Utrecht
University

Interpersonal skills and the state-like alliance as mechanism of change in the treatment of depression in individuals with a history of childhood trauma

Author: Oomes, N

E-mail: n.oomes@students.uu.nl

Student number: 9643176

Supervisor: Bruijniks, S

Date: 10-07-2023

Words: 4997

Contents

Abstract

Aim: This study aims to examine the role of interpersonal skills as a mechanism of change in the relationship between childhood trauma and treatment effect whilst taking into account the possible corrective experience of the state-like strengthening of the alliance.

Method: This study used data of 125 participants from the FreqMech study (Bruijniks et al., 2015). Treatment effect, childhood trauma, interpersonal functioning and state-like alliance are measured with the BDI-II, CTQ-SF, IPT skill inventory and WAI-SR. All variables are measured at baseline and, except for the CTQ-SF, monthly during a period of 6 months. Hypotheses will be tested with moderated mediation models in which childhood trauma is approached in three different ways; presence of childhood trauma (yes/no), emotional trauma vs other childhood trauma and the co-occurrence of childhood trauma.

Results: The index of moderated mediation was insignificant for childhood trauma ($B = .18$, *95% BootCI* [-.05, .12]), emotional trauma ($B = .10$, 95% *BootCI* [-.09, .50]), and co-occurrence of trauma ($B = .00$, *95% BootCI* [-.01, .02]). The results indicate that interpersonal functioning does not mediate the association between the different measures of childhood trauma and depression treatment outcome.

Discussion: Since the results of the current study may not be robust due to the small sample size, it is advised to repeat the current study with a bigger sample.

Key words: Childhood trauma, interpersonal functioning, state-like alliance, depression.

Introduction

Depression is a leading cause of disability around the world, affecting approximately 280 million people (World Health Organization, 2023). Depression is quite heterogeneous, with individual differences in severity and symptom patterns as well as the differences in onset and time course. Identifying variables that might explain these differences will help with gaining knowledge about the etiology of the disorder and the treatments (Harald & Gordon, 2012; Herrman et al., 2022; Nelson et al., 2017).

Psychotherapy and medication are common treatment options for depression (GGZ standaarden, 2023; NICE, 2022). Even these treatments have proven to be effective in treating depression, still 40 to 50% of the patients does not respond to treatment (Cuijpers et al., 2013; Cuijpers et al., 2014). It is not yet clear how therapies work and what mechanisms account for the perceived change (Bruijniks et al., 2015; Bruijniks et al., 2022; Cuijpers, Reijnders, et al., 2019; Huibers et al., 2022). Identification of how an for who these therapies work is important for the optimization of treatment. It helps with the formation of a more personalized approach, which is still lacking in the treatment of depression (Cuijpers, et al., 2019; Huibers et al., 2021).

Childhood trauma is one of the variables that may explain differences in the treatment outcome of depression (Herrman et al., 2022; Nelson et al., 2017). Childhood trauma occurs before the age of 18 and the following subtypes can be distinguished: emotional neglect (CEN), emotional abuse (CEA), physical neglect (CPN), physical abuse (CPA) and sexual abuse (CSA) (Kuzminskaite et al., 2022). Childhood trauma is associated with more severe and chronic depression (Fung et al., 2022; Humphreys et al., 2020; Nelson et al., 2017). Meta-analyses show significantly higher depression scores for all types of childhood trauma, with the strongest association for emotional trauma (Humphreys et al., 2020; Nelson et al., 2017).

Evidence for the effect of childhood trauma on treatment is mixed. Studies have shown that individuals with a history of childhood trauma are more likely to not respond to treatment than individuals without this history (Nelson et al., 2017). However, Kuzminskaite et al. (2022) found in their systematic review and meta-analysis, contradictory to previous meta-analyses, that patients with a history of childhood abuse did not have a poorer response to depression treatment. Neither did they find evidence for different effects of type of childhood trauma on treatment. They suggested that the previously found effects of childhood trauma on treatment might come from co-occurrence, number of experienced subtypes of childhood trauma, in which higher co-occurrence would be negatively associated with treatment effect (Kuzminskaite et al., 2022).

Although the association between childhood trauma and depression is frequently researched and established, the underlying mechanisms of this relation are less researched (Christ et al., 2019; Fung et al., 2022; Wilson & Scarpa, 2015). One of the mechanisms for which some evidence is found is difficulties in interpersonal functioning (Christ et al, 2019, Fung et al., 2022). Interpersonal functioning can be defined as forming and maintaining healthy and trusting relationships. Interpersonal skills, such as empathy, communication and especially managing of relational conflict and negative affect, are vital for good interpersonal functioning. (Knapp & Daly, 2011).

Childhood trauma can impact one's interpersonal functioning, since it makes an individual more vulnerable for the development of an insecure attachment style and early maladaptive schemas, which has been proven to be associated with interpersonal difficulties (Dugal et al., 2016; Janovsky et al., 2020). Studies indicate that especially CEA has a more negative influence on interpersonal functioning compared to other types of childhood trauma (Christ et al., 2019; Huh et al., 2014; Spitzer et al., 2019). The interpersonal stress that is caused by childhood betrayal trauma, trauma that is inflicted by someone who is close to the

victim, mediates the association between the abuse and depression (Fung et al., 2022). Individuals that experienced childhood trauma report more dysfunctional relationships and lower experienced social support (Christ et al., 2019).

Difficulties with interpersonal functioning can impact treatment outcome by affecting the therapeutic alliance (Cuijpers et al., 2019; Zilcha-Mano, 2017; Zilcha-Mano & Fisher, 2022). The therapeutic alliance is frequently researched as a mechanism of change in which a low therapeutic alliance might negatively affect the treatment outcome. The therapeutic alliance consists of two components that influence the treatment outcome, the trait-like alliance and the state-like alliance. The trait-like component reflects the general tendencies and ability of a patient to form satisfying relationships. These abilities have impact on the strength of the alliance that the patient is able to form with their therapist. Therefore, the trait-like alliance has a mediating effect on the treatment outcome (Cuijpers et al., 2019; Zilcha-Mano & Fisher, 2022). The state-like component of the alliance reflects how the alliance strengthened or weakened in specific situations. The therapeutic alliance can be a mechanism of change in itself; when an individual with low trait-like potential to form a strong alliance is able to form a strong alliance (Cuijpers, et al., 2019; Zilcha-Mano, 2017; Zilcha-Mano & Fisher, 2022). This state-like strengthening of the alliance is then a corrective experience in which interpersonal skills improve (Dolev & Zilcha-Mano, 2019; Zilcha-Mano & Fisher, 2022). Research has shown that individuals that have more trouble within the trait-like component of the alliance, such as individuals experiencing interpersonal difficulties, can benefit greatly from the state-like component of the alliance (Zilcha-Mano & Fisher, 2022).

Taken together, childhood trauma is associated with more severe, chronic and treatment resistant depression with the strongest association for emotional trauma. However, Kuzminskaite found that the effects of childhood trauma on depression and treatment effect might be better explained by co-occurrence. A possible underlying mechanism of this

association is difficulties with interpersonal functioning. Experiencing childhood trauma is negatively associated with interpersonal functioning and lower interpersonal functioning is associated with lower trait-like potential to form a strong therapeutic alliance. A weaker therapeutic alliance is in turn associated with lower treatment effect. However, individuals with a lower trait-like potential can benefit greatly from the state-like strengthening of the alliance. This corrective experience can improve interpersonal skills and there are studies showing its effect on treatment effect. However, there is no research looking into the mechanism of change of interpersonal skills that take the state-like strengthening into account in a population of individuals with a history of childhood trauma.

Therefore, interpersonal functioning will be investigated as a mechanism of change in the treatment of depressed individuals with a history of childhood trauma, whilst the effects of the state-like alliance are taken into account. This study focusses on childhood trauma in three different ways (see Figure 1).

a. It is expected that individuals that experienced childhood trauma (model 1), childhood emotional trauma (model 2) and more co-occurrence (model 3) have a lower reduction in BDI-II score after treatment than individuals that did not experience childhood trauma (model 1), that experienced other types of childhood trauma (model 2) and lower levels of co-occurrence of childhood trauma (model 3).

b. It is expected that IPT skills mediate the relationship between childhood trauma and reduction in BDI-II score after treatment.

c. It is expected that the strength of the state-like alliance influences how much effect the change in IPT skills has on the reduction of BDI-II score. Specifically, it is expected that change in IPT skills are not significantly impacted when the state-like alliance low whereas it does when the state-like alliance is high in a population that experienced childhood trauma.

Figure 1. *Conceptual model*
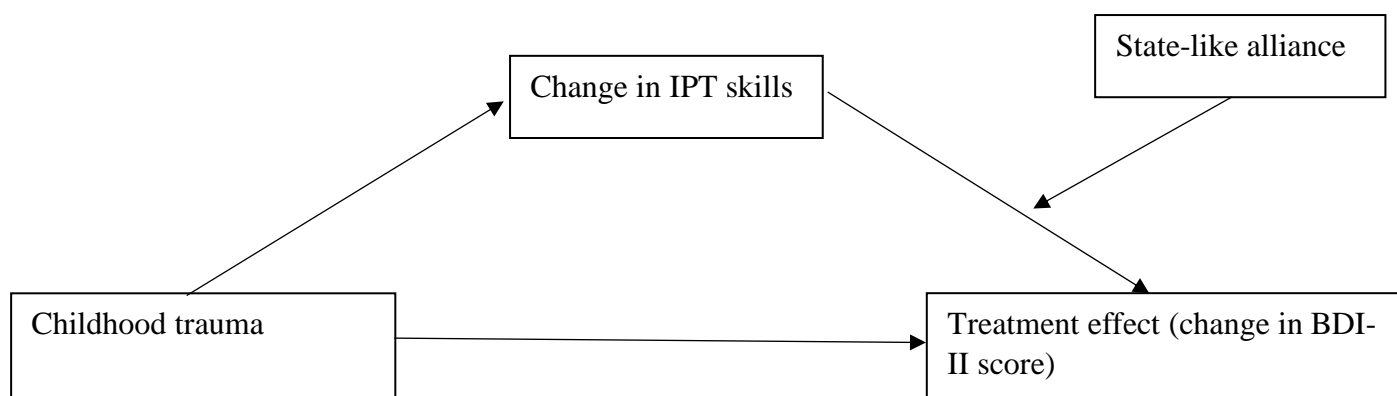
Note. Model 1: childhood trauma vs. no childhood trauma; model 2: childhood emotional trauma vs. other types of childhood trauma; model 3: Level of co-occurrence ranging from no childhood trauma present(0) to all five types of childhood trauma present (5)

Method

Design

In this study data of the FreqMech study (Bruijniks et al., 2015; Bruijniks et al., 2020) is used. The aim of the FreqMech study was to look into the effects of session frequency and mechanisms of change in cognitive behavioural therapy (CBT) and interpersonal psychotherapy (IPT) treatment for individuals with depression. Results can be found in Bruijniks et al. (2020) and Bruijniks et al. (2022). During the study several questionnaires were administered. Moments of measurements are presented in Table 1. The current study used the baseline data and data from the measurement of the 6th month.

The FreqMech study was approved by the Medical Committee of VU Medical Centre Amsterdam (registration number 2014.337) and all participants signed an informed consent. Furthermore, the current study was approved by the faculty's ethical review board of Utrecht University (FERB approved research program number 22-1800).

Participants

The recruitment of participants in the FreqMech study took place within nine participating specialized mental health care centers in the Netherlands (Bruijniks et al., 2015). The inclusion criteria were as follows: (1) participants had a primary DSM-IV or DSM-V diagnosis of major depressive disorder or persistent depressive disorder, (2) participants had a pre-therapy score of 20 or more on the BDI-II, (3) participants did not receive five or more therapy sessions of IPT or CBT in the past year, (4) participants did not start with antidepressant or did not have a dosage change in the past three months, (5) participants speak sufficiently Dutch, (6) there is no acute suicide risk, (7) participants have access to internet, (8) absence of DSM-IV or DSM-V diagnosis of personality disorder cluster A or B, (9) absence of DSM-IV or DSM-IV diagnosis of substance use disorder (Bruijniks et al., 2015; Bruijniks et al., 2020).

At the intake session, individuals were checked on the inclusion criteria and if an individual matched with these criteria, they were approached to participate. Individuals that did not match with the criteria received treatment as usual. Individuals willing to participate were placed in groups using block randomization (Bruijniks et al., 2015). The interventions that were received were CBT based on the protocol of Beck (1979) and IPT based on the protocol of Klerman (1984).

The FreqMech study contained 200 participants between 18 and 65 years old ($M = 38$, $SD = 12.31$). For the current study individuals were only removed from the data sample when they contained missing data.

Instruments

Treatment outcome

The treatment outcome is measured with the Dutch version of the Beck Depression Inventory II (BDI-II). This is a self-report questionnaire assessing the depressive symptoms that

are experienced in the past 2 weeks. The questionnaire consists of 21 questions that are scored on a scale from 0-3. Sum scores were calculated, which can be interpreted as follows: 0-13 minimal depression, 14-19 mild depression, 20-28 moderate depression and 29-63 severe depression (Beck et a., 1996).

The BDI-II has a high concurrent validity (Beck et al, 1988), is a very reliable instrument (Cronbach's alpha around .90) (Beck et al., 1988; Wang & Gorenstein, 2013) and has good to excellent retest reliability (range in $r = .73$ to .96) (Wang & Gorenstrein, 2013).

Childhood trauma

The Dutch version of the Childhood Trauma Questionnaire- Short Form (CTQ-SF) was used to measure the presence and co-occurrence of childhood trauma. This questionnaire is a retrospective self-report questionnaire and distinguishes between the five types of childhood trauma. The questionnaire consists of 28 items rated on a 5-point likert scale (0 = never true – 4 = very often true). The cut-off scores to determine the presence of childhood trauma are based on Bernstein and Fink (1998): CPA ≥ 8, CSA≥ 6, CEA ≥ 9, CPN ≥ 8, CEN ≥ 10. The CTQ-SF is a valid and reliable instrument to measure childhood trauma in a clinical and community sample (Scher et al., 2001; Hagborg et al., 2022). This study found an Cronbach's alpha of .91 for CPA, .89 for CEA, .95 for CSA, .91 for CEN and .63 for CPN (Thombs et al., 2009).

Therapeutic Alliance

The therapeutic alliance is measured with the Dutch version of the Working Alliance Inventory Short Revised form (WAI-SR). This measurement is used to calculate the state-like and trait-like component of the alliance. It focusses on the three factors of the state-like alliance; the bond, the tasks and the goals. This questionnaire consists of 12 items which are scored on 5-point Likert scale. According to a recent systematic review the evidence for the psychometric quality of the WAI-SR remains scarce due to the lack of methodological quality of studies. However, most studies show sufficient reliability and construct validity (Paap et al., 2022).

Interpersonal Skills

The interpersonal skills are measured with the IPT skill inventory. In this questionnaire the presence of the following subscales in the past two weeks are measured; general interpersonal skills, bereavement, interpersonal conflict, interpersonal change and interpersonal deficiency. The questionnaire consists of 31 items which are rated on a 7-point Likert scale (1 = not at all – 7 = completely) (Bruijniks et al., 2015). For this study sum scores were calculated with a minimum sum score of 31 and a maximum sum score of 217, with higher scores indicating stronger interpersonal skills. For more detail see Bruijniks et al. (2019).

Table 1.

Overview time points measurements (months)

Instruments	0	5	1	2	3	4	5	6	9	12	24
BDI	x	x	x	x	x	x	x	x	x	x	x
CTQ-SF	x										
WAI		x	x	x	x	x	x	x			
IPT	x	x			x			x			

Note. Copied from Bruijniks et al., 2015, p. 7.

Data-analysis

Before analyses were performed, the assumptions for linear regression were tested with the raw scores. The assumptions that were tested are normality of the dependent variable, absence of multicollinearity, normality of the residuals, outliers and homoscedasticity. The sample size will be assessed with power analyses. Since power analyses for moderated mediation cannot be performed (Hayes, 2022), power analyses for mediation and moderation separately will be used to assess sample size.

All variables are measured on different scales, therefore the variables will be transformed into *t*-scores after the assumptions are tested (Howell, 2017). Residual change scores were calculated for treatment effect and IPT skills as described in Jennings & Cribbie

(2021) and Valente & MacKinnon (2017). This approach accounts for the effects of the baseline measurement and therefore leaves the variability that is due to change (Castro-Schillo & Grimm, 2017). The state-like alliance was calculated by calculating the mean of the WAI-SR score for each of the individuals and subtracting it from the last measurement. A paired sample t-test evaluated the size of the state-like alliance. Lastly, the childhood trauma variable was dummy coded into the different groups. Co-occurrence was calculated by adding the presence of childhood trauma subtypes.

The three conceptual models were separately tested with Hayes process model 14. The coefficients were used to determine the direction and significance of the associations in this model. The direct effect will show the relation between childhood trauma and change in depression score. Moderation effects show the strength of the moderation by the state-like alliance. Eventually, the index of moderated mediation will show the strength of the moderated mediation model as a whole and the indirect effects on different levels of the moderator will show the mediation of IPT skills on different levels of the state-like alliance. To assess the mediation of IPT skills on the association of childhood trauma on treatment effect, Hayes process model 4 will be used to asses the indirect effects.

Finally, data from the conditional effect analysis was used to look at the effects of the mediator, interpersonal skills, on treatment outcome at several levels (-1SD, Mean, +1SD) of the moderator, i.e., state-like alliance.

Results

The dataset consisted of 200 participants, but after cleaning up the data the total number of the sample size ended up at 125 participants (63.20% female, $M_{age}= 39$). 83.20% of the participants experienced childhood trauma in which CEN (76.80%) was most prevalent. Descriptive data of the sample population and the variables can be found in Appendix A.

Assessing the change of the state-like alliance

The paired sample t-test came back insignificant ($t(124) = -1.29$, $p = .199$), indicating that no significant change is present between the mean of the WAI-SR measurements and the last measurement of the WAI-SR. This insignificant change shows that only a low state-like alliance is present.

Testing assumptions

The dependent variable, change in depression score, was tested for normality. Both the Kolmorogov-Smirnov, $D(125) = .06$, $p = .20$, and the Shapiro-Wilk test, $D(125) = .99$, $p = .63$, were not significant, indicating that the dependent variable does not significantly deviate from a normal distribution. All assumptions mentioned in the data-analysis were tested and none are violated. The power analyses showed that that for a moderation or a mediation with a power of .30 and a significance of .05 a sample size of $N = 210$ is needed. This indicates that the used sample size is too small. For specific information see appendix B

Change in IPT skills and state-like alliance in population childhood trauma (yes/no)

Mediation and moderation

The total effect of childhood trauma on change in BDI-II score is insignificant ($B = -.60$, *s.e.* $= 2.40$, $t = -.25$, $p = .80$), indicating that there is no significant effect in difference of type of childhood trauma on the change in depression score. Therefore, hypothesis 1a should be rejected. The indirect effect is insignificant ($B = 1.35$, 95% *BootCI*[-1.40, 4.59]), since the bootstrap confidence interval includes the zero. This indicates that there is no significant mediation of the association of emotional trauma on change in BDI-II score by the change in IPT skills. Therefore hypothesis 1b should be rejected. The effect of change in IPT skills on change in BDI-II score was significant ($B = -.46$, *s.e.* $= .08$, $t = 5.64$, $p < .001$). However, the
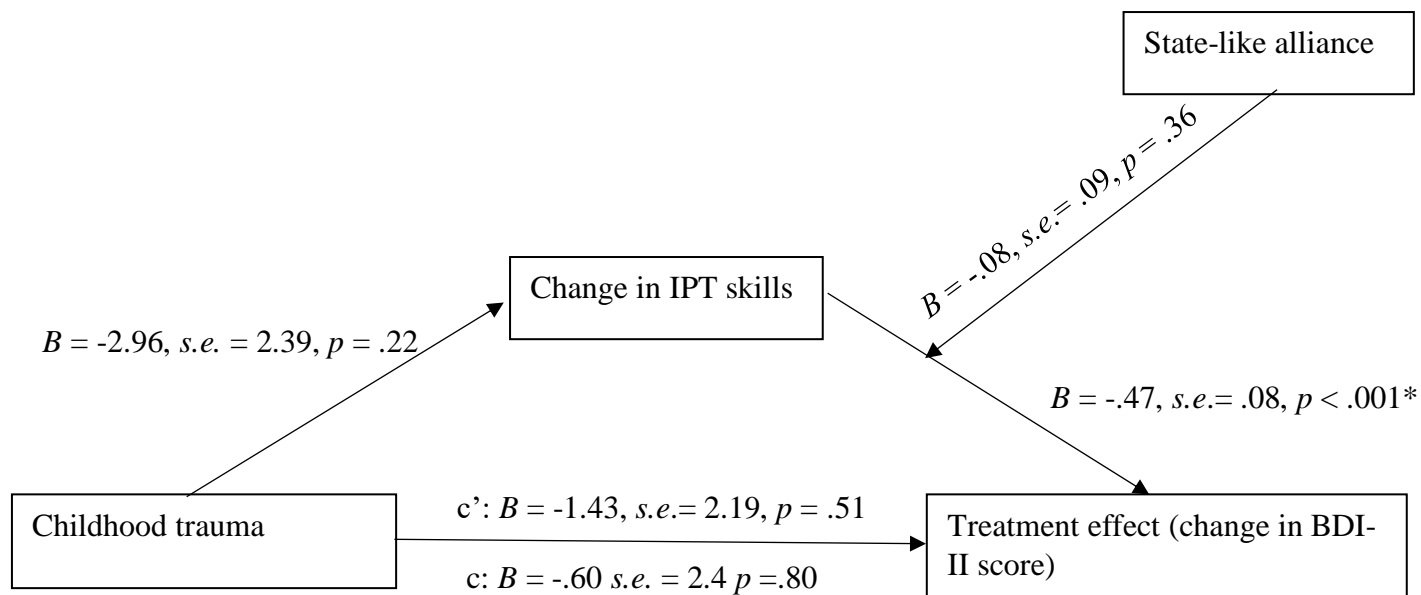
interaction variable of IPT skills and the state-like alliance is insignificant (B = -.01, $s.e.$= .01, t = -.72, p =.47), indicating that there is no significant moderation of the state-like alliance on the association of the IPT skills on change in depression score.

Moderated mediation model

The index of moderated mediation is insignificant (B=.18, *95% BootCI*[-.05, .12]), since the bootstrap confidence interval includes the zero. All indirect effects on -1 SD, M, +1 SD levels of the state-like alliance are insignificant (see Table 3). Indicating that there is no significant moderated mediation on the -1 SD, M, +1 SD levels of the state-like alliance. Therefore, hypothesis 1c should be rejected. Even though there is no significant moderated mediation, the conditional effects will be assessed (see appendix C). Overall, this moderated mediation model explains 22,0% of the variance of the change in BDI-II score (R^2= .22).

Figure 2

Moderated mediation model with coefficients and significance.

State-like alliance

$B = -.08, s.e.= .09, p = .36$

Change in IPT skills

$B = -2.96, s.e. = 2.39, p = .22$

$B = -.47, s.e.= .08, p < .001*$

Childhood trauma

c': $B = -1.43, s.e.= 2.19, p = .51$

c: $B = -.60 s.e. = 2.4 p =.80$

Treatment effect (change in BDI-II score)

Note. * significant effect, c = total effect, c': direct effect, N = 125

Change in IPT skills and state-like alliance in population emotional trauma compared with other types of trauma
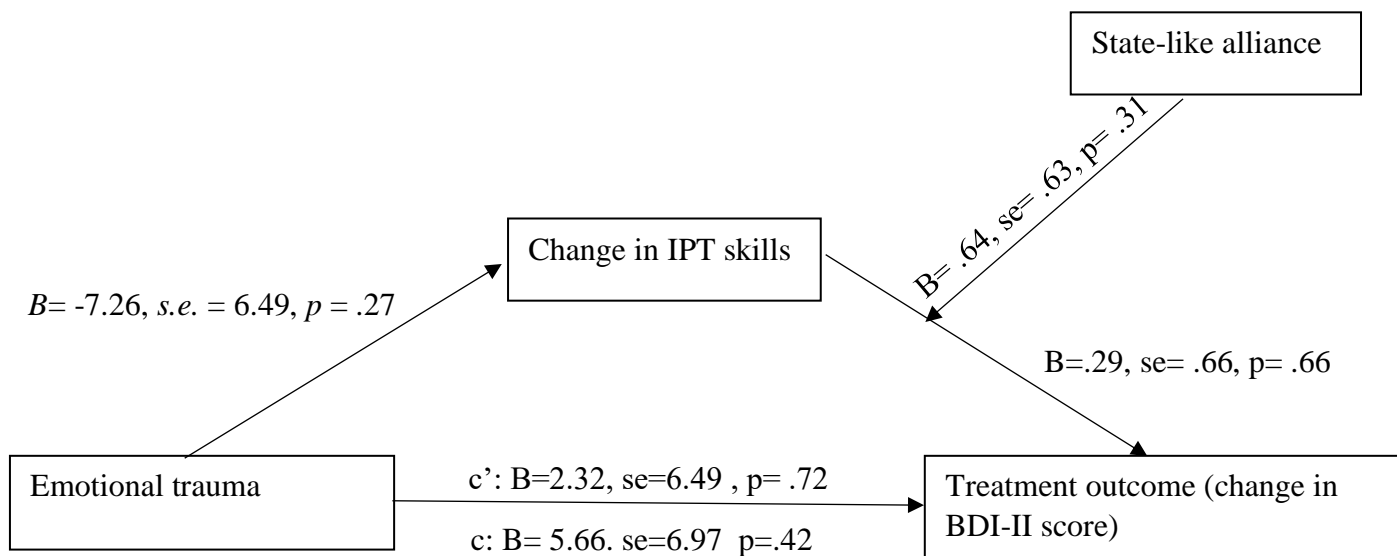
Mediation and moderation

The total effect of emotional trauma on change in BDI-II score (B =2.10, se= = 1.52, p = .131), is insignificant, indicating that there is no significant effect in difference of type of childhood trauma on the change in depression score. Therefore, hypothesis 2a should be rejected. The indirect effect is insignificant (B=3.11, 95% *BootCI*[-1.31, 9.57]), since the bootstrap confidence interval includes the zero. This indicates that there is no significant mediation of the association of emotional trauma on change in BDI-II score by the change in IPT skills. Therefore, hypothesis 2b should be rejected. The interaction variable of IPT skills and the state-like alliance, (B = -.01, *s.e.* = .01, *t*= 1.12, p = .260), is insignificant, indicating that there is no significant moderation of the state-like alliance on the association of the IPT skills on change in depression score.

Moderated mediation model

The index of moderated mediation (B = .10, *95% BootCI* [-.09, .50]) is insignificant, since the bootstrap confidence interval includes the zero. All indirect effects on levels of the state-like alliance are insignificant (see Table 3). Therefore, hypothesis 2c should be rejected. Even though there is no significant moderated mediation, the conditional effects will be assessed (see appendix C). Overall, this moderated mediation model explains 17,7% of the variance of the change in BDI-II score (R^2 = .18).

Figure 3

Moderated mediation model with coefficients and significance.

Note. c = total effect, c' = direct effect, N = 104

Change in IPT skills and state-like alliance in different levels of co-occurrence

Mediation and moderation

The total effect of co-occurrence on change in BDI score is significant, ($B = 1.26$, *s.e.* $= .60$, $t = 2.08$, $p = .039$). This indicates a significant positive association between level of co-occurrence and change in depression score. Since a significant negative association was expected, hypothesis 3a should be rejected. A mediation analysis shows that there is a significant association between change in IPT skills and change in BDI-II score is significant, ($B = -.44$, *s.e.* $= .08$, $t = -5.56$, $p < .001$). However, the indirect effect ($B = .13$, *95%BootCI*[-.44, .75]) is insignificant, since the confidence interval includes the zero. This indicates that there is no significant mediation of the association of co-occurrence on change in BDI-II score by IPT skills. Therefore, hypothesis 3b should be rejected. The interaction variable of IPT skills and the state-like alliance, ($B = -.07$, *s.e.* $= .01$, $t = -.81$, $p = .42$), is insignificant, indicating that there is no significant moderation of the state-like alliance on the association of the IPT skills on change in depression score.

Moderated mediation model

The index of moderated mediation is insignificant (B = .00, *95% BootCI*[-.01, .02]), since the bootstrap confidence interval includes the zero. All indirect effects on -1SD, M, +1SD levels of the state-like alliance are insignificant (see Table 3). Indicating that there is no significant moderated mediation on the -1SD, M, +1SD levels of the state-like alliance. Therefore, hypothesis 3c should be rejected. Even though there is no significant moderated mediation, the conditional effects will be assessed (see appendix C). Overall, this moderated mediation model explains 24.6% of the variance of the change in BDI-II score (R^2 = .25).

Figure 4.

Moderated mediation model with coefficients and significance.
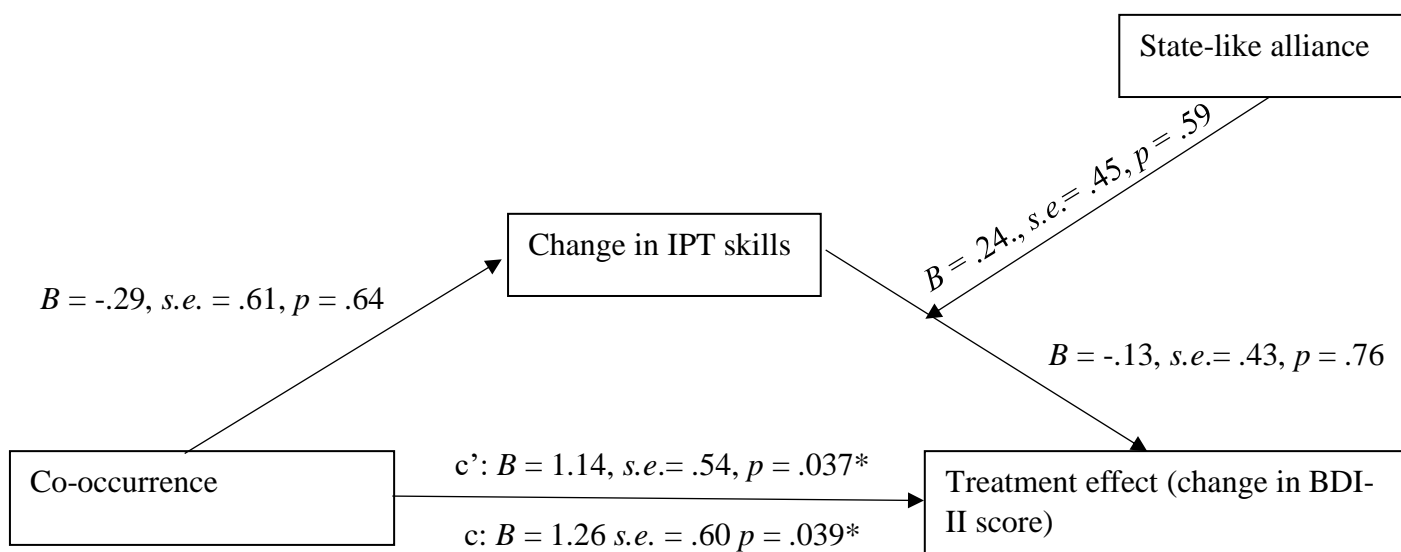
Note. c = total effect, c': direct effect, * significant effect, N = 125

Table 3 *Indirect effects IPT skills on association childhood trauma on treatment outcome on different levels of state-like alliance*

	State-like alliance	*B*	*BootSE*	*BootLLCI*	*BootULCI*
Childhood trauma	40	1.22	1.38	-1.14	4.26
(N = 125)	50	1.40	1.52	-1.30	4.65
	60	1.58	1.75	-1.56	5.28
Emotional trauma	41.52	2.09	2.84	-1.23	9.08
(N = 104)	50.66	3.01	3.29	-1.31	10.00
	59.80	3.94	4.20	-1.68	12.54
Co-occurrence	40	.12	.29	-.43	.77
(N = 125)	50	.13	.32	-.45	.80
	60	.15	.36	-.52	.89

Discussion

The current study investigated interpersonal functioning as a mechanism of change in the treatment of depression in individuals with a history of childhood trauma, whilst the effects of the state-like alliance were taken into account. For all experienced childhood trauma (yes/no) and emotional trauma no significant direct effect on depression treatment effect or mediation via interpersonal functioning was found. Childhood trauma did not significantly impact depression treatment effect nor did it impact interpersonal functioning. Interpersonal functioning, however, was significantly associated with treatment effect, but this relationship was not moderated by the state-like alliance. A significant association was found as well for co-occurrence and treatment effect. However, contrary to expectations analyses showed a positive association, indicating that the more types of childhood trauma one experienced, the more effect the depression treatment had. Hence, all hypotheses were rejected. The current study showed no significant impact of childhood trauma on treatment effect nor on interpersonal functioning as well as no support for the corrective experience of state-like alliance.

The positive association co-occurrence and treatment effect might be explained by the fact that individuals with higher depression scores at the start of treatment generally show a greater treatment effects (Bower et al., 2013). This effect might have happened here since higher co-occurrence of childhood trauma is associated with higher depression scores (Nelson et al., 2017; Humphreys et al., 2020).

When assessing the state-like alliance it is noteworthy that no significant difference was found between the mean measurement of the WAI-SR and the measurement at the end of treatment. Since the state-like alliance reflects the change in therapeutic alliance (Zilcha-Mano & Fisher, 2022) , this insignificant difference may indicate the absence of state-like strengthening of the alliance among the respondents. This absence could be explained by the questionable psychometric properties of the WAI-SR. Another explanation might be that individuals already had a high trait-like component of the alliance, or when a lower trait-like alliance was present, the patient was not able to form a stronger therapeutic alliance. However, in the current study the mean score per question is M = 2.73 (SD = .27), whereas the mean scores in other studies range from M = 3.36 to 3.8 (SD = .77 to .81) (Beatty et al., 2022; Darcy et al., 2021; Richards et al., 2012). This lower trait-like alliance might be due to the high prevalence of childhood trauma in the current study (83.20%). And as was discussed earlier, childhood trauma is negatively associated with interpersonal functioning, which plays an important factor in the initial trait-like alliance (Christ et al., 2019; Huh et al., 2014; Zilcha-Mano & Fisher, 2022). However, these insignificant results are in line with the expectation that the effect of interpersonal skills is not significantly impacted when the state-like alliance is low.

Several limitations have to be addressed. The power analysis showed that a minimum sample size of 210 is needed for sufficient statistical power. The current data sample consists of 125 participants, which is below the minimum required sample. Even

though bootstrapping is used in the analyses, the too small sample size continues to be a limitation to this study (Andrade, 2020; Faber & Fonseca, 2014). As can be seen in Appendix A there are uneven distributions, which may impact the robustness of the data (Howell, 2017). Another limitation that has to be addressed is that the current study did not account for gender or other confounding variables. Therefore, found results might also be due to other factors. A final limitation is that the co-occurrence is tested as a continuous variable instead of a categorical variable, which was chosen since a multi-categorical approach would diminish the robustness even more.

Taking into account the mentioned limitations several strengths have to be underscored. First, childhood trauma has been shown to significantly affect the clinical population by making an individual more vulnerable for mental health issues as well as it troubles the treatment effects (Downey & Crummy 2022; Teicher et al., 2021). Studies looking into specific mechanism of change for individuals with a history of childhood trauma helps to personalize treatment. The current study contributes to this. Therefore, another strength of the current study is that it is conducted in a fully clinical population. Lastly, is the longitudinal data, which allows to see change in depression and IPT skills scores over time, subsequently, increasing the robustness of the data.

Since the results of the current study may not be robust due to the small sample size, it is advised to repeat the current study with a bigger sample. Furthermore, the high occurrence of childhood trauma in this clinical sample, indicates the need for more research into childhood trauma and its effects on health and treatment. Since a positive association was found between co-occurrence and treatment effect, it might be interesting to further examine this association. As literature pointed out, other aspects of childhood trauma might be interesting to look into, such as the frequency of childhood trauma (Kuzminskaite et al., 2022) or the severity of childhood trauma (Nelson et al., 2017; Humphreys et al., 2020).

Reference

Andrade, C. (2020). Sample Size and its Importance in Research. *Indian Journal of Psychological Medicine*, *42*(1), 102–103. https://doi.org/10.4103/ijpsym.ijpsym_504_19

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck depression Inventory-II: Manual. Harcourt Brace

Beck, A. T., Steer, R. A., & Carbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review*, *8*(1), 77–100. https://doi.org/10.1016/0272-7358(88)90050-5

Bernstein, D.P, & Fink, L. (1998). Childhood Trauma Questionnaire: A retrospective self-reportmanual San Antonio, TX: The Psychological Corporation

Bower, P., Kontopantelis, E., Sutton, A. J., Kendrick, T., Richards, D., Gilbody, S., Knowles, S., Cuijpers, P., Andersson, G., Christensen, H., Meyer, B., Huibers, M. J., Smit, F., Van Straten, A., Warmerdam, L., Barkham, M., Bilich, L. L., Lovell, K., & Liu, E. (2013). Influence of initial severity of depression on effectiveness of low intensity interventions: meta-analysis of individual patient data. *BMJ*, *346*(feb26 2), f540. https://doi.org/10.1136/bmj.f540

Bruijniks, S. J. E., Bosmans, J. E., Peeters, F., Hollon, S. D., Van Oppen, P., Van Den Boogaard, M., Dingemanse, P., Cuijpers, P., Arntz, A., Franx, G., & Huibers, M. J. (2015). Frequency and change mechanisms of psychotherapy among depressed patients: study protocol for a multicenter randomized trial comparing twice-weekly versus once-weekly sessions of CBT and IPT. *BMC Psychiatry*, *15*(1). https://doi.org/10.1186/s12888-015-0532-8

Bruijniks, S. J. E., Lemmens, L. H., Hollon, S. D., Peeters, F., Cuijpers, P., Arntz, A., Dingemanse, P., Willems, L., Van Oppen, P., Twisk, J. W. R., Van Den Boogaard,

M., Spijker, J., Bosmans, J. E., & Huibers, M. J. (2020). The effects of once- versus twice-weekly sessions on psychotherapy outcomes in depressed patients. *The British Journal of Psychiatry*, *216*(4), 222–230. https://doi.org/10.1192/bjp.2019.265

Bruijniks, S. J. E., Meeter, M., Lemmens, L. H., Peeters, F., Cuijpers, P., & Huibers, M. J. (2022). Temporal and specific pathways of change in cognitive behavioral therapy (CBT) and interpersonal psychotherapy (IPT) for depression. *Behaviour Research and Therapy*, *151*, 104010. https://doi.org/10.1016/j.brat.2021.104010

Bruijniks, S. J. E., Peeters, F., Strunk, D. R., & Huibers, M. J. (2019). Measuring Patients' Acquisition of Therapy Skills in Psychotherapy for Depression: Assessing the CCTS-SR and the IPSS-SR. *American Journal of Psychotherapy*, *72*(3), 67–74. https://doi.org/10.1176/appi.psychotherapy.20180028

Castro-Schilo, L., & Grimm, K. J. (2017). Using residualized change versus difference scores for longitudinal research. *Journal of Social and Personal Relationships*, *35*(1), 32–58. https://doi.org/10.1177/0265407517718387

Christ, C., De Waal, M. M., Dekker, J., Van Kuijk, I., Van Schaik, D. J. F., Kikkert, M. J., Goudriaan, A. E., Beekman, A. T., & Messman-Moore, T. L. (2019). Linking childhood emotional abuse and depressive symptoms: The role of emotion dysregulation and interpersonal problems. *PLOS ONE*, *14*(2), e0211882. https://doi.org/10.1371/journal.pone.0211882

Cuijpers, P., Berking, M., Andersson, G., Quigley, L., Kleiboer, A., & Dobson, K. S. (2013). A Meta-Analysis of Cognitive-Behavioural Therapy for Adult Depression, Alone and in Comparison with other Treatments. *The Canadian Journal of Psychiatry*, *58*(7), 376–385. https://doi.org/10.1177/070674371305800702

Cuijpers, P., Karyotaki, E., Weitz, E., Andersson, G., Hollon, S. D., & Van Straten, A. (2014).
The effects of psychotherapies for major depression in adults on remission, recovery
and improvement: A meta-analysis. *Journal of Affective Disorders*, *159*, 118–126.
https://doi.org/10.1016/j.jad.2014.02.026

Cuijpers, P., Reijnders, M., & Huibers, M. J. (2019). The Role of Common Factors in
Psychotherapy Outcomes. *Annual Review of Clinical Psychology*, *15*(1), 207–231.
https://doi.org/10.1146/annurev-clinpsy-050718-095424

Dugal, C., Bigras, N., Godbout, N., & ClaudeBélanger. (2016). Childhood Interpersonal
Trauma and its Repercussions in Adulthood: An Analysis of Psychological and
Interpersonal Sequelae. In *InTech eBooks*. https://doi.org/10.5772/64476

Dolev, T., & Zilcha-Mano, S. (2019). The role of the therapeutic relationship in the
association between interpersonal behaviors and outcome: Comparison of two
competing models. *Psychotherapy Research*.
https://doi.org/10.1080/10503307.2017.1422215

Downey, C., & Crummy, A. (2022). The impact of childhood trauma on children's wellbeing
and adult behavior. *European Journal of Trauma & Dissociation*, *6*(1), 100237.
https://doi.org/10.1016/j.ejtd.2021.100237

Faber, J., & Fonseca, L. M. (2014). How sample size influences research outcomes. *Dental
Press Journal of Orthodontics*, *19*(4), 27–29.
https://doi.org/10.1590/2176-9451.19.4.027-029.ebo

Fung, H. W., Lam, S., Chien, W. T., Hung, S. L., Ling, H. W. H., Lee, V. W. P., & Wang, E.
(2022). Interpersonal stress mediates the relationship between childhood trauma and
depressive symptoms: Findings from two culturally different samples. *Australian and
New Zealand Journal of Psychiatry*, 000486742211385.
https://doi.org/10.1177/00048674221138501

Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, A. (2016). Social support and protection from depression: systematic review of current findings in Western countries. *British Journal of Psychiatry*, *209*(4), 284–293. https://doi.org/10.1192/bjp.bp.115.169094

Hagborg, J. M., Kalin, T., & Gerdner, A. (2022). The Childhood Trauma Questionnaire—Short Form (CTQ-SF) used with adolescents – methodological report from clinical and community samples. *Journal of Child & Adolescent Trauma*, *15*(4), 1199–1213. https://doi.org/10.1007/s40653-022-00443-8

Harald, B., & Gordon, P. (2012). Meta-review of depressive subtyping models. *Journal of Affective Disorders*, *139*(2), 126–140. https://doi.org/10.1016/j.jad.2011.07.015

Hayes, A. F. (2022). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Guilford Publications.

Herrman, H., Patel, V., Kieling, C., Berk, M., Buchweitz, C., Cuijpers, P., Furukawa, T. A., Kessler, R. C., Kohrt, B. A., Maj, M., McGorry, P. D., Reynolds, C. F., Weissman, M. M., Chibanda, D., Dowrick, C., Howard, L. M., Hoven, C. W., Knapp, M., Mayberg, H. S., . . . Wolpert, M. (2022). Time for united action on depression: a Lancet–World Psychiatric Association Commission. *The Lancet*, *399*(10328), 957–1022. https://doi.org/10.1016/s0140-6736(21)02141-3

Howell, D. C. (2017). *Statistical Methods for Psychology: Leiden University*.

Huh, H. J., Kim, S. Y., Yu, J. I., & Chae, J. (2014). Childhood trauma and adult interpersonal relationship problems in patients with depression and anxiety disorders. *Annals of General Psychiatry*, *13*(1). https://doi.org/10.1186/s12991-014-0026-y

Huibers, M. J., Lorenzo-Luaces, L., Cuijpers, P., & Kazantzis, N. (2021). On the Road to Personalized Psychotherapy: A Research Agenda Based on Cognitive Behavior Therapy for Depression. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.607508

Humphreys, K. L., LeMoult, J., Wear, J. G., Piersiak, H. A., Lee, A. Y., & Gotlib, I. H. (2020). Child maltreatment and depression: A meta-analysis of studies using the Childhood Trauma Questionnaire. *Child Abuse & Neglect*, *102*, 104361.

Janovsky, T., Rock, A. J., Thorsteinsson, E. B., Clark, G. I., & Murray, C. V. (2020). The relationship between early maladaptive schemas and interpersonal problems: A meta-analytic review. *Clinical Psychology & Psychotherapy*, *27*(3), 408–447. https://doi.org/10.1002/cpp.2439

Jennings, M. C., & Cribbie, R. A. (2021). Comparing Pre-Post Change Across Groups: Guidelines for Choosing between Difference Scores, ANCOVA, and Residual Change Scores. *Journal of data science*, *14*(2), 205–230. https://doi.org/10.6339/jds.201604_14(2).0002

Klerman GL, Weissman MM, Rounsaville BJ, Chevron E. Interpersonal psychotherapy of depression. Basic Books; New York: 1984.

Knapp, M. L., & Daly, J. A. (2011). *The SAGE Handbook of Interpersonal Communication*. SAGE Publications, Incorporated.

Kuzminskaite, E., Gathier, A. W., Cuijpers, P., Penninx, B. W., Ammerman, R. T., Brakemeier, E., Bruijniks, S. J. E., Carletto, S., Chakrabarty, T., Douglas, K., Dunlop, B. W., Elsaesser, M., Euteneuer, F., Guhn, A., Handley, E. D., Heinonen, E., Huibers, M. J., Jobst, A., Johnson, G. R., . . . Vinkers, C. H. (2022). Treatment efficacy and effectiveness in adults with major depressive disorder and childhood trauma history: a systematic review and meta-analysis. *The Lancet Psychiatry*, *9*(11), 860–873. https://doi.org/10.1016/s2215-0366(22)00227-9

McFarquhar, T., Luyten, P., & Fonagy, P. (2018). Changes in interpersonal problems in the psychotherapeutic treatment of depression as measured by the Inventory of

Interpersonal Problems: A systematic review and meta-analysis. *Journal of Affective Disorders*, *226*, 108–123. https://doi.org/10.1016/j.jad.2017.09.036

Nelson, J., Klumparendt, A., Doebler, P., & Ehring, T. (2017). Childhood maltreatment and characteristics of adult depression: Meta-analysis. *British Journal of Psychiatry*.

Paap, D., Karel, Y., Verhagen, A. P., Dijkstra, P. U., Geertzen, J. H. B., & Pool, G. (2022). The Working Alliance Inventory's Measurement Properties: A Systematic Review. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.945294

Rueger, S. Y., Malecki, C. K., Pyun, Y., Aycock, C., & Coyle, S. (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. *Psychological Bulletin*, *142*(10), 1017–1067. https://doi.org/10.1037/bul0000058

Santini, Z. I., Koyanagi, A., Tyrovolas, S., Mason, C., & Haro, J. M. (2015). The association between social relationships and depression: A systematic review. *Journal of Affective Disorders*, *175*, 53–65. https://doi.org/10.1016/j.jad.2014.12.049

Scher, C. D., Stein, M. B., Asmundson, G. J., McCreary, D. R., & Forde, D. R. (2001). The childhood trauma questionnaire in a community sample: Psychometric properties and normative data. *Journal of Traumatic Stress*, *14*(4), 843–857. https://doi.org/10.1023/a:1013058625719

Spitzer, C., Masuhr, O., Jaeger, U., & Euler, S. (2019). Kindheitstraumatisierungen und Behandlungsergebnis nach stationärer Psychotherapie. *Psychotherapeut*. https://doi.org/10.1007/s00278-019-0360-2

Teicher, M. H., Gordon, J. B., & Nemeroff, C. B. (2021). Recognizing the importance of childhood maltreatment as a critical factor in psychiatric diagnoses, treatment, research, prevention, and education. *Molecular Psychiatry*, *27*(3), 1331–1338. https://doi.org/10.1038/s41380-021-01367-9

Thombs, B. D., Bernstein, D. I., Lobbestael, J., & Arntz, A. (2009). A validation study of the Dutch Childhood Trauma Questionnaire-Short Form: Factor structure, reliability, and known-groups validity. *Child Abuse & Neglect*, *33*(8), 518–523. https://doi.org/10.1016/j.chiabu.2009.03.001

Valente, M. J., & MacKinnon, D. P. (2017). Comparing Models of Change to Estimate the Mediated Effect in the Pretest–Posttest Control Group Design. *Structural Equation Modeling*, *24*(3), 428–450. https://doi.org/10.1080/10705511.2016.1274657

Wang, Y., & Gorenstein, C. (2013). Psychometric properties of the Beck Depression Inventory-II: a comprehensive review. *Revista Brasileira de Psiquiatria*, *35*(4), 416–431. https://doi.org/10.1590/1516-4446-2012-1048

Wilson, L. A. B., & Scarpa, A. (2015). Interpersonal Difficulties Mediate the Relationship Between Child Sexual Abuse and Depression Symptoms. *Violence & Victims*, *30*(1), 163–176. https://doi.org/10.1891/0886-6708.vv-d-13-00059

World Health Organization: WHO. (2023, 31 maart). *Depressive disorder (depression)*. https://www.who.int/news-room/fact-sheets/detail/depression

Woods, A., Solomonov, N., Liles, B., Guillod, A., Kales, H. C., & Sirey, J. A. (2021). Perceived Social Support and Interpersonal Functioning as Predictors of Treatment Response Among Depressed Older Adults. *American Journal of Geriatric Psychiatry*, *29*(8), 843–852. https://doi.org/10.1016/j.jagp.2020.12.021

Zhang, S., Lin, X., Yang, T., Zhang, S., Pan, Y., Lu, J., & Liu, J. (2020). Prevalence of childhood trauma among adults with affective disorder using the Childhood Trauma Questionnaire: A meta-analysis. *Journal of Affective Disorders*, *276*, 546–554. https://doi.org/10.1016/j.jad.2020.07.001

Zilcha-Mano, S., & Fisher, H. (2022). Distinct roles of state-like and trait-like patient–

    therapist alliance in psychotherapy. *Nature Reviews Psychology*, *1*(4), 194–210.

    https://doi.org/10.1038/s44159-022-00029-z

Zilcha-Mano, S. (2017). Is the alliance really therapeutic? Revisiting this question in light of

    recent methodological advances. *American Psychologist*, *72*(4), 311–325.

    https://doi.org/10.1037/a0040435

Appendix A

Descriptive statistics of the data sample

Table A1.

Descriptive statistics and missing values.

	Minimum	Maximum	*M*	*SD*	Reliability (α)	Missing
Change in depression score	5.35	37.34	22.29	6.40	-	54
Change in IPT skills	92.81	171.36	124.00	13.67	.90	10
State-like alliance	-12.20	7.50	.36	3.12	.97	11
Childhood trauma					CEA .86	0
					CEN .91	
					CPA .88	
					CPN .75	
					CSA .85	
Co-occurrence	0.00	5.00	1.99	1.47		

Note. Reliability for the CTQ-SF is divided over subscales: childhood emotional abuse (CEA), childhood emotional neglect (CEN), childhood physical abuse (CPA), childhood physical neglect (CPN), childhood sexual abuse (CSA), N = 125.

Table A2.

Frequencies of type and co-occurrence of childhood trauma.

		Frequency	Percent
Type childhood trauma	CEA	60	48.00
	CEN	96	76.80
	CPA	19	15.20
	CPN	32	25.60
	CSA	42	33.60
Co-occurrence trauma	0	21	16.80
	1	31	24.80
	2	33	26.40
	3	16	12.80
	4	16	12.80
	5	8	6.40

Note. N = 125.

Table A3.

Gender.

	Frequency	Percentage
Male	46	36.80
Female	79	63.20

Table A4.

Age divided on different scales.

Age	Frequency	Percentage
18 -19	1	.80
20 – 29	37	29.60
30 – 39	22	17.60
40 – 49	35	28.00
50 – 59	27	21.60
60 - 65	3	2.40

Table A5.

Highest completed education.

	Frequency	Percent
None	1	.80
Primary school	2	1.60
Practical training school	6	4.80
Lower general secondary education	19	15.20
Higher general secondary education	9	7.20
Intermediate vocational education	36	28.80
Higher vocational education	27	21.60
Pre-university	5	4.00
University	20	16.00

Table A6.

Current job.

	Frequency	Percent
No side job	2	1.60
Side job	7	5.60
Student without side job	10	8.00
Student with side job	6	4.80
Not able to work	8	6.40
Partially not able to work and not working	3	2.40
Partially not able to work and working	9	7.20
Working	53	42.40
Government payment	22	17.60
Retirement	2	1.60
No legal income or government pay	2	1.60
Other	1	.80

Appendix B
Testing assumptions

Model 1 childhood trauma

Table B1.

Correlations.

	Change in BDI-II score	State-like alliance	Change in IPT skills	Childhood trauma
Change BDI-II score	1.00	.01	-.45	-.02
State-like alliance	.01	1.00	-.26	.15
Change IPT skills	-.45	-.26	1.00	-.11
Childhood trauma	-.02	.15	-.11	1.00

Table B2.

Collinearity statistics.

	Tolerance	VIF
State-like alliance	.92	1.09
Change in IPT skills	.93	1.08
Childhood trauma	.97	1.02

Table B3.

Residual statistics.

	Minimum	Maximum
Std. Residual	-2.59	2.82
Cook's distance	.00	.074

The normal P-P plot of regression standardized residual is assessed. No significant deviations from the regression line can be observed. There is an even spread of points in the scatterplot with and there is an absence of patterns.

Model 2 childhood emotional trauma

Table B4.

Correlations.

	Change in BDI-II score	State-like alliance	Change in IPT skills	Childhood trauma
Change BDI-II score	1.00	.01	-.45	-.00
State-like alliance	.01	1.00	-.26	.15
Change IPT skills	-.45	-.26	1.00	-.14
Childhood trauma	.00	.15	-.14	1.00

Table B5.

Collinearity statistics.

	Tolerance	VIF
State-like alliance	.92	1.09
Change in IPT skills	.92	1.09
Emotional trauma	.97	1.03

Table B6.

Residual statistics.

	Minimum	Maximum
Std. Residual	-2.59	2.82
Cook's distance	.00	.074

The normal P-P plot of regression standardized residual is assessed. No significant deviations from the regression line can be observed. There is an even spread of points in the scatterplot with and there is an absence of patterns.

Model 3 childhood emotional trauma

Table B7.

Correlations.

	Change in BDI-II score	State-like alliance	Change in IPT skills	Childhood trauma
Change BDI-II score	1.00	.01	-.45	.19
State-like alliance	.01	1.00	-.26	.03
Change IPT skills	-.45	-.26	1.00	-.04
Childhood trauma	.19	.03	-.043	1.00

Table B8.

Collinearity statistics.

	Tolerance	VIF
State-like alliance	.93	1.07
Change in IPT skills	.93	1.07
Childhood trauma	1.00	1.02

Table B9.

Residual statistics.

	Minimum	Maximum
Std. Residual	-2.66	2.45
Cook's distance	.00	.077

The normal P-P plot of regression standardized residual is assessed. No significant deviations from the regression line can be observed. There is an even spread of points in the scatterplot with and there is an absence of patterns.

Appendix C
Conditional effect analysis

The conditional effect analysis for the model of childhood trauma and co-occurrence indicates that the effects of the change in IPT skills on the change in BDI-II score are significant when the state-like alliance is -1 SD, M or +1 SD. Indicating no significant difference in strength of the state-like alliance. However, for emotional trauma, there is an insignificant effect of the IPT skills on treatment outcome when the state-like alliance is -1 SD. Indicating that with a low state-like alliance, there is no significant effect of IPT skills on treatment outcome, whereas IPT skills do have a significant effect on treatment outcome when the state-like alliance is average or high.

Table C1.

Conditional effects of IPT skills on treatment outcome on different levels of the state-like alliance.

	State-like alliance	*B*	*s.e.*	*t*	*p*
Childhood trauma	40	-.41	.13	-3.25	.002*
(n = 125)	50	-.47	.09	-5.60	<.001*
	60	-.53	.11	-4.88	<.001*
Emotional trauma	41.52	-.29	.17	-1.71	.091
(n = 104)	50.66	-.42	.10	-4.02	<.001*
	59.80	-.54	.14	-4.01	<.001*
Co-occurrence	40	-.40	.12	-3.19	.002*
(n = 125)	50	-.46	.08	-.58	<.001*
	60	-.53	.11	-4.91	<.001*

Note. * significant