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Effect of therapeutic competence, adherence, and alliance on treatment outcome in youth with PTSD treated with developmentally adapted cognitive processing therapy

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ABSTRACT

Background: Developmentally adapted cognitive processing therapy (D-CPT) is an effective treatment for posttraumatic stress disorder (PTSD) in adolescents and young adults. It is unclear if therapeutic adherence and competence in D-CPT are associated with higher PTSD treatment gains.

Objective: To assess if higher therapeutic adherence and competence in D-CPT are associated with higher symptom reduction of PTSD in adolescents and young adults, while controlling for therapeutic alliance.

Participants and setting: Participants were 38 patients (aged 14–21 years; $M = 17.61$ years, $SD = 2.42$ years) of a multicenter randomized controlled trial in which the efficacy of D-CPT was compared to a waitlist with treatment advice.

Methods: Videotaped therapy sessions were rated using validated ratings scales to assess adherence and competence. Therapeutic alliance was assessed via weekly patient ratings. We used hierarchical linear modelling to assess the relationship of adherence and competence on PTSD symptoms being measured by both clinician and patient while controlling for alliance.

Results: Neither adherence nor competence were related to treatment outcomes in clinician or patient rated PTSD symptom severity. Higher alliance was associated with a lower symptom severity at 12 months posttreatment in both clinician and patient rated PTSD symptoms.

Conclusions: In this study of young adults with PTSD, who were treated with D-CPT by well-trained therapists, therapeutic adherence and competence were not related to treatment outcome. This might be explained by a lack of range in therapist adherence and competence. Therapeutic alliance had a positive effect on PTSD symptom severity.

1. Introduction

Adolescents and young adults who have experienced sexual and/or physical abuse in childhood carry a high risk for the development of posttraumatic stress disorder (PTSD) as well as other mental health disorders (Lewis et al., 2019; McLaughlin et al., 2013;

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Messman-Moore & Bhuptani, 2017). Early treatment is important, as PTSD is often chronic and related to impairments in the broader development like impaired social or academic functioning (Mavranzeouli et al., 2020). Developmentally adapted cognitive processing therapy (D-CPT) is a treatment specifically developed to treat young adults and adolescents with child sexual and/or physical abuse related PTSD. In addition to trauma focused work, D-CPT gives special consideration to the need of youth patients by integrating emotion management techniques and developmental tasks, for example career choices and romantic relationships (Matulis, Resick, Rosner, & Steil, 2014). D-CPT has been shown to be effective in reducing PTSD symptoms, as well as symptoms of depression, borderline symptom severity, behavior problems and dissociation (Rosner et al., 2019; Steil, Weiss, Rimane, Renneberg, & Rosner, 2022).

To further advance and disseminate PTSD treatments for youth like D-CPT, it is crucial to identify factors that contribute to treatment success. For this purpose, measuring and ensuring treatment integrity is both a prerequisite as well as a possible predictor of change. Treatment integrity (also referred to as treatment fidelity) is comprised of adherence (the degree to which the therapist delivers specific therapeutic elements prescribed by the treatment manual), therapeutic competence (the therapist's level of skillfulness with which the treatment is delivered) and treatment differentiation (if non-prescribed therapeutic interventions and elements are avoided; Perepletchikova & Kazdin, 2005; Waltz, Addis, Koerner, & Jacobson, 1993). A methodologically sound assessment of treatment integrity ensures internal validity of treatment studies (hence that the treatment itself contributed to treatment success; Moncher & Prinz, 1991). Furthermore, the determination of therapeutic adherence and competence can help to identify central treatment elements and therapeutic skills that contribute to positive treatment outcome (Perepletchikova & Kazdin, 2005). A multitude of factors that influence therapeutic change have been studied and identified. For example, also client factors influence the outcome of therapies (Luborsky, Auerbach, Chandler, Cohen, & Bachrach, 1971; Miller, Hubble, Chow, & Seidel, 2013). In this study, we investigate factors related to the therapist, i.e., therapist adherence and competence. Findings on the relationship between adherence, competence, and clinical outcome in youth is mixed. Collyer, Eisler, and Woolgar (2019) conducted a systematic review and meta-analysis including studies on evidence-based treatments for youth of up to 21 years old with different mental health problems. Studies targeted substance abuse, anxiety disorder, or depressive symptoms. In the 29 studies measuring the relationship between adherence and treatment, authors found that higher adherence predicted better clinical outcome, even though the size of the effect was small. In nine studies, the relationship between competence and clinical outcome was measured, competence was not related to youth outcome (Collyer et al., 2019). None of the included studies included a sample of youth with PTSD.

Another systematic review on the relation between therapist adherence, competence, and therapy outcome in cognitive behavioral therapy (CBT) for youth under 18 identified only five studies examining this relationship (Rapley & Loades, 2018). Findings of these studies were mixed. Two of the identified studies reported no significant relationship between adherence, competence, and clinical outcome. In others, some effects were found. As different measures were used across studies (e.g., parent vs. child measures), authors stress that it remained unclear, whether true differences in effects were detected or if the mixed findings reflected limitations in measurement (Rapley & Loades, 2018). The authors conclude that findings regarding the effect of adherence and competence in CBT for youth are inconclusive. Again, none of the studies included PTSD treatments. One study on youth with PTSD (aged 9 to 18 years) assessed therapists' own perceived competence in trauma-focused cognitive behavioral therapy (TF-CBT) in relation to treatment outcome (Espeleta, Peer, Are, & Hanson, 2021). Therapist perceived own competence was significantly higher among young patients who remitted from their PTSD diagnosis compared to non-responders (Espeleta et al., 2021).

In adult patient populations, there are some findings on the relation between adherence and competence and PTSD treatment outcome, most studies focus on Cognitive Processing Therapy (CPT). Marques et al. (2019) found that competence in CPT was associated with PTSD symptom reduction while adherence to CPT was linked to symptom reduction of depression. In another study on adherence and competence in four central components of CPT, authors reported that therapist competence in two CPT components ("skill in socratic questioning" and "prioritizing assimilation before overaccommodation") were associated with a greater reduction of PTSD symptomatology (Farmer, Mitchell, Parker-Guilbert, & Galovski, 2017).

When assessing the influence of adherence and competence on treatment outcome other influential factors should be taken into consideration. Especially therapeutic alliance is a factor that should be considered as it has repeatedly been shown to positively influence treatment outcome (Horvath, Re, Flückiger, & Symonds, 2011). The positive influence of therapeutic alliance on treatment outcome has also been shown in youth (Puls, Schmidt, & Hilbert, 2019), and in PTSD treatments (Cloitre, Stovall-McClough, Miranda, & Chemtob, 2004). Specifically in the treatment of young patients with PTSD, therapeutic alliance is an important factor that has been shown to positively influence attrition rates in PTSD treatment studies for children (van der Hoeven et al., 2022; Wamser-Nanney & Walker, 2023). Furthermore, therapeutic alliance seems to interact with adherence and competence and might influence the relationship between the two constructs and treatment outcome (Barber et al., 2006). For example, Weck, Grikscheit, Jakob, Höfling, and Stangier (2015) found that higher therapeutic alliance was associated with a stronger effect of adherence on treatment outcome.

Taken together, studies on the relationship between therapeutic adherence, competence, and treatment success in PTSD treatments for youth are scarce and thus far, the nature of this relationship remains unclear. Findings from adult patient populations indicate a positive effect of adherence and/or competence on treatment outcome in CPT, however no study so far has examined this relationship in young patients treated with D-CPT. The present study therefore aimed to assess the relationship between adherence to and competence in D-CPT and clinical outcomes in youth aged 14 to 21 years while controlling for therapeutic alliance. Based on findings from adult patient populations, we hypothesized that higher adherence as well as higher competence would predict higher treatment gains as rated by patient and clinician.

2. Method

2.1. Clinical trial and procedure

The present study was part of a randomized controlled trial (RCT) on the effectiveness of D-CPT in youth with PTSD (Rosner, König, Neuner, Schmidt, & Steil, 2014, German Clinical Trials Register identifier: DRKS00004787). In this multicenter trial, adolescents with childhood abuse related PTSD were randomized to either D-CPT or a waitlist/treatment advice (WL/TA) group. In the D-CPT group, there were four major assessment time points (baseline, mid-treatment, post-treatment, and three months after the end of treatment) as well as two long-term follow-up assessments (six and 12 months after the end of treatment). Participants in WL/TA were advised to seek treatment outside the trial. D-CPT was offered to these participants after the three-month follow-up. Participants showed higher treatment gains in PTSD severity as well as in all secondary outcomes in the D-CPT group than in the WL/TA group (Rosner et al., 2019). Furthermore, treatment success was stable at the long-term follow-up (Steil et al., 2022). The institutional review boards approved of the study. All participants and parents or guardians of minors gave written informed consent. Further details of the trial can be found in the study protocol (Rosner et al., 2014).

2.2. Participants

In the main trial, altogether, 88 adolescents (44 in the D-CPT group and 44 in the WL/TA group) were included. In the current study, 38 participants from the D-CPT group were included, from whom at least one video recorded therapy session was available. The remaining six patients in the D-CPT group were not included in our study, because four dropped out before the commitment phase (Reasons for dropout: Patient moved (1); revealed having substance dependency (1); revealed ongoing abuse (2), patients were offered alternative treatment or referral) and for two no video recordings were available. To be included in the RCT, participants had to have a primary diagnosis of PTSD according to the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV-TR; American Psychiatric Association [APA], 2000) following childhood physical abuse (CPA) and/or childhood sexual abuse (CSA) beyond the age of 3. The threshold for PTSD diagnosis was lowered, because of the ongoing discussion on diagnostic criteria for PTSD in children (Cohen, Mannarino, Perel, & Staron, 2007). For a PTSD diagnosis in the RCT, a minimum of 2 avoidance symptoms instead of 3 as defined in the DSM-IV-TR were required. Further inclusion criteria were sufficient German language skills, no or stable pharmacological medication (for ≥ 3 weeks), and stable living conditions (no ongoing abuse, no homelessness). Exclusion criteria were current severe suicidality or severe and life-threatening suicidality or self-harming behavior within the last 6 months; an IQ of 75 or less, and/or any documented pervasive development disorder, concurrent psychotherapy, and the following diagnoses according to DSM-IV-TR: lifetime psychotic or bipolar disorder, current substance dependence (abstinence < 6 months), or a substance-induced disorder (Rosner et al., 2019).

2.3. Therapists

Participants were treated by 14 therapists, of whom all had a master's degree in psychology and ten were licensed therapists. Four therapists were still in training, all four were at least in their second year of training. Ten therapists were female. They had a mean (*SD*) clinical experience of 46.1 (19.3) months and had treated 3.3 (5.6) cases with PTSD before the trial. Therapists completed a 3-day workshop in D-CPT and treated one pilot case before entering the trial. During the trial, therapists attended weekly group supervision in the three study centers (supervisors: R.R., B.R., R.S.) as well as biweekly telephone case consultations.

2.4. Treatment

D-CPT is an adapted form of CPT, specifically modified to meet the need of adolescents and young adults after sexual and/or physical abuse. It comprises thirty 50-min sessions, and six optional sessions for crisis intervention or joint sessions with the caregiver. D-CPT is structured in four phases: (1) the commitment phase; (2) a phase in which emotion management techniques are integrated; (3) the intensive phase, in which the original CPT sessions are administered with a higher frequency (15 sessions in 4 weeks) and (4) the last phase, in which developmental tasks specific for young adults are considered (i.e. career choices, romantic relationships, ...). Treatment was completed in 16 to 20 weeks. Participants in the D-CPT group attended a mean (*SD*) of 25.4 (11.6) therapy sessions (range, 0–36); completers attended a mean (*SD*) of 31.6 (3.3) sessions (range, 19–36). More detail regarding D-CPT can be found in Matulis et al. (2014).

2.5. Assessment of adherence and competence

2.5.1. Rating process

Video recordings of 38 patients and 14 therapists in the D-CPT condition were included in the ratings of adherence and competence. Two video recordings per patient-therapist dyad were randomly selected from either the commitment or the intensive phase. For six patients, only one videotape from the commitment phase was rated, as they dropped out before the intensive phase. Altogether, 71 video recordings were randomly selected and rated by rater 1. Of those, 19 randomly selected video recordings were doubly rated by rater 2. Interrater-reliability for these 19 double-coded video recordings was assessed via intraclass correlation coefficient (ICC) using Model 2 [ICC_(2,2)] following recommendations by Shrout and Fleiss (1979). ICCs exceeding 0.75 are considered to indicate good

reliability (Portney & Watkins, 2017).

2.5.2. Raters

Raters were two trained psychologists who at the time of the rating had 2.5 and 3.5 years of clinical experience. Both had treated patients with D-CPT under supervision before and received intensive training in D-CPT by the treatment developers.

2.5.3. Measures

2.5.3.1. Adherence. Our workgroup developed the Therapeutic Adherence Scale (TAS; Gutermann et al., 2015), a rating scale specific for the treatment manual for D-CPT. The scale consists of 10 items rated on a three-point Likert scale (0 = *not adherent*, 1 = *adherent to some extent*, 2 = *adherent*). The items were created to be applicable in every treatment session and reflect therapist's adherence to the D-CPT manual. One item was additionally used to assess if interventions from other therapy orientations were used. The TAS showed acceptable psychometric properties (ICC = 0.95; Cronbach's Alpha = 0.59; Gutermann et al., 2015). In our sample, the interrater reliability for the TAS was high with ICC = 0.95.

2.5.3.2. Competence. The Therapeutic Competence Scale (TCS; Gutermann et al., 2015) was also developed by our workgroup. It is based on the Cognitive Therapy Scale (CTS; Weck, Hautzinger, Heidenreich, & Stangier, 2010), which was adapted for adolescent PTSD treatment. Furthermore, seven newly developed items were added. These new items assess competences specific to D-CPT ('Dealing with emotions'; 'Dealing with severe stress'; 'Use of validation strategies'; 'Use of change-oriented interventions'; 'Consideration of autonomy'; 'Facilitating cooperation'; 'Contingency management'). The 21 items of the TCS are rated on a seven-point Likert scale (0 = *poor competence* to 6 = *excellent competence*). Additionally, to prevent that sympathy towards the therapist would influence competence ratings, three items were added. In these items, which had to be judged at the beginning, middle and end of the session, the rater was asked how likeable the therapist was for them. The rater was also reminded to actively attempt to exclude this opinion from the rating. At last, raters evaluated the patient's difficulty and motivation. The TCS showed good psychometric properties (ICC = 0.94; Cronbach's Alpha = 0.96; Gutermann et al., 2015). In our sample interrater reliability for the TCS was also high with ICC = 0.97.

2.5.3.3. Alliance. To measure therapeutic alliance, we used the German version of the Helping Alliance Questionnaire (HAQ; Bassler, Potratz, & Krauthauser, 1995). After each session, patient and therapist completed the HAQ. The HAQ has 11 items which include statements like "I believe that my therapist is helping me" in the patient version or "I believe that I can help my patient" in the therapist version. The items are rated on a 6-point Likert scale from 1 (*No, I strongly feel the statement is not true*) to 6 (*Yes, I strongly feel the statement is true*). In the end, a sum score is built that can range from 11 to 66. The German version of the HAQ has been validated and showed good psychometric properties (Bassler et al., 1995). We used the patients' ratings of alliance as it has been shown to be more strongly related to therapeutic outcome than therapist rated alliance (Barber et al., 1999).

2.6. Outcome measures

As primary outcome measure for PTSD severity, we used the German version of the Clinician-administered PTSD Scale for Children and Adolescents (CAPS-CA, Nader et al., 1996; Steil & Füchsel, 2006). The CAPS-CA is a structured clinical interview in which frequency and intensity of PTSD symptoms are assessed on a scale from 0 (*never/no problem*) to 4 (*most of the time/extreme*). Total scores can range from 0 to 136. The German version of the CAPS-CA has demonstrated good internal consistency (Cronbach's Alpha = 0.92) and good test-retest reliability (ICC = 0.88; Steil & Füchsel, 2006).

In addition, we measured self-reported PTSD symptoms with the German version of the University of California at Los Angeles Post-traumatic Stress Disorder Reaction Index (UCLA-PTSD-RI, Ruf, Schauer, & Elbert, 2010; Steinberg, Brymer, Decker, & Pynoos, 2004, range 0–68). Psychometric properties of the English version have been demonstrated as high (Steinberg et al., 2013). Cronbach's Alpha of the German version was 0.81 (Matulis et al., 2014). Greater scores indicate a greater severity of symptoms in both assessments. Both instruments were assessed at the six assessment points baseline, mid-treatment, post-treatment as well as three-, six-, and 12-months follow-up.

3. Data analyses

To obtain one competence and adherence score per patient-therapist dyad, we averaged ratings of both raters and ratings from the commitment and the intensive phase. We decided to average ratings from commitment and intensive phase, as there was no statistical difference between both treatment phases in adherence ratings ($M_{\text{commitment}} = 1.59$, $SD = 0.27$; $M_{\text{intensive}} = 1.53$, $SD = 0.34$; $t(31) = 0.91$, $p = .36$) or in competence ratings ($M_{\text{commitment}} = 3.56$, $SD = 0.86$; $M_{\text{intensive}} = 3.52$, $SD = 1.06$; $t(31) = 0.75$, $p = .46$). To obtain one score for alliance, we used the mean of the sum scores from the weekly HAQ ratings, as rated by the patient.

Our data had a multilevel structure with repeated assessment time points (level 1, $N = 6$) nested within patients (level 2, $N = 38$), nested within therapists (level 3, $N = 14$), therefore we used multilevel modelling to examine the influence of adherence and competence on the primary and secondary outcome. Due to the modest sample size and especially the small number of therapists, we decided to exclude the third level from the analyses. We therefore conducted 2-level hierarchical linear models with random intercepts and fixed slopes. The model with random slopes was tested and did not explain more variance than the model with fixed slopes, hence

we chose the simpler model. Separate models were performed for the two outcome variables CAPS-CA and UCLA-PTSD-RI. Due to high correlations between adherence and competence (see Table 2), we also performed separate models for adherence and competence to avoid multicollinearity. Hence, altogether, four models were performed.

At level 1, time (representing the six assessment points) was entered as a predictor variable. At level 2, we entered adherence/competence respectively and alliance. The cross-level interactions time \times adherence or time \times competence and time \times alliance were added to account for the effect of adherence, competence, and alliance over the course of the six assessment time points. Effect sizes were calculated following the procedure suggested by Peterson and Brown (2005) we used standardized β -coefficients and converted them into Cohen's d (Lenhard & Lenhard, 2017).

4. Results

Video recordings of 38 participants from the D-CPT condition were rated and part of the analyses. Participants had a mean age of 17.61 years ($SD = 2.42$ years), two were male. Concerning the type of abuse, $N = 22$ participants indicated that they had experienced both CSA and CPA, $N = 6$ participants experienced only CSA, and $N = 10$ participants experienced only CPA.

Table 1 reports mean scores, as well as standard deviation and the range of adherence, competence, and alliance. In Table 2 we present the correlations between the predictor variables adherence, competence, and alliance. Descriptive statistics of both outcome measures at the six assessment time points are presented in Table 3.

4.1. Association between adherence, alliance, and outcome

Results of the multilevel model with the CAPS-CA as dependent variable can be found in Table 4. Adherence was not a significant predictor for the sum score of the CAPS-CA from baseline to 12-months follow-up as depicted by the non-significant main and interaction effect. The interaction term time \times alliance was the only significant predictor in the model, indicating that in patient therapist dyads with a higher alliance, the reduction of the CAPS-CA sum score from baseline to 12-months follow-up was more pronounced than in those with lower alliance. This effect is depicted in Fig. 1.

The same pattern of results was evident for self-reported PTSD symptoms, measured with the UCLA-PTSD-RI: adherence did not predict the sum score of the UCLA-PTSD-RI at the different measurement time points, but the significant interaction term time \times alliance indicated that a higher alliance score was associated with a greater reduction of the sum score from baseline to 12-months follow-up.

4.2. Association between competence, alliance, and outcome

In the multilevel model for the CAPS-CA with competence as the predictor, time \times alliance emerged as the only significant predictor. Higher alliance was associated with greater CAPS-CA sum score reduction from baseline to 12-months follow-up. Competence did not predict reduction of the CAPS-CA sum score. For the UCLA-PTSD-RI, competence did not predict sum scores at the different assessment time points. The interaction term time \times alliance was significant, indicating that higher alliance was associated with lower UCLA-PTSD-RI sum scores 12 months after the end of the treatment. The results of both models can be found in Table 5.

5. Discussion

We examined the association between therapeutic adherence and competence and symptoms of PTSD over the course of therapy in youth treated with D-CPT. Contrary to our initial hypothesis, our analyses showed no association between neither adherence nor competence and the severity of PTSD symptoms over the course of therapy. There was no difference in the association between adherence, competence and PTSD symptoms as assessed by clinicians or self-reported by the patients. There was however a significant relationship between therapeutic alliance and the severity of PTSD symptoms over the course of therapy. A higher therapeutic alliance was associated with less PTSD symptoms, both clinician and self-rated, at the end of therapy.

Our results of a non-significant relationship between adherence, competence and youth treatment outcome go in line with existing findings. Small to non-existing adherence/competence treatment outcome relationships have been reported in meta-analyses in both youth (Collyer et al., 2019) and adult patients (Webb, DeRubeis, & Barber, 2010). However, some other studies in adult patient populations found that competence in CPT was associated with PTSD symptom reduction (Farmer et al., 2017; Marques et al., 2019).

Table 1
Mean scores of adherence, competence, and alliance.

	<i>M (SD)</i>	<i>Range</i>
Adherence ^a	1.56 (0.24)	0.98–1.97
Competence ^b	3.50 (0.84)	1.54–5.01
Alliance ^c	54.84 (7.51)	33.92–64.64

^a Adherence scores can range from 0 (*not adherent*) to 2 (*adherent*).

^b Competence scores can range from 0 (*poor competence*) to 6 (*excellent competence*).

^c As rated by the patient, alliance scores can range from 11 to 66.

Table 2
Correlations between predictor variables.

	Adherence	Competence	Alliance
Adherence	–	0.71	–0.04
Competence	–	–	0.03
Alliance	–	–	–

Table 3
Descriptive statistics (mean, standard deviations) for outcome measures.

Measure	Assessment time points					
	Baseline M (SD)	Mid-treatment M (SD)	Post-treatment M (SD)	3-months FU M (SD)	6-months FU M (SD)	12-months FU M (SD)
CAPS-CA	65.32 (21.71)	56.81 (23.91)	24.66 (21.16)	25.90 (25.42)	24.07 (29.19)	19.68 (21.84)
UCLA-PTSD-RI	48.76 (13.24)	36.88 (15.45)	20.59 (16.79)	19.28 (18.86)	18.54 (18.49)	14.95 (15.26)

Abbreviations: CAPS-CA = Clinician-administered PTSD Scale for Children and Adolescents, UCLA PTSD-RI = University of California at Los Angeles Post-traumatic Stress Disorder Reaction Index; FU = follow-up.

Table 4
Hierarchical linear model for adherence.

Fixed effects	CAPS-CA					UCLA PTSD-RI				
	Est.	SE	t	p	Effect size	Est.	SE	t	p	Effect size
Intercept	70.52	3.93	17.97	<.001		50.44	2.57	19.62	<.001	
Level 1 predictor										
Time	–9.50	0.76	–12.58	<.001	d = –1.16	–6.47	0.52	–12.42	<.001	d = –1.15
Level 2 predictors										
Adherence	–1.37	4.03	–0.34	.73	d = –0.08	–3.37	2.61	–1.29	=.20	d = –0.31
Alliance	–0.78	4.01	–0.20	.85	d = –0.05	–3.11	2.68	–1.16	=.25	d = –0.28
Interaction terms										
Time × adherence	0.07	0.83	0.09	.93	d = 0.12	0.79	0.57	1.40	=.17	d = 0.35
Time × alliance	–2.84	0.86	–3.32	<.01	d = –0.63	–1.28	0.62	–2.06	<.05	d = –0.39

Abbreviations: Est. = estimate, SE = standard error, CAPS-CA = Clinician-administered PTSD Scale for Children and Adolescents, UCLA PTSD-RI = University of California at Los Angeles Post-traumatic Stress Disorder Reaction Index.

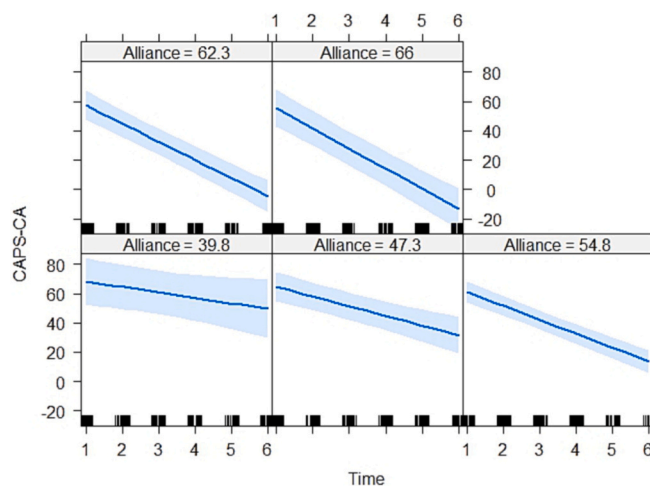


Fig. 1. Interaction of time and alliance. CAPS-CA = Clinician-administered PTSD Scale for Children and Adolescents, CAPS-CA sum scores at the different assessment time points for low (mean – 2 SD; mean – 1 SD), mean (54.8), and high (mean + 1 SD; maximum level) levels of alliance. Time 1 = baseline; 2 = mid-treatment; 3 = post-treatment; 4 = 3-months follow-up; 5 = 6-months follow-up; 6 = 12-months follow-up.

Table 5
Hierarchical linear model for competence.

Fixed effects	CAPS-CA					UCLA-PTSD-RI				
	Est.	SE	t	p	Effect size	Est.	SE	t	p	Effect size
Intercept	70.46	3.92	17.78	<.001		50.43	2.59	19.42	<.001	
Level 1 predictor										
Time	-9.47	0.75	-12.58	<.001	d = -1.16	-6.47	0.52	-12.33	<.001	d = -1.15
Level 2 predictors										
Competence	4.16	3.93	1.06	=.29	d = 0.37	-0.05	2.59	-0.21	=.83	d = -0.05
Alliance	-0.99	3.40	-0.25	=.81	d = -0.06	-3.05	2.70	-1.13	=.26	d = -0.27
Interaction terms										
Time × competence	-0.81	0.74	-1.11	=.27	d = -0.20	0.25	0.51	0.48	=.63	d = 0.19
Time × alliance	-2.76	0.85	-3.24	<.01	d = -0.61	-1.25	0.62	-2.01	<.05	d = -0.37

Our findings are also in contrast to results of one other study that reported an existing relationship between therapeutic competence and PTSD treatment outcome in youth (Espeleta et al., 2021). Contradicting findings could be explained by different types of therapy that were administered (TF-CBT in Espeleta et al. (2021) vs. D-CPT in our study). Methodological differences between both studies could be a further explanation for the different findings. In our study, adherence and competence were rated by judges who watched and rated video recorded therapy sessions. In Espeleta et al. (2021), therapists rated their own perceived competence. As methodological differences like these could explain different findings, it is important to consider that the methodological conceptualization of our study could also be the cause for our null findings. In the conceptualization of our study, we followed recommendations considered as the “gold standard” in the assessment of adherence and competence (Hogue, Liddle, & Rowe, 1996). We rated randomly chosen videotapes of different therapy phases, used psychometrically validated rating scales, and performed ratings by more than one rater. Hence, we are confident that our data was suitable for the purpose of assessing the adherence/competence treatment outcome relationship in youth with PTSD. A further point that has been discussed as a reason for the failure to find an association between adherence/competence and treatment outcome is a restricted range of therapeutic competence and adherence and thus a ceiling effect (Rapley & Loades, 2018). It is possible that this also shows in our study. Both mean adherence scores and mean competence scores were rather high, and the range of both ratings did not include the lower endpoint of the scales. In treatment studies, high levels of adherence and competence are desirable for internal validity. Thus, therapists in treatment studies are often specifically trained and monitored. In our original RCT (Rosner et al., 2014), therapists were trained by the treatment developers and received supervision in a high frequency. Both factors may have led to an overall high competence and adherence in our study. The association between adherence, competence and treatment outcome should be investigated in future dissemination trials, where the range of these ratings can be expected to be large.

Apart from methodological considerations, our results also have clinical relevance. They suggest that in the treatment of PTSD in youth, therapeutic alliance is an important influential factor. This is consistent with previous findings of a positive impact of alliance on PTSD symptom reduction in sexually abused youth (Capaldi, Asnaani, Zandberg, Carpenter, & Foa, 2016). In this group of patients, a positive therapeutic alliance is particularly important, because maltreated youth seem to have difficulties forming positive therapeutic relationships (Eltz, Shirk, & Sarlin, 1995). If good therapeutic alliance can be developed, young patients might be motivated to engage and participate in the therapeutic process. This could then lead to better treatment outcomes.

There are some limitations to our study. As only the treatment group of our original RCT could be included in the present study, our sample size was modest. Possibly, this small sample size prevented us from finding a statistical association between adherence/competence and outcome. Future studies should examine this association in larger samples. Furthermore, only two participants in our sample were male. Previous studies on the association between adherence, competence, and treatment outcome in youth (e.g., included in the review and meta-analysis by Collyer et al., 2019) included more balanced samples with regard to participant's sex. Therefore, comparability of our results to previous studies could be limited. The therapeutic adherence scale (TAS) that was used to measure adherence in our study showed a low internal consistency with Cronbach's alpha = 0.59. However, authors of the validation study of the TAS underline that Cronbach's alpha is dependent on the length of a scale. Considering that the TAS is a short scale with only 10 items, we regard Cronbach's alpha to be in an acceptable range (Gutermann et al., 2015). As discussed before, the restricted range in therapeutic adherence and competence is a strength of our original RCT but can be seen as a limitation of the present study. As the original trial was not specifically designed to assess the influence of adherence/competence on therapeutic outcome, a high level of adherence and competence was desirable for the purpose of the original trial (Rosner et al., 2014). A further limitation of our study is that apart from adherence, competence and alliance, no other potentially influential factors were considered. It is likely that factors such as social support, economic stability or numerous others influence treatment outcome. More research on factors influencing PTSD treatment outcome in youth is necessary.

6. Conclusions

Despite some limitations, our study provides an important addition to the current state of research on the association between adherence, competence, and treatment success in younger patients with PTSD. Our findings show that in a sample of well-trained therapists, adherence and competence did not predict outcome, while therapeutic alliance was clearly related to symptom severity 12 months after treatment. It is important that the influence of adherence and competence on PTSD treatment outcome is further

studied, especially outside of efficacy studies.

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Trial registration

German Clinical Trials Register Identifier: DRKS00004787.

Declaration of competing interest

RS and RR receive honoraries for presentations and workshops on D-CPT. JG receives honoraries for workshops on CPT. No further disclosures were reported.

Data availability

Data will be made available on request.

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