory networks and autobiographical knowledge. Therefore, the original content of these memories is still regarded as threatening and is also experienced as such when triggered by internal or external stimuli. In addition, these memories often have a negative meaning attached to them (Ehlers & Clark, 2000; Hackmann, 2011). Through ImRs, the meaning of these memories, their associated emotions, and underlying schemas can be changed (Brockman & Calvert, 2017), which is also thought to integrate the traumatic memory and link it with new appraisals and meanings. During ImRs, the focus is on the past feelings and needs of the young self without changing the actual memory. Similar to EMDR, ImRs it thought to help the individual to experience a sense of mastery or empowerment (Arntz & Weertman, 1999a), in part as they actively participate in the rescripting process and intervene in the trauma memory.

Predictors of Treatment Outcome: Depression and Trauma Exposure

Based on the main outcomes of the IREM trial, no significant difference was found in the effectiveness of EMDR and ImRs in the treatment of Ch-PTSD (Boterhoven de Haan et al., 2020). However, as individual differences within this population could differentially impact the effectiveness of these treatments, an important next step is to study and identify these factors to benefit personalized treatment selection and improve the overall effectiveness of these treatments for groups of patients with certain characteristics.

Using the data from the IREM trial, Assmann et al. (2021) investigated the moderating effect of comorbid depression and anxiety disorders. They found no evidence for a moderating effect of comorbid anxiety disorders, but the findings showed that ImRs was more effective in the long term when patients had a comorbid depression whereas, in contrast, EMDR was more effective in the long term in the absence of a comorbid depressive disorder. Additionally, a study testing the effectiveness of EMDR for PTSD found that the presence of two or more comorbid diagnoses was related to worse treatment outcomes. Interestingly, the most common disorder in this population was depression, followed by anxiety disorders (Bae et al., 2016). However, the exact role of depression during PTSD treatment is still unclear.

Depression comorbid with PTSD may be associated with a higher overall disease burden and can negatively impact several cognitive functions. For example, depression is associated with a higher severity of PTSD symptoms, a higher number of comorbid disorders, worse functioning in general, and greater higher dissociation severity (Bedard-Gilligan et al., 2015). In addition, depressive symptoms were found to negatively affect cognitive functioning, including emotion regulation (Huh et al., 2017) and Cloitre et al. (2016) showed that the burden of experienced symptoms, including PTSD and depression, was associated with emotion regulation difficulties. These difficulties could negatively influence treatment effectiveness and make patients more treatment-resistant (Huh et al., 2017).

When the symptoms are more complex or severe ImRs may be more effective than EMDR. An idea raised by Assmann et al. (2021) is that patients may learn to better cope with their emotions during ImRs, which may benefit individuals who experience more difficulties in regulating their emotions. Moreover, one of the symptoms of major depressive disorder is experiencing feelings of worthlessness and excessive guilt (American Psychiatric Association, 2013). One study found that participants who watched a trauma film and received ImRs compared to exposure alone or unrelated positive imagery showed a stronger decrease in self-blame (Hagenaars & Arntz, 2012), which can be seen as a form of guilt. Additionally, this is in line with the finding that the relationship between changes in PTSD symptoms and subsequent guilt, shame, and anger (**Chapter 3**) was stronger for ImRs compared to EMDR and that during ImRs the meaning of trauma memories is changed more strongly than during EMDR (**Chapter 4**).

Based on our current knowledge, it remains difficult to explain why EMDR would be less effective in the absence of a comorbid depressive disorder in patients with PTSD. Patients with depression tend to suppress negative emotions and one study found that the suppression of positive emotions is even stronger, which is also more strongly related to depression severity (Beblo et al., 2012). Suppression of emotions during EMDR could interfere with the activation of negative emotions and cognitions and the shift towards positive cognitions. In addition, when patients experience cognitive dysfunctions (e.g., loss of concentration and rumination) due to their depressive symptoms, this may also decrease the effectiveness of EMDR. For example, it might impair patients' ability to focus on the bilateral stimulation or the trauma memory (Assmann et al., 2021), or retrieve information and sensations during processing. Although EMDR has been found effective in the treatment of depression (Carletto et al., 2021), the combined effect of the additional difficulties related to depression experienced alongside PTSD symptoms may cross a certain threshold and interfere with its effectiveness as it specifically focuses on the identification of negative and alternative positive cognitions of the trauma, the trauma memory, and the WM task.

However, these explanations have several limitations. According to the WM theory, a limited WM capacity could also enhance the effectiveness of EMDR. Studies have supported the idea that a higher taxing of WM is associated with stronger effects (e.g., Engelhard et al., 2010; Littel & van Schie, 2019), although there are also indications that overtaxing leads to opposite effects (Engelhard et al., 2011). In addition, it must be noted that such cognitive dysfunctions can similarly affect the effectiveness of ImRs and therefore may not be specific for EMDR. Thus, currently, it remains unclear what may explain the superiority of ImRs for patients with comorbid PTSD and depression and therefore more research is needed to further examine the moderating effects of depression and the mechanisms behind these findings.

Insights and New Developments in ST for BPD and the Processing of Trauma

Based on the findings of our meta-analysis (**Chapter 6**) and the ST trial outcomes as described in **Chapter 5**, we can conclude that ST, in addition to several other specialized treatments, is one of the most effective treatments for BPD. As discussed throughout this dissertation, there are strong links between CT and BPD and patients suffering from BPD are often exposed to CT (e.g., Porter et al., 2020; Yuan et al., 2023). ST addresses essential aspects of BPD such as schemas and emotion regulation, which are also linked to CT and EA, and which partly explains its effectiveness for this population. In addition, the links between CT and BPD indicate that incorporating trauma processing may be very beneficial. While ImRs is offered as a stand-alone treatment for PTSD, it is also an important component of ST for BPD. However, ImRs is mainly offered as part of the combined and individual ST formats, suggesting that these formats are more effective than group formats in which ImRs is less extensively offered. Our findings from **Chapter 5** partly confirmed this idea as CT and dissociation were related to higher treatment retention (although not to changes in BPD pathology) in the combined ST format compared to the predominantly group ST format. However, in **Chapter 5**, we did not test individual ST. Currently, a plan is devised to set up a new trial comparing the effectiveness of individual and combined ST formats for BPD (National Library of Medicine, NCT05986552). The outcomes of this trial will give us more insight into the relative effectiveness of these formats. Additionally, this study will also allow us to further investigate whether CT and dissociation moderate the effectiveness of these formats, extending the findings of **Chapter 5**.

The strong link and high comorbidity between PTSD and BPD raise the question of what the impact of CT (and CT subtypes) and comorbidity between these diagnoses is on treatment effectiveness. One study showed that patients with comorbid PTSD and BPD experienced the highest exposure to CT and showed the highest risk of suicide attempts and self-injury compared to BPD patients without PTSD (Harned, Rizvi, et al., 2010). In addition, comorbid PTSD has been shown to negatively impact treatment outcomes for BPD compared to patients with either a BPD or PTSD diagnosis (Pagura et al., 2010), although another DBT study found that patients with comorbid BPD and PTSD showed decreases in dissociation, which were not observed in BPD patients without a comorbid PTSD diagnosis (Harned, Jackson, et al., 2010). Therefore, although some findings are mixed, research indicates that the need to offer effective treatment to patients with BPD and PTSD is high.

In clinical practice, sequential treatments for BPD and PTSD are common. For example, depending on the specific needs of the patient, treatment can be designed to address PTSD and BPD symptoms in a stepwise manner by either addressing PTSD or BPD first. In addition, a parallel treatment that has been developed for PTSD and BPD is DBT-PTSD (Bohus et al., 2013b; Steil et al., 2011). Several elements of the DBT program are combined with cognitive and exposure-based techniques focused on the processing of the trauma. The DBT skills component is mainly based on emotion regulation, which also plays a large role in patients exposed to CT and diagnosed with PTSD and BPD. DBT-PTSD was found to be more effective than DBT alone for patients with comorbid BPD and PTSD (Harned et al., 2014). Interestingly, the presence of a BPD diagnosis or BPD severity was not related to PTSD symptom change during DBT-PTSD (Bohus et al., 2013b). Therefore, the findings from such DBT trials indicate that a combined treatment for BPD and PTSD is feasible and effective.

As ST incorporates ImRs, it is therefore also expected to be effective in the combined treatment of PTSD, BPD, and other PDs with strong associations with CT. Following this line of reasoning, one promising trial is currently running and one trial is being set up. Similar to BPD, cluster C personality disorders are highly comorbid to PTSD (Friborg et al., 2013). One trial will therefore aim to compare ImRs to ST in the treatment of patients with PTSD and a comorbid cluster C personality disorder (van den End et al., 2021). In addition, ImRs as part of ST for BPD is currently offered later during treatment, as it is thought that a safe and strong therapeutic relationship first needs to develop (van Genderen & Arntz, 2021). However, it is still unclear if early ImRs during ST is feasible. Therefore, the LUCY trial (Koppeschaar et al., 2022), a collaboration between the University of Amsterdam and several mental health sites, aims to further investigate the effectiveness of ST for BPD and the effectiveness of early ImRs during ST. These trials will give us more insight into the effectiveness of ST and the effects of the processing of traumatic experiences as part of ST.

A Stronger Need for Randomized Clinical Trials

Throughout this discussion, several suggestions for future studies were offered. The golden standard to study such questions is through randomized controlled trials (RCTs). However, conducting RCTs can be very challenging for several reasons. First, RCTs are relatively difficult to set up as they often require large groups of participants and (international) collaboration between different universities and mental health care sites. In addition, conducting these trials often depends on funding from healthcare insurers or government grants. Surprisingly, healthcare insurers only reimburse evidence-based treatments and not experimental treatments, even though studies into new treatments benefit insurance companies. Moreover, many clinical health institutions have mission statements that commit them to empirical research, but there is often a lot of resistance from management as they are forced to keep additional costs as low as possible and running large trials requires a lot of resources.

Further improving and simplifying these procedures and intensifying collaboration and funding would therefore enhance the possibilities of researchers to conduct well-powered RCTs, which is important to be able to answer a range of research questions related to mechanisms and treatment effects, including several suggestions made in this discussion. More knowledge about certain processes will prove highly beneficial to improve personalized medicine, i.e., selecting the optimal treatment based on certain factors and patient characteristics. This may further improve the effectiveness of several treatments, including EMDR, ImRs and ST. A hopeful development is that within the field of psychology, the number of publications related to RCTs is continuing to increase. According to the global ratio of publications of RCTs across diseases, the number of

RCT publications for mental disorders is the second highest and the number of new publications in mental health research is showing the strongest increasing trend (Marshall et al., 2021).

However, a meta-analysis of Swedish treatment studies revealed that the methodological quality of many trials is limited (Sundell & Åhsberg, 2018). Moreover, certain topics and treatments receive a stronger focus, and therefore some treatments and topics are underrepresented in research. For example, there are a great number of RCTs (and other study designs) focused on DBT, while the methodological quality of many treatment studies for BPD was low (Storebø et al., 2020). We observed a similar pattern in **Chapter 6.** A meta-analysis on psychological treatments for PTSD found that in general, study quality was moderate (Morina et al., 2021). As previously emphasized, such a bias towards certain treatments complicates directly comparing other combinations of treatments and investigating underlying processes. In addition, when the study quality is low, the beneficial value of RCTs decreases. However, it is unclear to what extent this is the case as the findings from Morina et al. (2021) and **Chapter 6** suggested that study quality was not related to treatment outcomes. This is an interesting finding, as we included all study design types and did not merely focus on RCTs.

We must note we should not disregard the value of other study designs. RCTs are very important to be able to generalize findings to real-world clinical settings and establishing cause and effect relationships. However, because many treatments are already effective, effects become smaller which requires an increasing number of participants to be included in RCTs to maintain sufficient power. It is therefore important to take the cumulative evidence from multiple sources and study designs into account (Deaton & Cartwright, 2018; Kazdin, 2007). For example, naturalistic designs may be very suitable for certain questions (e.g., studying CT) and qualitative studies can provide insight into patients' experiences and personal opinions. This may help to both test hypotheses and generate new ideas (Kazdin, 2007). In addition, N-of-1 trials can offer important advantages, especially in the view of personalized medicine. If such trials are replicated, the outcomes can be aggregated enabling us to gain new insights about groups of patients with shared characteristics or even larger populations (Schork, 2015).

However, many of the underlying working mechanisms of psychological treatments, developmental pathways, and individual factors that are related to treatment outcomes are still unknown. Kazdin (2007) also underlines the need to continue to study working mechanisms. First, this could help us to group certain types of treatments and to order them based on our knowledge regarding their working mechanisms. Second, as mentioned previously, it enhances the selection of the optimal treatment for individuals based on certain characteristics. Third, it would further help us understand which treatment elements are most important to focus on, creating opportunities to optimize treatment models. Lastly, it is important to combine clinical research with more experimental designs and studies focusing on biological and genetic processes, taking a stronger interdisciplinary approach once important possible mechanisms have been identified (Kazdin, 2007).

Therefore, we highly encourage the field to continue to conduct high-quality RCTs, while also focusing on other study designs and combining the findings from different types of analyses and research designs. This will provide more knowledge and insights into relative treatment effectiveness, underlying mechanisms, and processes of change. As many disorders and concepts are interconnected, either via common pathways, overlapping symptoms, or comorbidity, we must continue striving to investigate such fundamental research questions to accelerate scientific progress and to further bridge the gap between research and clinical practice.