

Trauma History and Course of Therapy in a Naturalistic Cognitive Behavior Therapy Outpatient Sample: An Archive Data Study

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November 9, 2023

Abstract

Objective: Cognitive Behavior Therapy (CBT) is an effective treatment for anxiety and depression disorders. Nonetheless, nearly 50% of all patients do not respond. Besides other factors, this seems to be linked to the experience of traumatic life events. This study aims to assess the effects of trauma history on the choice of therapy interventions and treatment outcomes. **Methods:** We analyzed data from 340 CBT outpatients diagnosed with a depression or anxiety disorder and possibly a trauma history treated under naturalistic conditions. Based on their written therapy files, we collected information on trauma history, psychiatric diagnoses, duration of therapy, applied interventions, and severity of depression and anxiety symptoms at the start and end of therapy. The influence of trauma, diagnoses, and intervention use on the development of depression and anxiety symptoms were analyzed. **Results:** Patients with a trauma history reported higher overall depression and anxiety symptoms than those without trauma. No differences in the duration of therapy, applied interventions, or decrease in symptom severity were found between patients with and without a trauma history. Trauma-specific interventions failed to boost treatment success; however, they were also seldom applied. **Conclusion:** Although no differences between traumatized and non-traumatized patients were found for naturalistic CBT, traumatized patients maintained higher levels of symptom severity irrespective of diagnoses. These results indicate a need for more trauma-specific and personalized interventions. Therapists may need evidence-based guidelines to personalize CBT for patients with a trauma history and high symptom severity.

Introduction

Depression and anxiety disorders are among the most frequent mental disorders in the general population (Jacobi et al., 2014) as well as among psychotherapy outpatients (Gaebel, Kowitz, Fritze, & Zielasek, 2013; Velten et al., 2018). They carry a high burden of illness worldwide (GBD 2019 Mental Disorders Collaborators, 2022) and are associated with high illness costs (König, König, & Konnopka, 2019; Konnopka & König, 2020).

Lifetime traumatic events including childhood maltreatment (abuse and neglect) are often risk factors for the onset of a depression or anxiety disorder (Hovens, Giltay, Spinhoven, Hemert, & Penninx, 2015; Kühn et al., 2006; Mandelli, Petrelli, & Serretti, 2015; Walsh, McLaughlin, Hamilton, & Keyes, 2017) and are also predictors of depression and anxiety severity (Chu, Williams, Harris, Bryant, & Gatt, 2013; Hovens et al., 2010). Traumatic events can be classified as interpersonal or non-interpersonal and as single or repeated (Maercker & Augsburger, 2019). Interpersonal and repeated trauma types like childhood maltreatment and intimate partner violence have robustly been associated with more severe consequences such as higher posttraumatic stress disorder (PTSD), depression, and anxiety scores compared to non-interpersonal types such as traffic accidents and natural disasters (Bridges-Curry & Newton, 2021; Contractor, Brown, & Weiss, 2018).

Despite long-standing research on the effectiveness of CBT for depression and anxiety disorders (Carpenter et al., 2018; Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Tolin, 2010), about 51.5 to 59.0% of all patients do not respond to treatment (Cuijpers et al., 2021; Loerinc et al., 2015), calling for a better understanding of mechanisms involved in the treatment. One promising and cost-efficient way to identify potential CBT non-responders may lie in assessing and investigating psychological patient characteristics at the start of therapy (Kunas, Lautenbacher, Lueken, & Hilbert, 2021).

Childhood maltreatment predicts non-response and non-remission for a broad range of psychological and medical treatments for depression, including CBT (Nanni, Uher, & Danese, 2012; Nelson, Klumpp, Doebler, & Ehring, 2017). Emotional, physical, and sexual abuse were related to lower response and higher post-treatment symptom severity for depressed patients treated with the Cognitive Behavioral Analysis System of Psychotherapy (CBASP) or Supportive Psychotherapy (Serbanescu et al., 2020). Emotional abuse in particular predicted less depression-free time in outpatients one year after psychotherapy (Bausch et al., 2020), while physical and sexual abuse were more frequently indicated by psychotherapy non-responders (Fischer et al., 2018). For patients with an anxiety disorder, the picture is less conclusive. In some studies, childhood maltreatment in general and more specifically emotional and physical abuse were linked to low psychotherapy response (Alden, Taylor, Laposa, & Mellings, 2006; Fischer et al., 2018). Other studies report no effect of childhood maltreatment (Santacana et al., 2016) or found an effect only on absolute levels of symptom severity, not on the amount of decrease (Bruce, Heimberg, Goldin, & Gross, 2013).

Effects of adulthood and non-interpersonal trauma on treatment success have, to our knowledge, scarcely been investigated. In one study, the overall effect of exposure-based CBT for panic disorder was similar for patients with and without trauma history (Trautmann et al., 2019). Only a subgroup of traumatized female patients, characterized by a specific genotype and comorbid depressive symptoms, achieved less change in symptom severity than the non-traumatized controls. Robust evidence on the effects of adulthood and non-interpersonal trauma on CBT response rates is missing.

Although negative effects of childhood maltreatment on treatment response have been demonstrated, questions remain concerning the relevance of these effects under different delivery conditions of CBT. Most studies, except for Fischer et al. (2018), investigated the effects of trauma only for CBT provided under controlled study conditions and used data from efficacy studies. These studies, while providing a maximum of experimental control and internal validity, often are not well transferable to therapies conducted under routine care conditions in terms of patient characteristics, number of therapy sessions, and especially the use of treatment manuals (Lincoln & Rief, 2004; Seligman, 1995; Shadish et al., 1997). Being aware of the trauma history of a patient gives the therapist the possibility to individually adapt the treatment by using specific interventions to address the trauma-related symptoms.

Victims of childhood maltreatment often present a more complex clinical picture at the start of CBT treatment compared with patients, who did not suffer childhood maltreatment (Fullana et al., 2019; Norman et al., 2012). They are more likely to have emotion regulation difficulties (Bridges-Curry & Newton, 2021) or engage in self-injuring behavior (Brown et al., 2018; Liu, Scopelliti, Pittman, & Zamora, 2018). These conditions may complicate the treatment of mental health problems and are risk factors for low treatment success (Kunas et al., 2021; Serbanescu et al., 2020; Taylor, Abramowitz, & McKay, 2012). Therapists might therefore offer skills training (Bohus & Wolf-Arehult, 2016; Cloitre, Koenen, Cohen, & Han, 2002; Linehan, 1993) to promote emotion regulation competencies in the early stages of therapy. Furthermore, childhood maltreatment is linked to an anxious or avoidant attachment style (Shahab et al., 2021; Widom, Czaja, Kozakowski, & Chauhan, 2018) and increased problems in intimate partner relationships in adulthood (Bender et al., 2022; Colman & Widom, 2004; Paradis & Boucher, 2010). Such interpersonal problems may affect the therapeutic relationship, which poses a key factor for successful therapy (Flückiger, Del Re, Wampold, & Horvath, 2018; Weck, Grikscheit, Jakob, Höfling, & Stangier, 2015), for example, by lowering relationship quality or raising difficulties in building a trustful working alliance (Alden et al., 2006). Consequently, interpersonal problems might mediate the link between childhood maltreatment and low therapy response. Supporting this notion, meta-analytic evidence points towards lower therapy success in patients with insecure

attachment styles (Levy, Kivity, Johnson, & Gooch, 2018). Elements of schema therapy (Young, Klosko, & Weishaar, 2006), developed specifically for patients with challenging interpersonal behavior and a history of childhood maltreatment, might be applied to overcome problems in the therapeutic relationship and even modify dysfunctional attachment styles. Regarding persistent depressive disorder, deficits in social cognition, more specifically the phenomenon of preoperational thinking (McCullough, 2000, 2006), has been proposed as a mediator between childhood trauma and chronic, treatment-resistant depression (McCullough Jr., 2003; Struck, Gärtner, Kircher, & Brakemeier, 2021). Following McCullough (2006), maltreated and early-onset chronically depressed patients have difficulties in recognizing the effects they have on their interaction partners. They therefore cannot use the feedback obtained during interactions with their therapists to correct maladaptive assumptions and behaviors (McCullough, 2006). Supporting its relevance for treatment outcome, preoperational thinking is correlated with childhood maltreatment and a chronic course of depression (Klein et al., 2020) and can predict the course of depression over two years (Sondermann et al., 2020). Therapists might implement CBASP interventions like Disciplined Personal Involvement (McCullough, 2000) to reduce preoperational thinking and promote interpersonal learning. Regarding anxiety disorders, impaired extinction learning in trauma victims might contribute to low therapy success. Extinction of conditioned fear appears to be a key mechanism of exposure therapy for anxiety disorders (Craske et al., 2008; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). It is the laboratory analog of exposure therapy (Barlow, 2002), during which a new safety memory trace is formed and can inhibit fear (Milad & Quirk, 2012). However, extinction learning may be impaired in patients with an anxiety disorder (Duits et al., 2015). Alterations in extinction learning observed in victims of childhood trauma aged 6-11 years might contribute to impaired extinction learning during adulthood (Marusak et al., 2021). There is also experimental evidence that supports impaired extinction learning following stress exposure in healthy adults (Klinke, Fiedler, Lange, & Andreatta, 2020) and in stress-exposed rodents (Knox et al., 2012; Wilber, Southwood, & Wellman, 2009; Yamamoto et al., 2008). Hence, trauma-exposed patients might experience slower or less robust extinction learning and, in parallel, profit less during exposure therapy (Maren & Holmes, 2016). They might, therefore, need a more extended treatment duration to compensate for slower learning.

These possibilities to individualize and intensify treatment in the naturalistic context might buffer adverse effects of trauma on treatment success observed in highly manualized therapy settings. Additionally, in the case of trauma-related avoidance behavior and hyperarousal, therapists might apply trauma-focused techniques (Neuner, 2012) and self-calming techniques (Reddemann, 2010) to treat these PTSD-like symptoms. To date, it remains open to what extent therapists under naturalistic treatment conditions apply trauma-specific interventions and unspecific intensification of therapy for traumatized patients. Furthermore, it is currently unknown if and how applying these measures affects treatment response.

Taken together, patients suffering from anxiety or depression, who additionally experienced trauma, seem to be at risk for non-response and non-remission in CBT treatment as these patients are more likely to present a complex clinical picture, have difficulties in the therapeutic relationship and possibly show reduced sensitivity to important CBT change mechanisms. Current evidence points towards more severe effects of interpersonal and childhood trauma compared to non-interpersonal and adulthood trauma. Still, the role of different trauma subtypes and the characteristics of the naturalistic therapy setting remain unclear. The present study aims to investigate treatment trajectories for depression and anxiety symptoms of patients with and without a trauma history in a naturalistic CBT context. It will distinguish between different trauma subtypes and test the role of the diagnostic group and trauma-specific therapy modifications as potential moderators of treatment success. We expect therapists to adapt treatment for patients with a trauma history by offering longer and intensified therapies and using trauma-specific interventions (Hypothesis 1). We also expect higher overall levels of symptom severity in the trauma group (Hypothesis 2a) and less decrease in symptom severity throughout therapy (Hypothesis 2b), especially for depressed patients (Hypothesis 2c). Furthermore, we expect the effect of trauma on symptom severity and decrease in symptom severity to be more pronounced in patients with a history of childhood trauma and interpersonal trauma in contrast to adulthood trauma and non-interpersonal trauma only (Hypothesis 3). Regarding the individualization of treatment in the naturalistic context, we expect to find more improvement in symptom severity for

traumatized patients if trauma-specific therapy techniques were used (Hypothesis 4).

Methods

Sample Characteristics

The study was conducted at a German university outpatient clinic for psychotherapy and was approved by the local ethics committee for psychology. Hypotheses 1-3, sample size, and statistical analyses were pre-registered on OSF (see <https://osf.io/cyzex>). Hypothesis 4 was developed later and, therefore, not pre-registered. Data was collected from written archive therapy files at the university CBT outpatient clinic.

To determine the optimal sample size, we conducted an a priori power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). Based on trauma prevalence in a prior German CBT study (Trautmann et al., 2019), we assumed a trauma prevalence of 33.3% and calculated sample size to detect a medium effect size of $d = 0.5$ between trauma groups and for both diagnostic groups separately at the standard alpha error probability of 5% with a power of at least 80%, which yielded an optimal sample size of $N = 340$.

Following the results of the power analysis, 340 therapy cases were included. All therapies took place between 2011 and 2020. Patients were, on average, 36.97 years old ($SD = 13.61$) and 64.41% were female. All patients were diagnosed with either a depression disorder, an anxiety disorder, or both by their therapist after at least four diagnostic sessions. On average, patients had 1.54 different psychiatric diagnoses ($SD = 0.65$, $Min = 1$, $Max = 4$), with 46.47% of all patients having at least one comorbidity. Most frequent were depression disorders (86.47%), followed by anxiety disorders (27.94%). Patients diagnosed with PTSD were rare (1.18%). Based on the criteria described below, 50.88% of all patients were classified as having experienced at least one traumatic event and belonged to the trauma group instead of the no-trauma group. Sociodemographic characteristics by trauma group are displayed in Table 1. For a more detailed overview, see Supplemental Material, Table 3, Table 4, and Supplemental Figure 5.

Table 1:

Sociodemographic characteristics of patients at the start of therapy by trauma group.

Variable		no Trauma, $n = 167$	Trauma, $n = 173$	p
Gender	female	98 (58.7%)	121 (69.9%)	.040
	male	69 (41.3%)	52 (30.1%)	
Age (SD)		34.0 (12.8)	39.9 (13.8)	<.001
Highest educational level	none	2 (1.2%)	4 (2.4%)	<.001
	still in school	3 (1.8%)	0 (0.0%)	
	Hauptschule (9 years)	20 (12.0%)	45 (26.6%)	
	Realschule (10 years)	41 (24.7%)	61 (36.1%)	
	Abitur (12 years)	100 (60.2%)	59 (34.9%)	
Number of comorbid psychiatric diagnoses	1	88 (52.7%)	94 (54.3%)	.387
	2	70 (41.9%)	64 (37.0%)	
	3	7 (4.2%)	14 (8.1%)	
	4	2 (1.2%)	1 (0.6%)	
Diagnostic group	depression, no anxiety	116 (69.5%)	129 (74.6%)	.554
	anxiety, no depression	24 (14.4%)	22 (12.7%)	
	depression and anxiety	27 (16.2%)	22 (12.7%)	
Beck Anxiety Inventory (SD)		19.6 (10.7)	21.2 (12.2)	.217
Beck Depression Inventory-II (SD)		24.2 (11.1)	26.9 (11.1)	.030

Note. M (SD) for continuous variables, $n(\%)$ for categorical variables. p -values were calculated using an independent sample t -test for differences in continuous variables and χ^2 -tests for differences in categorical variables. Beck Anxiety Inventory and Beck Depression Inventory–II scores at the start of therapy.

Procedure

A detailed codebook was developed to extract study-relevant information from the archive therapy files. Each file consisted of diagnostic results, including the patient self-report form and symptom severity questionnaires, therapy reports, and the therapist’s session-by-session documentation of therapy content. Three research assistants were trained in using the codebook by the first author, and interrater reliabilities were calculated (see below).

Inclusion Criteria.

First, we screened all archive files for usability in the study, starting with the most recently archived files and progressing chronologically to the older files. Files were included if they met the following criteria: diagnosis of unipolar depression (ICD-10: F32.X, F33.X) or an anxiety disorder (ICD-10: F40.0, F40.1, F41.0, F41.1) and at least one therapy session after the initial diagnostic phase. Incomplete files were not included (missing patient self-report form, completely missing symptom severity questionnaires at the start of therapy, missing therapy reports, unreadable or missing session-by-session documentation).

Coding of Files.

Second, based on the codebook, we extracted study-relevant information on sociodemographic characteristics, symptom severity, trauma history, and therapy characteristics from all included files. Information on sociodemographic characteristics and medication at the start of therapy was retrieved from the patient self-report forms. The severity of depression symptoms at the start and end of therapy was obtained from the *Beck Depression Inventory–II* (BDI-II, Beck & Steer, 1993; German version by Hautzinger, Keller, & Kühner, 2009), a 21-item self-report questionnaire based on DSM-IV. The severity of anxiety symptoms at the start and end of therapy was obtained from the *Beck Anxiety Inventory* (BAI, Beck, Steer, & Brown, 1996; German version by Margraf & Ehlers, 2007), a self-report questionnaire with 21 items and a focus on bodily symptoms of stress or anxiety. A measure of global symptom severity was obtained from the *Global Severity Index (GSI)* of the *Brief Symptom Inventory* (BSI, Derogatis, 1993; German version by Franke, 2000), a 53-item self-report questionnaire that measures symptoms of a broad range of psychiatric disorders.

For trauma, as defined by DSM-5 (Association, 2013), interpersonal and non-interpersonal, as well as single and repeated traumatic events (Maercker & Augsburger, 2019) before and after age 18, were rated as present or not present after reading the entire file. For childhood maltreatment, the five subtypes of physical, emotional, and sexual abuse and physical and emotional neglect (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997; Bernstein et al., 2003) were likewise coded as present or not present. Additionally, the total number of traumatic events was counted.

The duration of therapy in months and the number of therapy sessions were obtained from the therapist’s final report. Trauma-specific interventions were defined as self-calming techniques (Reddemann, 2010), skills training (Linehan, 1993), trauma-focused therapy techniques (Neuner, 2012), schema mode interventions (Young et al., 2006), and other interventions with an explicit trauma focus that did not fall among the first four interventions. Trauma-unspecific interventions were defined as inpatient treatment episodes during therapy and a combination of psychotherapy with other non-medical psychosocial interventions. Both types of interventions were rated as either used or not used based on the therapist’s session-by-session documentation and the final report.

Monitoring of Data Quality.

Third, the collected data were screened for implausible values, and the original files were consulted again to correct data entry errors. To assess the interrater reliability, a total of 70 files (20.59%), chosen randomly, were rated again by another research assistant. In case of disagreement between two raters, the first author decided on the rating to use for the data analysis, consulting the original therapy file again if necessary.

Data Analysis

All analyses were conducted using R (Version 4.2.2; R Core Team, 2021) and the R-packages *irr* (Version 0.84.1; Gamer, Lemon, & Singh, 2019), *lme4* (Version 1.1.31; Bates, Mächler, Bolker, & Walker, 2015), *mice* (Version 3.15.0; van Buuren & Groothuis-Oudshoorn, 2011), *mitml* (Version 0.4.4; Grund, Robitzsch, & Luedtke, 2021), *papaja* (Version 0.1.1; Aust & Barth, 2022), and *tidyverse* (Version 1.3.2; Wickham et al., 2019).

Scoring and Indices.

First, we calculated questionnaire scores and aggregated trauma and intervention indices. For the BAI, BDI-II, and GSI, scores were calculated as described in the corresponding manuals (sum scores for BAI and BDI-II, mean score for GSI). Additionally, the *Reliable Change Index* (RCI, Jacobson, Follette, & Revenstorf, 1984; Jacobson & Truax, 1991) was applied for BAI, BDI-II, and GSI to assess the number of patients who recovered or improved during therapy, as recommended by Loerinc et al. (2015). To calculate the RCI as Jacobson and Truax (1991) described, we first divided each patient's change score by its standard error, resulting in a continuous change score with change values > 1.96 indicating reliable improvement and change values < -1.96 indicating reliable deterioration. We then categorized patients who reliably improved and fell below the cut-off score for clinically relevant symptom severity of the corresponding questionnaire as recovered, patients who reliably improved and did not fall below the cut-off score as improved, patients with reliable deterioration as deteriorated, and all others as unchanged.

For trauma, two indices were calculated. The first index, global trauma, differentiated between cases with at least one traumatic event and cases without any traumatic event. The second index, interpersonal trauma, differentiated between cases with at least one interpersonal traumatic event, cases without interpersonal traumatic event but at least one non-interpersonal traumatic event, and cases without any traumatic event. Diverging from the pre-registration for Hypothesis 3, we could not further differentiate between childhood interpersonal and adulthood-only interpersonal trauma because cases with adulthood-only interpersonal trauma were sporadic in the sample (2.35%).

Interrater Reliability.

Second, we assessed agreement percentages and interrater reliabilities (Cohen's Kappa or Fleiss Kappa, as appropriate) for all trauma and intervention ratings and all rater pairs. Regarding the trauma ratings, the aggregated global and interpersonal trauma indexes achieved satisfying interrater reliabilities ($\kappa = 0.62-1$), as did the number of traumatic events rating ($ICC = 0.81$). Some trauma subtypes, in contrast, had insufficient reliabilities ($\kappa = -0.05-1$). For 52.78% of all trauma subtypes, interrater reliability was unacceptably low ($\kappa < .61$), so trauma subtypes could not be used for exploratory analysis as initially intended. Consequently, all further analyses were based on the global and interpersonal trauma indexes.

Regarding the intervention ratings, the aggregated intervention index achieved satisfying interrater reliability ($\kappa = 0.78$). The intervention subtypes generally had satisfying interrater reliabilities as well ($\kappa = 0.38-1$), except for the rarely used trauma-focused interventions ($\kappa = -0.01$) and other, not further specified interventions ($\kappa = 0$). Since the interrater agreement was acceptable for all intervention types (70.00-93.10%), we included all intervention subtypes in the analysis as pre-registered to provide a more detailed picture. The interrater reliability and agreement for all indices and subtypes used for analyses can be found in the Supplemental Material, Tables 5 and 6.

Treatment of Missing Data.

Third, a significant challenge for data analyses was the substantial percentage of missing values, primarily due to post-treatment symptom severity questionnaires missing in the original files. Whereas trauma and intervention ratings had no missing values and missingness was low on sociodemographic variables, treatment-related variables, and pre-treatment BDI-II and BAI questionnaires, at post-treatment, both BDI-II (37.06% missingness) and BAI (43.24% missingness) suffered from missing data. Missingness on the GSI was even higher (pre-treatment: 23.24%, post-treatment: 65.00%). For further information on missing values, see Supplemental Material, Table 7.

We applied Multiple Imputation (Rubin, 1987) for missing BAI and BDI-II values to minimize bias due to missing values during hypotheses testing. We used fully conditional specification and a two-level imputation model for longitudinal data, including all model-relevant variables and their interaction terms as well as auxiliary variables with a correlation of at least $r \geq .2$ with either the imputed variable or missingness (Kleinke, Reinecke, Salfrán, & Spiess, 2020; Spiess, Kleinke, & Reinecke, 2021; van Buuren, 2018). Fifty imputed data sets were generated with 20 iterations each (White, Royston, & Wood, 2011). For the GSI, the percentage of missing values at post-treatment exceeded 50%, making it prone to estimation errors even using Multiple Imputation (Barzi & Woodward, 2004; Marshall, Altman, Royston, & Holder, 2010). Hence, contrary to the preregistration, we excluded the GSI from further analysis.

Hypothesis Testing.

Finally, to investigate differences between the trauma groups in categorical outcome measures, e.g., trauma-specific interventions and Reliable Change Index, Fisher's exact tests were conducted and pooled in case of missingness as proposed by Eekhout, Wiel, and Heymans (2017). Differences between the two trauma groups in continuous outcome variables were tested using between-subjects t -tests. Differences between the trauma groups, the depression groups, and the intervention groups in symptom severity trajectories were tested using the recommended pooling procedure for multi-parameter pooling of mixed designs described by van Ginkel and Kroonenberg (2014). We deviated from the pre-registered mixed-effects ANOVA models because of the multiple imputation context. Instead, we compared linear mixed effects models with and without the time, trauma, depression, and intervention factors and applied the D1 pooling method (Grund, Lüdtke, & Robitzsch, 2016). Full models always contained the factors of time point and trauma and their interaction in the fixed part and contained random intercepts by patient. The full model for the effect of the depression group (Hypothesis 2c) additionally contained a depression factor and its interaction effects. The full model for the effect of trauma-specific interventions (Hypothesis 4) contained an intervention factor and its interaction effects and number of therapy sessions as a covariate. In line with Ludbrook (2013), we used one-sided tests for pre-registered hypotheses. The standard significance level of $p < .050$ was set for all tests. The Bonferroni method was applied to adjust for multiple comparisons in case of multiple testing.

Results

General Trauma Characteristics

Lifetime traumatic experiences were highly prevalent (50.88%). In most cases (76.30%), this included interpersonal trauma. Among patients with a trauma history, 46.82% reported multiple types of trauma, with a maximum of 6 types ($M = 0.92$, $SD = 1.21$). In 76.30% of cases, therapists registered traumatic experiences during the initial diagnostic phase of therapy.

Trauma and Adaption of Therapy

Therapy characteristics by trauma group are given in Table 2.

Table 2:

Therapy characteristics by trauma group: Descriptive summary

Variable		no Trauma, $n = 167$	Trauma, $n = 173$
Number of therapy sessions (SD)		43.7 (19.6)	43.9 (18.5)
Duration of therapy in months (SD)		22.2 (9.5)	21.5 (7.9)
Psychiatric medication	no	70 (41.9%)	77 (44.5%)
	yes	97 (58.1%)	96 (55.5%)
Inpatient treatment	no	145 (86.8%)	150 (86.7%)
	yes	22 (13.2%)	23 (13.3%)
Social support	no	124 (74.3%)	132 (76.3%)
	yes	43 (25.7%)	41 (23.7%)
At least one trauma-specific intervention	no	101 (60.5%)	94 (54.3%)
	yes	66 (39.5%)	79 (45.7%)

Note. M (SD) for continuous variables, $n(\%)$ for categorical variables.

As stated in Hypothesis 1, we first tested for a longer duration of treatment and more use of trauma-specific interventions in the trauma group. There was no significant effect in the expected direction in the number of therapy sessions ($t(338) = 0.12, p_{Bonf.} = .905, d = -0.01$) and the duration of therapy in months ($t(338) = 0.75, p_{Bonf.} > .999, d = 0.08$). Likewise, Fisher's exact test revealed no differences in the use of trauma-unspecific measures to intensify therapy (psychiatric medication: $OR = 0.90, p_{Bonf.} > .999$, inpatient treatment: $OR = 1.01, p_{Bonf.} > .999$, non-medical social support: $OR = 0.90, p_{Bonf.} > .999$).

Among the trauma-specific interventions, schema mode interventions were most frequent (22.94%), while trauma-focused interventions (6.47%) and other, not further specified interventions (3.53%) were rare. Only skills training was used significantly more often in the trauma group than in the no-trauma group ($OR = 2.47, p_{Bonf.} = .019$); see Figure 1. For trauma-focused interventions ($OR = 2.73, p_{Bonf.} = .137$) and other, not further specified interventions ($OR = 5.04, p_{Bonf.} = .103$), probabilities were descriptively higher in the trauma group but did not reach significance. For self-calming techniques ($OR = 0.89, p_{Bonf.} > .999$) and schema mode interventions ($OR = 0.96, p_{Bonf.} > .999$), the probability was not higher in the trauma group than in the no-trauma group. The probability for at least one trauma-specific intervention was not significantly higher for the trauma group than the no-trauma group ($OR = 1.29, p = .150$).

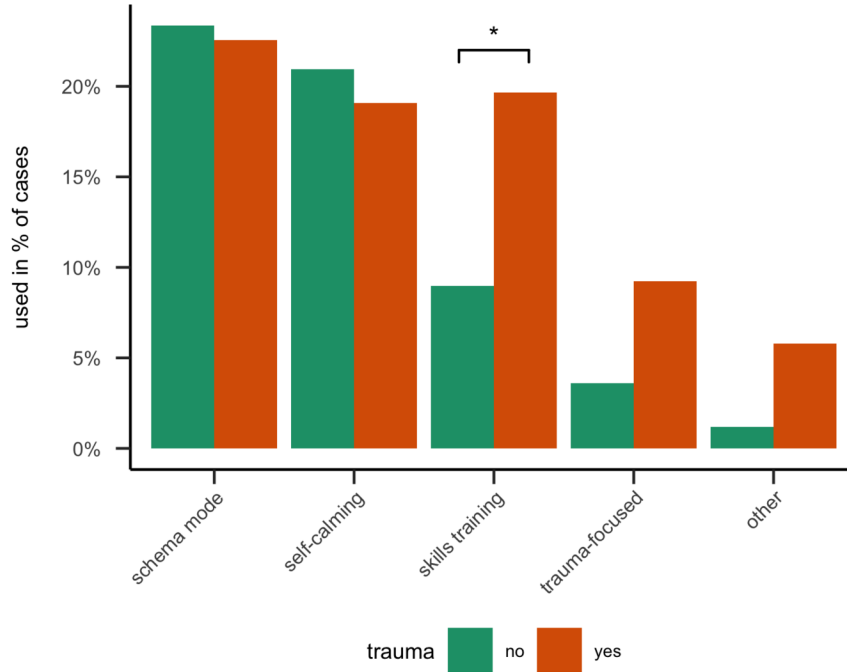


Figure 1: Intervention frequency in percent of cases by trauma group. Schema mode interventions were most frequent. Significant differences between the trauma groups were observed for the use of skills training. Bonferroni-adjusted Fisher tests between the trauma groups: * $p < .05$.

Trauma and the Development of Symptom Severity

We then tested for higher symptom severity and less decrease in symptom severity in the trauma group (Hypothesis 2a, 2b). Adding trauma group as a factor significantly improved the models for anxiety and depression symptoms (BAI: $F(1, 345.86) = 4.23, p = .041$, BDI-II: $F(1, 1,264.71) = 5.33, p = .021$), indicating differences in symptom severity between the trauma groups across time. As expected, group means for the trauma group were higher than for the no-trauma group on BAI and BDI-II at the start and end of therapy, see Figure 2. Adding time as a factor improved the models for anxiety and depression symptoms (BAI: $F(1, 190.53) = 118.27, p < .001$, BDI-II: $F(1, 401.71) = 356.67, p < .001$), indicating a general decrease in symptom severity over time across both trauma groups. However, contrary to our expectation, adding the interaction effect between the trauma group and time point did not improve the models (BAI: $F(1, 141.76) = 0.62, p = .431$, BDI-II: $F(1, 346.90) = 0.01, p = .938$), indicating no evidence for differential symptom trajectories in the trauma group compared to the no trauma group.

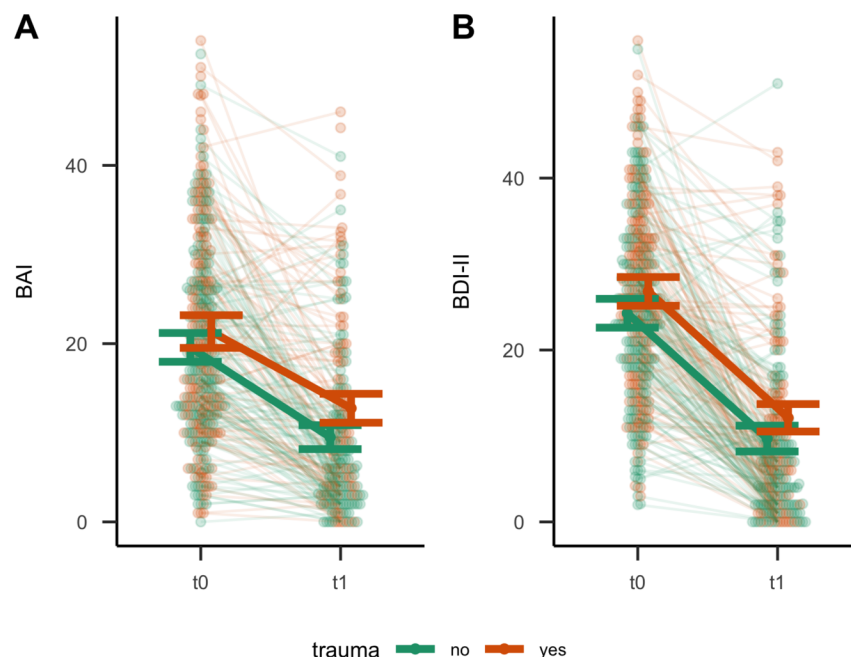


Figure 2: Symptom severity at the start and end of therapy by trauma group on the Beck Anxiety Inventory (BAI) and Beck Depression Inventory-II (BDI-II). Error bars represent 95% confidence intervals for group means. Symptom severity decreased over time in both trauma groups (main effect of time), while the absolute levels of symptom severity were higher in the trauma group across time points (main effect of trauma group).

We then assessed recovery rates in both trauma groups using the RCI. At the end of therapy, across all imputed data sets, on average, 38.26% of all patients (range across data sets: 32.06 - 42.35%) were classified as recovered according to the RCI on the BAI and 49.76% (range across data sets: 45.88 - 53.82%) on the BDI-II. Fisher's exact test showed no significant difference between the trauma groups in the rates of recovered patients on BAI ($OR = 0.59$, $p = .060$) or BDI-II ($OR = 0.69$, $p = .089$). Recovery classifications based on the RCI are displayed in Figure 3.

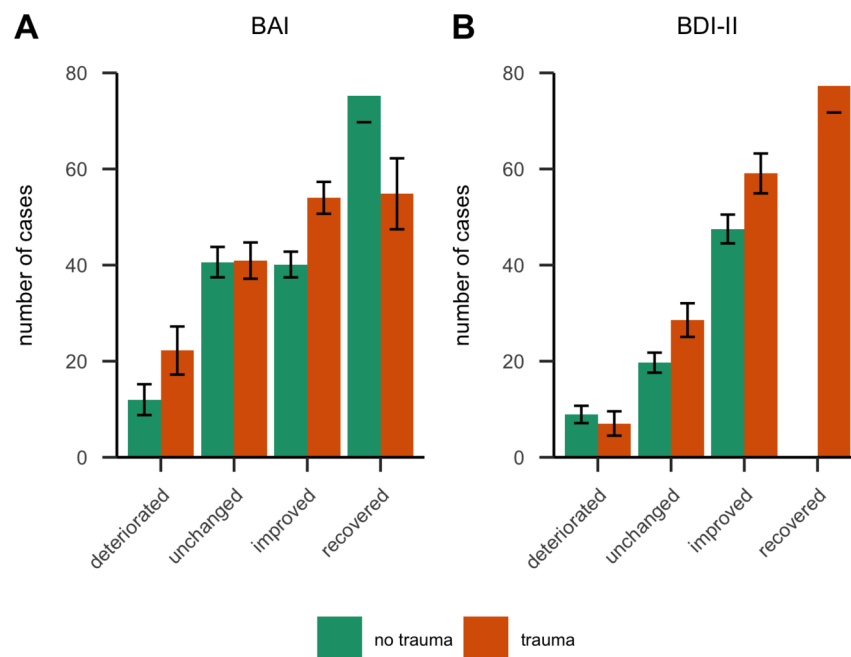


Figure 3: Number of recovered, improved, unchanged, and deteriorated patients at the end of therapy based on the Reliable Change Index classification (RCI) in both trauma groups. Error bars represent standard deviations between the imputed data sets. Most patients recovered, with no significant differences between the trauma groups.

Differences between the Depression Groups

According to Hypothesis 2c, we tested for differences in the effect of trauma on symptom severity over time between patients diagnosed with and without a depression disorder.

For the BAI, adding the depression factor did not improve the model ($F(1, 2,723.98) < 0.01, p = .986$), neither did the interaction effect between depression and trauma ($F(1, 2,975.45) = 0.73, p = .393$), depression and time point ($F(1, 723.22) = 0.75, p = .388$) or depression, trauma and time point ($F(1, 937.24) = 0.27, p = .606$). Results indicate no differences in the BAI scores or trajectories and no differences in the effect of the trauma group on BAI scores between the depression groups; see also Supplemental Figure 6.

For the BDI-II, adding the depression factor ($F(1, 1,633.38) = 22.27, p < .001$) significantly improved the model, but adding the interaction effect between depression and trauma ($F(1, 4,536.77) = 0.21, p = .645$) and between depression, trauma and time point ($F(1, 1,106.90) = 0.47, p = .494$) did not, indicating no evidence for differences in the effect of the trauma group on BDI-II scores between the depression groups. More detailed information on the effects of depression over time on BDI-II scores is given in the Supplemental Material.

Differences between the Trauma Subtypes

Differences in the impact of interpersonal, non-interpersonal, and no trauma on symptom severity over time were tested according to Hypothesis 3 using the interpersonal trauma index instead of the global trauma index. Adding the interpersonal trauma factor did not improve the models for anxiety and depression symptoms (BAI: $F(2, 542.09) = 1.92, p = .148$, BDI-II: $F(2, 1,503.24) = 2.69, p = .068$), nor did the

interaction effect between interpersonal trauma and time point (BAI: $F(2, 237.55) = 1.15, p = .319$, BDI-II: $F(2, 490.63) = 1.38, p = .254$), indicating no differences in symptom severity or trajectories between patients with interpersonal trauma, non-interpersonal trauma only and no trauma, see Supplemental Figure 7.

Effects of Trauma-specific Interventions

In an exploratory analysis in line with the not preregistered Hypothesis 4, adding the factor trauma-specific intervention (none or at least one) did not improve the model for depression or anxiety severity (BAI: $F(1, 4,936.26) = 0.27, p = .602$, BDI-II: $F(1, 3,584.34) = 0.01, p = .931$), neither did adding the interaction effect between trauma-specific intervention and trauma (BAI: $F(1, 6,180.62) = 0.69, p = .405$, BDI-II: $F(1, 4,754.02) = 0.01, p = .943$), trauma-specific intervention and time point (BAI: $F(1, 1,123.00) = 0.24, p = .624$, BDI-II: $F(1, 1,311.98) = 3.13, p = .077$) or trauma-specific intervention, trauma and time point (BAI: $F(1, 979.65) = 0.73, p = .392$, BDI-II: $F(1, 1,388.50) < 0.01, p = .995$). This indicates no significant differences between groups with and without trauma-specific intervention in the overall symptom severity and the decrease in symptom severity, regardless of trauma history, see Figure 4.

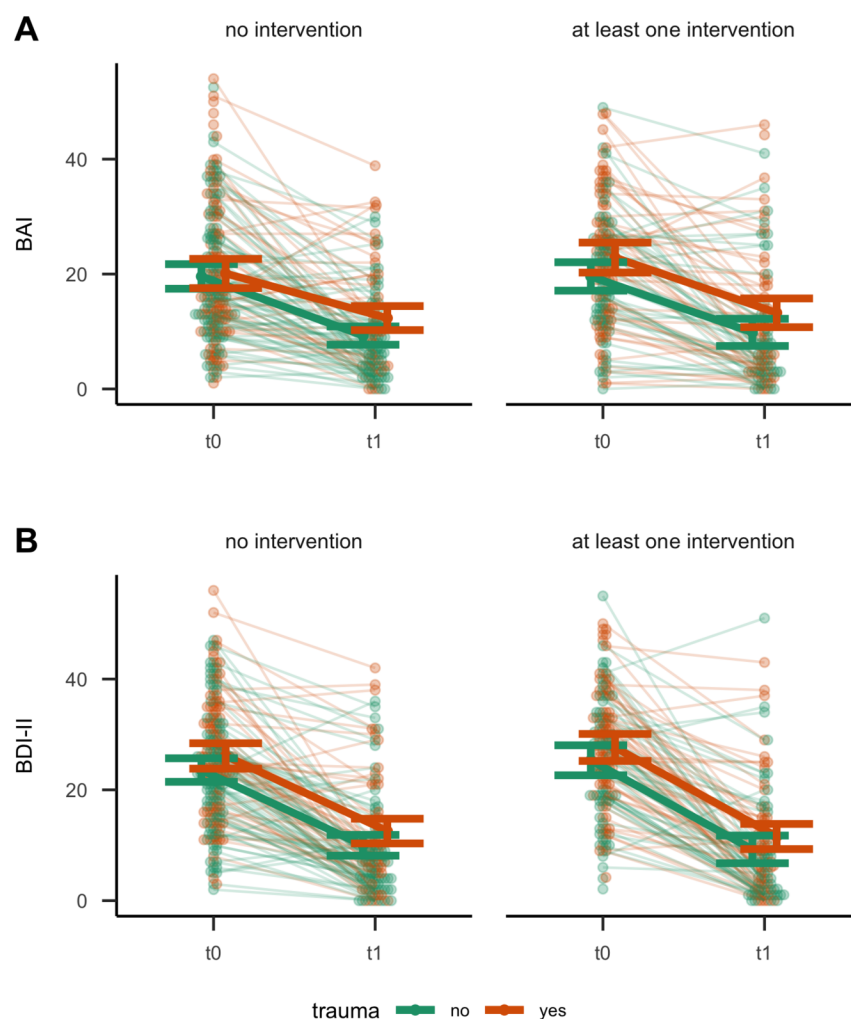


Figure 4: Symptom severity at the start and end of therapy by trauma group with- and without the use of trauma-specific interventions on the Beck Anxiety Inventory (BAI) and Beck Depression Inventory–II (BDI-II), replicating the main effects of time point (decrease over time) and trauma group (higher symptom severity in the trauma group), while showing no differences between the intervention groups. Error bars represent 95% confidence intervals for group means.

Discussion

Trauma history in patients with anxiety or depressive disorders may hinder the effects of psychological treatments. We investigated the effects of trauma on the duration of therapy, applied interventions, and symptom severity in outpatients receiving naturalistic CBT. Circa half of the 340 outpatients were classified as having experienced trauma, and in 79 cases (45.66% of all trauma cases), therapists applied a trauma-specific intervention.

General treatment characteristics like the number of sessions and the use of trauma-specific interventions, except for skills training, did not differ between the groups, indicating that CBT was delivered similarly to all patients, regardless of trauma history. The overall severity of depression as well as anxiety was higher among patients with a trauma history, in line with prior findings (Chu et al., 2013; Fullana et al., 2019; Hovens et al., 2015; Kuzminskaite et al., 2021; Mandelli et al., 2015; Nelson et al., 2017). The reduction in symptom severity throughout treatment and recovery rates were comparable between patients with and without a trauma history. For anxiety symptoms, this is mainly in line with the existing literature (Bruce et al., 2013; Trautmann et al., 2019), while for depressive symptoms, prior studies reported lower success of a variety of treatments in patients with a trauma history (Fischer et al., 2018; Miniati et al., 2010; Nanni et al., 2012; Serbanescu et al., 2020). Previous studies, however, did not investigate CBT treatments specifically and focused mainly on childhood interpersonal trauma. Studies showing reduced response to CBT were conducted mainly in depressed adolescents (Lewis et al., 2010; Waldron, Howard, & Reinecke, 2019). Differences in the investigated psychotherapy type and patient age might have contributed to the diverging results. Our findings are, however, consistent with the results of a recently published meta-analysis on the effects of childhood trauma across both pharmacological treatment and psychotherapy, concluding that evidence-based treatments for depression are similarly effective for patients with and without a history of childhood trauma (Kuzminskaite et al., 2022).

To our knowledge, this study is the first to investigate the effects of trauma history under naturalistic treatment conditions. In addition to the longer treatment duration (on average 44 sessions) in our study compared to the abovementioned studies (i.e., less than 20 sessions), therapists were free to choose therapeutic interventions for each patient, offering possibilities for personalized treatment. Our results indicate that among the assessed interventions, therapists independently from the trauma group most often applied interventions focusing on the regulation of extreme emotions and coping with maladaptive cognitive-emotional schemata (schema mode interventions, self-calming techniques, and skills training) compared to trauma-focused interventions. However, except for skills training, we did not find evidence for a specific use of these interventions in patients with a trauma history. The criteria on which therapists based their choice of trauma-specific interventions remained unclear. The decision may have been more bound to the therapist's therapeutic style rather than the patient's characteristics. Exploratory analyses revealed significant differences between the therapists in intervention use irrespective of the patient, $\chi^2(59) = 93.76$, $p = .003$. Therapists, who treated at least 5 different patients, used a trauma-specific intervention for between 0.00% and 85.71% of their patients. Although trauma-related treatments were not necessarily applied more frequently in patients with a trauma history, exploratory analyses revealed no differences in symptom severity trajectories between patients who did or did not receive trauma-specific interventions, regardless of trauma history. Thus, we did not find evidence for an efficient personalization of the therapy content based on the patient's trauma history. These explorative analyses also suggest that trauma-specific interventions did not boost symptom reduction in those patients with an initial higher symptom severity.

While prior studies found more severe long-term consequences of interpersonal than non-interpersonal trauma (Bridges-Curry & Newton, 2021; Contractor et al., 2018), we did not find any effects when comparing the interpersonal, non-interpersonal, and no-trauma groups. This might be due to the relatively small sample size in the non-interpersonal trauma group ($n = 12$, 23.12%) and considerable heterogeneity in the symptom severity trajectories in this group, see Supplemental Figure 7. As a result of low subgroup sample size and high within-group variance, we may not have been able to detect between-group differences. The same might have been accurate for comparing patients with and without a depression diagnosis as the latter group was comparatively small ($n = 46$, 13.53%).

The current study sheds light on applied interventions and treatment trajectories in naturalistic CBT for depressed or anxious outpatients. It thereby extends evidence from well-controlled therapy trials by investigating CBT under routine care conditions. Furthermore, the data collection from archive files rules out any effects of the scientific investigation on treatment implementation or results. On the downside, therapy files did not always provide sufficiently detailed information. Childhood trauma was assessed through clinical routine data only, and therapists seldom used validated diagnostic tools to assess trauma history. Although retrospective trauma assessment is generally reliable (Kendall-Tackett & Becker-Blease, 2004), it tends to underestimate childhood trauma (Hardt & Rutter, 2004), especially in clinical records (Rossiter et al., 2015). Our study might, therefore, have underestimated the amount of childhood trauma. Furthermore, although interrater reliability was sufficient for trauma and intervention indices, single trauma subtypes had low reliabilities and did not allow further analyses to differentiate the effects of single trauma subtypes. Also, the effects of childhood and adulthood interpersonal trauma were not separable because both groups had extreme overlap. Future studies should encourage therapists to assess trauma history using validated measures, including trauma duration and age at exposure. Another limitation of our study was missing post-treatment assessment of symptom severity, which was not limited to patients who dropped out of therapy. A primary reason for missing post-treatment assessment presumably was that there were no special requirements or incentives for therapists concerning post-treatment diagnostic assessment because of the naturalistic nature of the therapy setting. We applied Multiple Imputation (Rubin, 1987) to minimize bias due to missing data. Future studies conducted under routine care conditions should consider incentives for therapists to minimize missing data. Concerning the role of the therapist's choice of interventions, we could not investigate the reasons for the therapist's decisions. The choice of intervention seemed to depend on the therapist's personal style. Therefore, it remains open if a more targeted application of trauma-specific interventions could help trauma-exposed patients reach similar symptom levels as unexposed patients at the end of treatment. Future studies could, therefore, assess therapist's reasons for applying certain trauma-specific interventions and assess the behavioral, emotional, and interpersonal problems for which each of these interventions is specialized. Furthermore, a more fine-grained assessment of symptom severity over time, combined with an assessment of the time interval in which a particular intervention was applied, would enable an in-depth analysis of the effects of intervention choice on symptom severity trajectories in naturalistic CBT.

Conclusion

In summary, our results highlight the frequency of childhood and adulthood trauma in the outpatient psychotherapy population, even without a PTSD diagnosis. Therapists should routinely screen for trauma history at the start of therapy using validated trauma questionnaires, as trauma history may influence therapeutically relevant characteristics like emotion regulation (Bridges-Curry & Newton, 2021) and interpersonal behavior (Shahab et al., 2021; Widom et al., 2018). We found overall symptom severity higher among trauma-exposed patients than non-exposed patients. Although patients with interpersonal and non-interpersonal trauma did improve throughout treatment in our study, the lack of differences in the relief of symptoms between patients with and without trauma suggests that other types of interventions might be necessary to ensure treatment success.

As not all trauma-exposed individuals suffer from long-term consequences (Glaesmer, Matern, Rief, Kuwert, & Braehler, 2015; Laugharne, Lillee, & Janca, 2010), assessing domains associated with trauma history

and low therapy success in trauma-exposed patients at the start of treatment may be promising to identify those needing intensified treatment. These might be patients with subclinical PTSD symptoms, emotional dysregulation, interpersonal problems, or early-onset and recurrent symptoms. Therapists could then tailor interventions to the patient's needs, offering, for example, skills training specifically to patients with (trauma-related) emotional dysregulation and Schema therapy or CBASP to patients with maladaptive attachment styles and interpersonal problems. For depressed patients with a trauma history, trauma-focused interventions like EMDR or Imagery Rescripting may also be effective (Dominguez, Matthijssen, & Lee, 2021). Modular psychotherapy (Elsaesser et al., 2022) could be a promising approach to individualized and evidence-based treatment.

Conflict of Interest

The authors declare no conflict of interest.

Preregistration

This study was pre-registered at OSF; see <https://osf.io/cyzex>.

Data Availability Statement

The data that support the findings of this study are openly available in OSF at <http://doi.org/10.17605/OSF.IO/WJ3Y6>.

Ethics statement

The study is based on archive data and was approved by the local University's ethics committee for psychology. It conforms with the Declaration of Helsinki.

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