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The effectiveness of schema therapy for patients with anxiety disorders, OCD, or PTSD: A systematic review and research agenda

Nancy Peeters[1,2]*, Boris van Passel[1,2] and Julie Krans[1,2,3]

[1]Pro Persona Overwaal Centre for anxiety, OCD and PTSD, Nijmegen, The Netherlands
[2]Behavioural Science Institute, Radboud University, Nijmegen, The Netherlands
[3]Behaviour, Health and Psychopathology, KU Leuven, Leuven, Belgium

Objectives. We reviewed the evidence regarding the effectiveness of schema therapy for anxiety disorders, obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD).

Methods. This systematic review followed the recommendation of the PRISMA guidelines. A database search (PsycINFO, MEDLINE, EMBASE, WEB OF SCIENCE, and Academic Search Ultimate) was conducted to identify eligible studies up until 2 April 2021. The search included the keywords ('schema therap*' or 'schema group therap*' or 'schema mode therap*' or 'schema focused' or 'young's model') and ('anxiety disorder*' or 'anxiety-related disorder*' or 'agoraphobia' or 'health anxiety' or 'phobi*' or 'panic disorder' or 'obsessive compulsive disorder' or 'OCD' or 'posttraumatic stress' or 'post traumatic stress' or 'PTSD' or 'hypochondria' or 'axis 1'). Included studies were appraised on methodological quality according to the Psychotherapy Outcome study Methodology Rating Form.

Results. We identified 41 studies that were eligible based on the topic. However, only six (comprising 316 anxiety, OCD, and PTSD patients) could be included despite lenient methodological inclusion/exclusion criteria. Results showed that schema therapy can lead to beneficial effects in disorder-specific symptoms and early maladaptive schemas. Yet, we also uncovered substantial methodological limitations in most studies.

Conclusions. Schema therapy is a promising treatment for anxiety, OCD, and PTSD. Yet, there is a systematic problem in the quality of research despite growing clinical interest and application. We therefore concluded with a research agenda presenting recommendations for future research that will be crucial for building a solid evidence-base for schema therapy in chronic anxiety, OCD, and PTSD.

**Correspondence should be addressed to Nancy Peeters, Behavioural Science Institute, Radboud University, Thomas van Aquinostraat 4, 6525 GD Nijmegen, The Netherlands (email: nancy.peeters@ru.nl).*

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Practitioner points

- A systematic review on the effectiveness of schema therapy for anxiety disorders, OCD, and PTSD.
- Preliminary but limited evidence that schema therapy leads to beneficial effects in disorder-specific symptoms.
- Preliminary but limited evidence that schema therapy leads to beneficial effects in early maladaptive schemas in anxiety, OCD, and PTSD.
- More research of higher methodological quality is needed to provide more conclusive empirical support for the use of schema therapy for anxiety, OCD, and PTSD.

Anxiety disorders, obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD) have lifetime prevalences of 28.8%, 1.6%, and 6.8%, respectively (Kessler et al., 2005) and are associated with a negative impact on quality of life (Olatunji, Cisler, & Tolin, 2007). Cognitive behavioural therapy (CBT) is the most established evidence-based psychological treatment for anxiety, OCD, and PTSD and is considered as guideline treatment of choice (Clark, 2011; Clark & Beck, 2009). Nevertheless, approximately 50% of patients do not respond sufficiently to CBT (Loerinc et al., 2015), and CBT has an average dropout rate of 26.2% (Fernandez, Salem, Swift, & Ramtahal, 2015). In addition to CBT, eye movement desensitization and reprocessing (EMDR) has been recognized as a guideline treatment for PTSD (American Psychological Association, 2017). However, studies report an average dropout rate of 16.9% (Fernandez et al., 2015) and only moderate effect sizes for EMDR as well (Hedges's $g = -0.662$; Chen et al., 2014). For patients who do not recover with guideline treatments, a different approach is required yet currently lacking.

Over the last years, interest in schema therapy (ST) as a treatment for (chronic) anxiety disorders, OCD, and PTSD has increased. ST (Young, 1990, 1999) was originally developed to treat patients who were not adequately helped by CBT, such as patients with personality disorders or chronic psychological disorders. Young suggests that those patients are a poor fit for CBT, partly because of their difficulty in identifying, accessing, and changing their cognitions and emotions. ST integrates elements of different psychotherapeutic approaches into one treatment model. In contrast to CBT, ST focuses on the developmental origins of (chronic/severe) psychopathology, on entrenched patterns in social and psychological functioning, and on maladaptive cognitions and behaviours (Martin & Young, 2010).

Central to ST are the concepts early maladaptive schemas (EMS) and schema modes. EMS are self-defeating emotional and cognitive thinking patterns that develop early in life if children's basic emotional needs (e.g., safety and autonomy) are not met (Arntz et al., 2021; Young, Klosko, & Weishaar, 2003). Schema modes represent the active emotional and behavioural state of a person in response to EMS activation. In ST, patients learn to manage these modes by addressing the dysfunctional modes and strengthening the 'healthy adult' mode through experiential techniques such as imagery rescripting and chair work.

Given the effectiveness of ST for personality disorders (Jacob & Arntz, 2013), ST is also offered to patients with chronic psychological disorders with an unsatisfactory response to CBT. These patients might respond (better) to ST because it addresses maladaptive schemas that are thought to maintain their disorder (Dadomo et al., 2016; Hoffart, 2012). Three systematic reviews so far have examined the effectiveness of ST across psychological disorders, including anxiety disorders (Hawke & Provencher, 2011; Masley, Gillanders, Simpson, & Taylor, 2012; Taylor, Bee, & Haddock, 2017). However, these reviews covered studies only up to 2016, whereas interest in ST for chronic

psychological disorders has taken a flight since then. Furthermore, the review from Taylor et al., (2017) was restricted to studies including measures of both EMS and symptoms, thereby excluding studies about the effectiveness on symptoms only. Therefore, the current study aimed to systematically review the current evidence regarding the effectiveness of ST (or in combination with a guideline treatment) for anxiety disorders, OCD, and PTSD in terms of disorder-specific symptoms (primary objective) and EMS (secondary objective).

Methods

Protocol registration

A systematic review protocol was developed and registered within the International Prospective Register of Systematic Reviews (PROSPERO) in May 2020 (registration number CRD42020183325). This systematic review followed recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

Literature search

The first literature search was conducted on 6 May 2020. On 7 August 2020, 24 December 2020, and 2 April 2021, the search was updated. First, we searched PsycINFO, MEDLINE, EMBASE, WEB OF SCIENCE, and Academic Search Ultimate for reports on ST (or in combination with an evidence-based treatment) as an intervention for patients diagnosed with any anxiety disorder, OCD, and/or PTSD. Second, references of eligible studies and Google Scholar were checked to ensure literature saturation. All reports from first date available to 2 April 2021 were included.

To identify relevant studies, we conducted a broad multi-purpose search that included the keywords ('schema therap*' or 'schema group therap*' or 'schema mode therap*' or 'schema focused' or 'Young's model') and ('anxiety disorder*' or 'anxiety-related disorder*' or 'agoraphobia' or 'health anxiety' or 'phobi*' or 'panic disorder' or 'obsessive compulsive disorder' or 'OCD' or 'posttraumatic stress' or 'post traumatic stress' or 'PTSD' or 'hypochondria' or 'axis 1'). The keywords were adopted for use in each database. No further restrictions were set.

Selection of studies

Reports meeting the following criteria were included in the review:

Study design

Intervention studies of all design types (e.g., randomized controlled trials (RCTs), controlled trials (CT), uncontrolled trials (UT), and case series) were included. Individual case studies were excluded due to higher potential of biases (Willis, 2014).

Participants

Patients with an anxiety disorder, OCD, and/or PTSD diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders (DSM 5, IV-(TR) or III (R) edition;

depending on year of publication) were included. Studies with participants younger than 18 years old were excluded. Comorbidity was not an exclusion criterion. Studies including samples with mixed mental health disorders were only included when data for anxiety disorders, OCD, and/or PTSD samples were specifically reported.

Interventions

Studies examining ST (or in combination with a guideline treatment) were included. There were no restrictions set on the number of sessions or therapeutic format (e.g., individual or group format, in-, or outpatient setting).

Outcomes

Primary outcomes required were (1) changes in anxiety, OCD, and/or PTSD symptoms and, if available, corresponding effect size, and (2) changes in anxiety, OCD, and/or PTSD status of diagnosis according to the DSM (5, IV-(TR) or III-(R) edition; depending on year of publication). Studies were only eligible if at least one of the primary outcomes (change in symptom level or status of diagnosis) was reported. The secondary outcome (not required for inclusion) was changes in EMS. For all outcomes, we discriminated between immediate treatment response and long-term treatment effects. There were no restrictions set by timing of assessments.

Language

For practical reasons, only full-text articles reported in English or Dutch language were included.

For each article yielded by the search, references and abstracts were imported into Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia, www.covidence.org), and duplicates were removed. The first and last author independently screened the titles and abstracts according to the inclusion criteria (see below). Then, full texts of articles including potentially relevant studies were reviewed by the same authors. Disagreement was resolved through discussion. Where necessary and possible, additional information was requested from study authors. Information was regarded as missing after three reminders in case of no response to our query. If primary outcome data was missing/incomplete, studies were excluded.

Data extraction

The first and last author independently extracted data from the selected studies using a devised data extraction form in Covidence. Data extraction included country of origin, year of publication, clinical group, number of participants, age, gender, assessment points, intervention groups, control group, number of sessions, duration of treatment, and pre-, post-and follow-up treatment results regarding reported outcomes of interest. In addition, pre-intervention and post-intervention means, standard deviations, and sample sizes for all therapy conditions were extracted. Any discrepancies in extracted data were resolved through discussion.

Effect size calculation

We computed uncontrolled and controlled Cohen's *d* effect sizes of the effect of ST on anxiety, OCD, and/or PTSD symptoms. Uncontrolled Cohen's *d* effect sizes were calculated by dividing the mean difference between pre- and post-measurement by the pooled standard deviation. Because correlations between pre- and post-measurement scores were not reported, we used a fixed value of $r = .50$. Controlled effect sizes were calculated by dividing mean differences between the post-measurement of experimental and control group by the pooled standard deviation. For each study, we first calculated the effect sizes for all reported primary outcome measures individually and then calculated the mean of these effect sizes. Cohen's *d* values are interpreted as small (0.2), medium (0.5), or large (0.8) (Cohen, 1988).

Quality assessment

Methodological quality of selected studies was evaluated according to the Psychotherapy Outcome study Methodology Rating Form (POMRF; Öst, 2008). This rating form is designed for reviews considering psychotherapy studies with variable research designs (Sloan et al., 2017). The POMRF consists of 22 items assessing methodological elements (e.g., research design). Each item is scored 0 (poor), 1 (fair), or 2 (good). Item 2 (severity/chronicity of the disorder) and item 8 (assessor training) were considered irrelevant to the current review and were disregarded in the assessment. Total scores ranged from 0 to 40, with higher scores indicating higher quality.

Quality assessment of all included studies was conducted independently by the first and last author with an inter-rater reliability of $k = 0.82$, $p < .001$, 95% CI [0.73, 0.91]. Discrepancies were resolved through discussion.

Results

Selection of studies

Searches of PsycINFO, MEDLINE, EMBASE, WEB OF SCIENCE, and Academic Search Ultimate identified 103, 33, 66, 80, and 59 articles, respectively, with an additional 32 records identified from reference lists and Google Scholar search. Of the 373 articles found, 183 duplicates were removed, leaving 190 unique articles for further consideration. Of these, 149 were excluded based on the information in the title and abstract. Forty-one full-text articles were retrieved and reviewed in detail. Ultimately, six studies satisfied all eligibility criteria for inclusion. Figure 1 provides a flow chart of the study selection process, including reasons for exclusion. Two of the included papers contained overlapping samples, as the sample assessed in Hoffart, Versland, and Sexton (2002) constitutes a sub-sample of the patients assessed in Gude's , Monsen, and Hoffart (2001) study. Because the papers reported different outcome measures, we included both in our review.

Study characteristics

Table 1 outlines the characteristics of the included studies. The six studies that were included had a total of $n = 316$ participants. The number of participants per study ranged from 10 to 181 ($M = 52.67$; $SD = 64.18$). In total, two studies included patients with a diagnosis of panic disorder and/or agoraphobia (Gude et al., 2001; Hoffart et al., 2002),

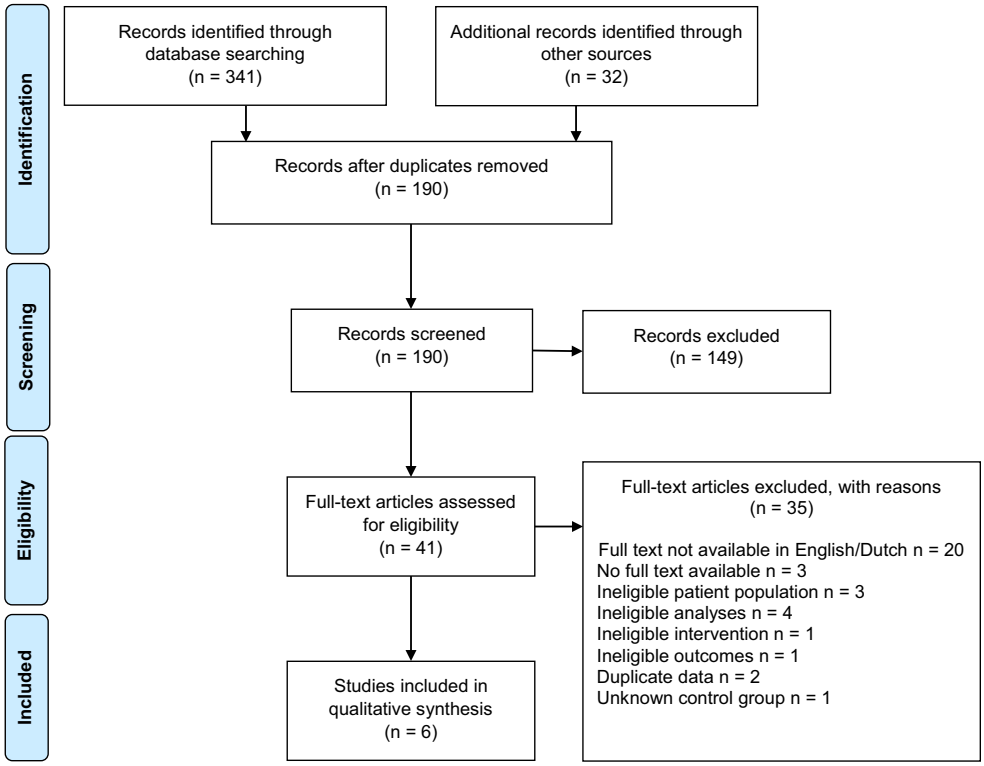

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram for studies examining schema therapy (stand-alone or in combination with a guideline treatment) for treating patients with anxiety disorders, OCD, or PTSD.

one study included patients with a diagnosis of generalized anxiety disorder (Mohammadi & Moradi, 2016), one study included patients with a diagnosis of OCD (Thiel et al., 2016), and two studies included patients with a diagnosis of PTSD (Cockram, Drummond, & Lee, 2010; Tapia et al., 2017). Below, we report the findings split by clinical population.

Panic disorder and/or agoraphobia

Gude et al., (2001) investigated the effectiveness of a treatment program combining cognitive therapy with ST. Participants were 47 (25 women; age M = 40.9 years, SD = 8.7 years) panic disorder and/or agoraphobia patients with cluster C personality traits. The first 5-week phase was based on the cognitive model of panic and agoraphobia (Clark et al., 1994) and aimed to reduce cognitive and behavioural avoidance and increase awareness of catastrophic fears and symptom-related behaviours. In daily group sessions, patients received information about this cognitive model and were challenged through behaviour experiments. The second phase was a 6-week personality-focused treatment program based on Young's (1990) schema-focused approach. This phase consisted of eight group sessions and nine/10 individual sessions, aimed at changing maladaptive schemas and affective avoidance. EMSs were activated and challenged by imagery

Table 1. Characteristics of the included studies

Study (country)	Disorder	*n*	Intervention	Control	Assessment moments	Outcome measures
Gude et al., (2001) (Norway)	Panic disorder and/or agoraphobia + Cluster C personality traits	45	Cognitive therapy + ST	N/A	Pre-treatment Mid-treatment Post-treatment Follow-up (12 months)	MI
Hoffart et al., (2002) (Norway)	Panic disorder and/or agoraphobia + Cluster C personality traits	35	Cognitive therapy + ST	N/A	Evaluation Pre-treatment Mid-treatment Post-treatment Follow-up (12 months)	MI-ACC, MI-AAL, PRS-F, PRS-PD, PRS-AD, ACQ, BSQ, STAI-Y1, STAI-Y2, SQ
Cockram et al., (2010) (Australia)	PTSD	181 I = 54 C = 127	ST	TCBT	Pre-treatment Post-treatment[a] Follow-up (3 months)	YSQ, PCL-M, HADS (anxiety scale)
Mohammadi and Moradi (2016) (Iran)	GAD	30 I1 = 10 I2 = 10 C = 10	I1 = ST I2 = NLP	NT	Pre-treatment Post-treatment	GAD-7
Thiel et al., (2016) (Germany)	OCD	10	ST + ERP	N/A	Pre-treatment Post-treatment Follow-up (6 months)	Y-BOCS, OCI-R
Tapia et al., (2017) (France)	PTSD + SUD	15	TAU + ST + EMDR	N/A	Pre-treatment Mid-treatment (4 months) Post-treatment (8 months) Follow-up (12 months)	PCL-S, YSQ-S2

Note. ST = Schema Therapy; N/A = Not applicable; MI = Mobility Inventory; MI-ACC = Mobility Inventory (accompanied); MI-AAL = Mobility Inventory (alone); PRS-F = Panic Rating Scale (frequency); PRS-PD = Panic Rating Scale (panic disability); PRS-AD = Panic Rating Scale (avoidance disability); ACQ = Agoraphobic Cognitions Questionnaire; BSQ = Body Sensations Questionnaire; STAI-Y1 = State-Trait Anxiety Inventory (state); STAY-Y2 = State-Trait Anxiety Inventory (trait); SQ = Schema Questionnaire; PTSD = Posttraumatic Stress Disorder; I = intervention; C = Control; TCBT = Traditional Cognitive Behavioural Therapy; YSQ = Young Schema Questionnaire; PCL-M = PTSD Checklist Military; HADS = Hospital Anxiety and Depression Scale; GAD = Generalized Anxiety Disorder; NLP = Neural-linguistic Programming; NT = No Therapy; GAD-7 = Generalized Anxiety Disorder −7; OCD = Obsessive-Compulsive Disorder; ERP = Exposure and Response Prevention; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale 7; OCI-R = Obsessive-Compulsive Inventory-revised; SUD = Substance Use Disorder; TAU = Treatment As Usual; EMDR = Eye Movement Desensitization and Reprocessing; PCL-S = PTSD Checklist Specific; YSQ-S2 = Young Schema Questionnaire-Short Form.

[a]Post-treatment assessment was only administered in the intervention group.

exercises and/or role play. During the 12–15 months follow-up period after discharge, patients received homework assignments related to schema work and behavioural experiments. Two patients dropped out during treatment, and one patient did not complete the follow-up assessment. All participants were assessed with the Mobility Inventory (Chambless, Caputo, Jasin, Gracely, & Williams, 1985) to measure agoraphobic avoidance at pre-, mid- (between phases 1 and 2), and post-treatment, and at 1-year follow-up. Results revealed that agoraphobic avoidance scores improved from pre- to mid-treatment and further from mid- to post-treatment. These gains were maintained at follow-up. The POMRF score of only 13 out of 40 relates to the absence of a control group and/or counterbalancing the order of the therapy phases, incomplete reporting about therapy/therapist quality, and incomplete reporting of statistical results (e.g., effect sizes were not reported).

Hoffart et al., (2002) more extensively investigated the effectiveness of the same treatment. Participants were 40 patients. Two patients dropped out from treatment, and three patients were excluded from the study. Remaining participants were 35 (28 women; age M = 40.1 years, SD = 9.5 years) panic disorder and/or agoraphobia patients with cluster C personality traits. All patients attended at least nine individual ST sessions. Participants were assessed twice before start of treatment (evaluation and pre-treatment), at mid-treatment (between phase 1 and 2), post-treatment, and 1-year follow-up. Measurements included measures of panic and agoraphobia symptoms (Mobility Inventory, Body Sensation Questionnaire (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984), Agoraphobic Cognitions Questionnaire (ACQ; Chambless et al., 1984), and Panic Rating Scale (Clark et al., 1994)), a general anxiety measure (State-Trait Anxiety Inventory; Spielberger, 1983), and a schema measure (Schema Questionnaire (SQ; Schmidt, Joiner, Young, & Telch, 1995)). Results showed that, on all measures, symptoms significantly decreased from pre- to post-treatment. On most of the panic/agoraphobia measures, the general anxiety measure, and the schema measure, significant reductions occurred during the schema-focused phase, but not during the symptom-focused phase. On the ACQ and the BSQ, significant reductions occurred in both phases. SQ scores further decreased during follow-up. For the remaining measures, gains were maintained at follow-up. The POMRF score of 20 out of 40 for this study relates to a reasonable level of generalizability of the findings. Compared to the study of Gude et al., (2001), this study included more outcome measures, was more specific about therapy/therapist quality, and was complete in reporting statistical results. This study lacked a control group and/or counterbalancing of the order of the phases.

Generalized anxiety disorder

Mohammadi and Moradi (2016) compared the effectiveness of ST to neuro-linguistic programming (NLP) and a non-intervention control group on generalized anxiety symptoms. Participants were 30 GAD patients (24 women; age M = 28.7 years). Participants were randomly assigned to one of the three conditions. In the ST condition, participants received ten 70-min sessions of ST. In the NLP condition, participants received eight 70-min sessions of neuro-linguistic training. In the control group, participants received no training at all. No dropouts were reported. All participants underwent pre- and post-treatment measurements on the Generalized Anxiety Disorder-7 questionnaire (Spitzer, Kroenke, Williams, & Löwe, 2006) to assess GAD symptoms severity. Results showed that, compared to the control condition, both ST and NLP conditions were effective in reducing generalized anxiety. At post-treatment, there were

no differences in generalized anxiety scores between the ST and NLP group. However, a POMRF of only 5 out of 40 was given as the article lacks a clear description of the sample (demographic information, inclusion/exclusion criteria) and intermediate or follow-up measurements. The initial diagnosis of participants and analyses were unclear, and treatments were not manual-based. Moreover, there are considerable doubts about the validity of the active control intervention (NLP). In scientific literature, NLP has repeatedly been stated as pseudoscience (Passmore & Rowson, 2019; Witkowski, 2010). Finally, contact hours in the ST group markedly differed from the NLP group.

Obsessive-compulsive disorder

Thiel et al., (2016) tested a 12-week inpatient treatment program augmenting exposure and response prevention with ST. Participants were 10 OCD patients (5 women; age M = 35.26 years, SD = 11.11 years). All patients were non-responders to at least one CBT treatment and first-line medication. The treatment program consisted of three phases of individual weekly sessions. The first 3-week introduction phase focused on case history and psychoeducation. In the second 6-week change phase, schema mode models were created, exposure was conducted, and ST techniques (chair work and imagery rescripting) were applied. The final 3-week phase focused on transferring learned skills to home environment, relapse prevention, organizing outpatient psychotherapy, and gradual termination. One patient dropped out during the study. At pre-treatment, post-treatment, and 6-month follow-up, participants completed the Yale-Brown Obsessive-Compulsive Scale 7 (Y-BOCS-7; Goodman et al., 1989) and the Obsessive-Compulsive Inventory-Revised (Gönner, Leonhart, & Ecker, 2008) to assess OCD severity. Patients significantly improved on both measures from pre- to post-treatment. These gains were maintained at follow-up. Based on the Y-BOCS scores, four of the 10 included patients fully responded and another two patients partially responded to the therapy. Despite the lack of a control group and small sample size, a POMRF of 22 out of 40 was given, suggesting a reasonable level of generalizability of the findings. Strengths of this study were clear descriptions of the sample and therapy/therapist quality and complete presentation of the statistical results. In addition, this was the only study that used/reported blind evaluators and assessed clinical significance. Lack of a control group was the main limitation.

Posttraumatic stress disorder

Tapia et al., (2017) examined the effectiveness of the combined use of schema therapy and EMDR in PTSD. Participants were 15 female patients (age M = 31.27 years, SD = 6.78 years) with substance use disorder and PTSD. In the first 4-month phase, patients received an introduction to ST and EMDR, and eight sessions of combined ST with EMDR focused on the trauma memory. In the second 4-month phase, patients received eight sessions of combined EMDR with ST focused on an addiction memory (e.g., memories of intoxication). Patients continued to receive treatment as usual during the treatment period for as long as required by their treating clinicians. No dropouts were reported. All participants underwent pre-, mid- (between phases 1 and 2), post-treatment, and 1-year follow-up assessments on the PTSD Checklist-Specific (Weathers, Litz, Herman, Huska, & Keane, 1993) and the Young Schema Questionnaire-Short Form 2 (Young, 1998) to assess PTSD severity and EMS, respectively. Results revealed that PTSD severity and EMS improved significantly during the first phase. During the second phase, changes in neither PTSD severity nor EMS reached significance. Gains in PTSD severity and EMS were

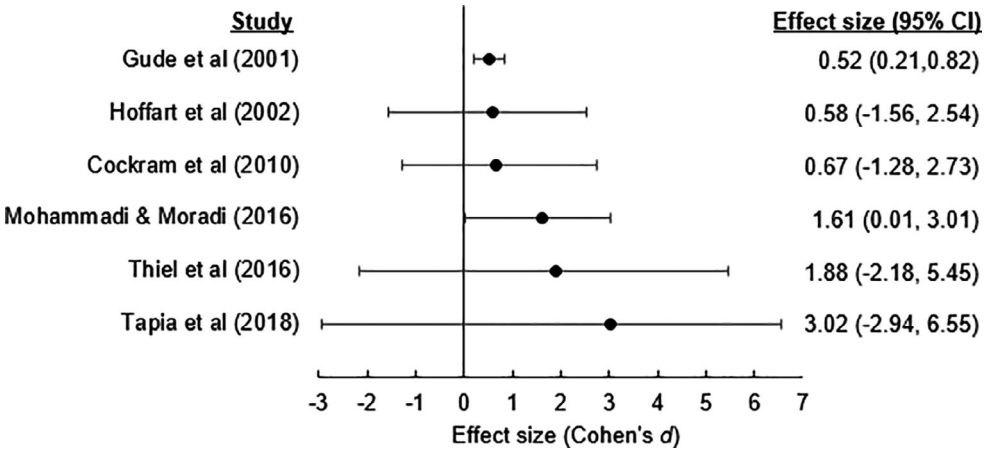

Figure 2. Uncontrolled Cohen's *d* effect sizes and corresponding 95% confidence intervals (pre- vs. post-treatment) for the effectiveness of schema therapy on primary outcome measures.

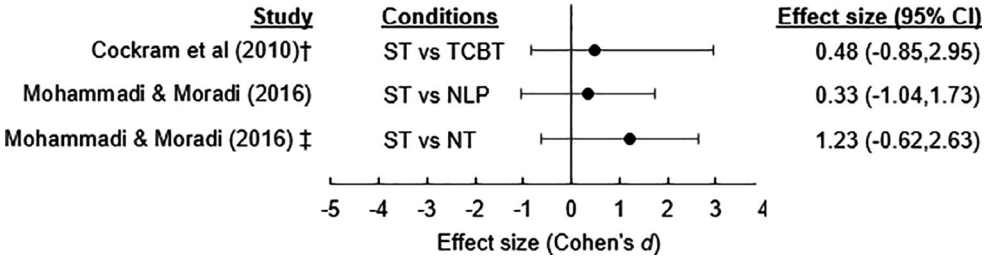

Figure 3. Controlled Cohen's *d* effect sizes and corresponding 95% confidence intervals (post-treatment) for the effectiveness of schema therapy compared to control conditions on primary outcome measures.*Note*: ST = Schema Therapy; TCBT = Traditional Cognitive Behavioural Therapy; NLP = Neural-linguistic Programming; NT = No Therapy. †There were no post-treatment outcomes reported for the TCBT condition. Therefore, the reported effect size is based on follow-up outcomes of both conditions. ‡The difference between the ST and NT condition was non-significant.

maintained at follow-up. The POMRF of only 10 out of 40 was related to a small sample size, lack of control group, unclear content description of the provided ST, and incomplete reporting of statistical quantities.

Cockram et al., (2010) compared the effectiveness of ST with traditional CBT (TCBT) in a historically controlled trial. Patients were 127 male veterans with PTSD. The TCBT group consisted solely of Vietnam veterans, the ST group consisted mainly of Vietnam veterans but also veterans from Sinai, Rwanda, Cambodia, East Timor, Bougainville, Afghanistan, and Iraq. Fifty-four patients (age $M = 52$ years, $SD = 11.1$ years) received ST in the years 2007 and 2008, and 127 patients (age $M = 52$ years, $SD = 6.0$ years) received TCBT in the years 1996–2002. Both therapies provided individual and group sessions. ST focused on how pre-war factors increased vulnerability to PTSD and how subsequent experiences maintained PTSD. Individual sessions consisted of imagery rescripting or imaginary exposure to negative memories related to schemas (either childhood or war-related). In group sessions, patients were informed about their primary schemas and their

maintenance by linking them to schema modes. TCBT focused on the two-factor theory (Mowrer, 1951) and the central role of avoidance in maintaining PTSD. Individual sessions consisted of exposure exercises that focused on trauma memories related to the war experiences. In group sessions, patients were taught to identify and correct inaccurate beliefs that lead to negative feelings and behaviours to reduce cognitive and behavioural avoidance and gain reflective self-awareness. In the ST group, 5 patients dropped out between post- and 3-month follow-up measurements. In the ST group, all participants underwent pre-, post-, and 3-month follow-up measurements on the PTSD Checklist Military (Forbes, Creamer, & Biddle, 2001), Young Schema Questionnaire (Young & Brown, 2003), and the Hospital Anxiety and Depression Scale, anxiety subscale (Zigmond & Snaith, 1983) to assess PTSD severity, EMS, and anxiety symptoms, respectively. Within the CBT group, the YSQ was not included, and outcome measures were collected at pre-treatment and 3-month follow-up only. Results revealed that, within both therapy groups, PTSD and anxiety symptoms decreased from pre-treatment to 3-months follow-up, with a greater decrease in the ST group than the TCBT group. In addition, in the ST group, 15 out of the 18 EMS decreased from pre- to post-measurement. Five EMS (self-sacrifice, unrelenting standards, insufficient self-control, approval-seeking, punitiveness) further decreased from post-treatment to follow-up, whereas changes in all other schema modes were maintained from post-measurement to follow-up. In total, 17 out of the 18 EMS reduced from pre-measurement to follow-up. The POMRF score of only 14 out of 40 for this study was related to a poor sample description, incomplete reporting about therapy/therapist quality, and the different assessment points between the groups.

Effect sizes

Included studies showed major clinical and methodological differences. Therefore, a meta-analysis was not appropriate (Cochrane, 2020), and we do not present a mean effect size across the studies. Calculated uncontrolled and controlled effect sizes (Cohen's *d*) per study are shown in Figures 2 and 3 for illustrative purposes.

Quality assessment

The quality assessment scores of the six included studies are presented in Table 2. Total quality scores ranged from 5 to 22 out of a total of 40 points (M = 14.00, SD = 6.29).

Analysing item scores across studies revealed that none of the included studies reported the use of a power analysis or described and performed a dropout analysis. All six studies used reliable and valid outcome measures with good psychometric properties.

Discussion

Over the last years, interest in ST has increased as an intervention for patients with chronic psychological disorders with an unsatisfactory response to CBT. These patients might respond (better) to ST because it addresses EMS that are thought to maintain their disorder. With this systematic review, we aimed to provide an overview of effectiveness studies on ST (or in combination with an evidence-based treatment) as an intervention for patients with an anxiety diagnosis, OCD, and/or PTSD in terms of disorder-specific symptoms and EMS. Six out of 190 studies met our inclusion criteria. All studies reported a reduction in anxiety, OCD, and/or PTSD symptoms from pre- to post-treatment. Two

Table 2. Quality Assessment Ratings of Included Studies (using POMRF)

	Gude et al., (2001)	Hoffart et al., (2002)	Cockram et al., (2010)	Mohammadi and Moradi (2016)	Thiel et al., (2016)	Tapia et al., (2017)
Clarity sample description	2	2	0	0	2	1
Representativeness sample	2	2	1	0	2	1
Reliability diagnosis in question	2	2	2	0	1	1
Specificity outcome measures	1	2	2	1	2	2
Reliability/validity outcome measures	2	2	2	2	2	2
Use of blind evaluators	0	0	0	0	2	0
Assignment to treatment	0	0	0	1	0	0
Design	0	0	2	1	0	0
Power analysis	0	0	0	0	0	0
Assessment points	2	2	1	0	1	2
Manualized, replicable, specific treatment programs	1	1	2	0	1	0
Number of therapists	0	1	0	0	1	0
Therapist training/experience	0	1	0	0	2	0
Checks treatment adherence	0	1	0	0	0	0
Checks therapist competence	0	1	0	0	1	0
Control concomitant treatments	0	1	0	0	1	0
Handling attrition	0	0	0	0	0	0
Statistical analyses / presentation results	1	2	2	0	2	1
Clinical significance	0	0	0	0	2	0
Equality therapy hours	N/A	N/A	0	0	N/A	N/A
Total POMRF score	13	20	14	5	22	10

Note. POMRF = Psychotherapy Outcome study Methodology Rating Form; 0 = Poor, 1 = Fair, 2 = Good; N/A = Not applicable.

studies included a control group and reported that ST was more effective than CBT or no therapy. Three studies included EMS measurements, and all reported a decline in EMS after ST. As most studies did not perform analyses on clinical significance, we cannot conclude whether these results are clinically meaningful.

Uncontrolled effect sizes from pre- to post-treatment ranged from medium to large. Controlled effect sizes of ST ranged from small to large. However, it should be noted that the confidence intervals of the effect sizes were wide. Also, uncontrolled effect sizes have a high chance of bias, as they can be influenced by uncontrolled variables unrelated to the intervention (e.g., natural recovery; Cuijpers, Weitz, Cristea, & Twisk, 2017).

The mean total POMRF score of the included studies was 14. This is well below the average POMRF score of 19.6 reported in third-wave studies and the average POMRF score of 27.8 reported in CBT studies (Öst, 2008). This implies a poor methodological quality of the published studies on the effect of ST on anxiety, OCD, and PTSD.

Limitations

Despite lenient inclusion and exclusion criteria, we only identified six relevant studies. Additionally, the overall quality of these studies was low. These significant methodological limitations and the small number of published papers seriously impair our conclusions.

Regarding the quality assessment, there is currently no agreed-upon golden standard for psychotherapy studies. Although POMRF is suitable for psychotherapy studies with variable research designs (Sloan et al., 2017), there are no established cut-off scores for methodological quality assessment. In the current review, the exclusion of two low-quality studies (i.e., Mohammadi & Moradi, 2016 and Tapia et al., 2017) would not have changed the direction of our conclusions. However, these low-quality studies showed relatively large effect sizes, possibly due to their methodological limitations, and the overall effectiveness of schema therapy may thereby appear inflated. The POMRF does indeed not assess all key methodological issues (Atkins et al., 2017). Therefore, future studies may consider supplementing the POMRF with, for example, quality items rated as 'absolutely indispensable in psychotherapy outcome studies' (such as 'Problem/research question being clearly stated) as formulated by Liebherz, Schmidt, and Rabung (2016)[1].

This systematic review also has several strengths. Due to the lenient methodological inclusion and exclusion criteria, we were able to provide an up-to-date and inclusive overview of all studies published in this research area. Also, the protocol was preregistered, and the systematic review closely adheres to the PRISMA Guidelines for high reporting standards.

Research agenda

Our review identified mostly small naturalistic studies, which provided preliminary evidence, or 'proof-of-concept', of the potential of ST for anxiety, OCD, and PTSD. To make more conclusive statements, well-controlled and well-powered studies are required as a next step.

First, future studies could consider including an active control group within a randomized controlled trial (RCT). Interesting for ST specifically would be the

[1] *We thank the anonymous reviewer for this suggestion.*

comparison with CBT or another active guideline evidence-based treatment. In addition, researchers may consider alternative designs that are more suited to assess process variables to evaluate possible working mechanisms of ST (e.g., targeting schema modes or information processing biases). For example, multiple baseline designs allow for more in-depth information about the relationship between the independent and dependent variables (Hawkins, Sanson-Fisher, Shakeshaft, D'Este, & Green, 2007). Using a Bayesian approach, a 'leapfrog' design can be used when researchers want to accelerate developments or optimize psychological treatments (for details, see Blackwell, Woud, Margraf, & Schönbrodt, 2019). These alternative designs generally require a smaller sample size that makes research in specific clinical populations more feasible.

Second, valid and reliable outcome measures are of the utmost importance to ensure quality of the data as well as comparability among studies. To be able to compare symptoms in mixed diagnostic samples (e.g., different anxiety disorders), we recommend assessing general functioning, for example, with the Outcome Questionnaire-45 (Lambert et al., 1996), the Brief Symptom Inventory (Derogatis & Spencer, 1983), or the Symptom Checklist-90 (Derogatis, 1977). To assess disorder-specific symptoms for anxiety, OCD, or PTSD, we recommend measures such as the Panic Disorder Severity Scale (Houck, Spiegel, Shear, & Rucci, 2002), Liebowitz Social Anxiety Scale (Liebowitz, 1987), Yale-Brown Obsessive-Compulsive Scale (Goodman et al., 1989), and the Posttraumatic Symptom Scale (Foa, Cashman, Jaycox, & Perry, 1997). Studies on ST preferably include measures to assess changes in schemas and schema modes, such as the Schema Mode Inventory (Young et al., 2007) and the Young Schema Questionnaire (Young, 1990).

Third, assessment points should be well-considered. Patients should preferably be assessed before and after the treatment and after a follow-up period to verify long-term sustained outcomes and relapse rates. Of the included studies, five out of the six studies included three assessment points, although the timing of the follow-up period varied from 3 to 12 months. In line with POMRF, a follow-up period of at least 1 year after treatment termination is recommended for future research (also, see Levy, O'Bryan, & Tolin, 2021). We also recommend intermediate measurements to assess mediation effects of theoretical working mechanisms (such as schema modes) of ST.

Fourth, studies should be sufficiently powered by a priori power calculations, as small sample sizes have the risk to be underpowered to detect differences. Power analyses for individual comparisons can be performed by a power-analysis software, such as G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). For multiple-baseline studies, we refer to Ferron and Sentovich (2002) for an overview of the power required for randomization tests for multiple-baseline designs. For leapfrog designs, a Bayes Factor Design Analysis package is available (Blackwell et al., 2019; Schönbrodt & Stefan, 2019).

Fifth, analyses should be carefully evaluated and presented. In this review, 50% of the studies did not perform adequate statistical analyses and/or did not present all relevant results. Furthermore, only one study reported analyses of clinical significance, while most reported all parameters needed to calculate this important measure of efficacy. Including clinical significance will increase the quality and impact of effectiveness studies.

Sixth, to ensure quality of the intervention under scrutiny, therapists providing the treatment in the study would preferably have completed an accredited ST training. Also, the validity of the provided ST during the study should be assessed in regular supervision sessions throughout the study and with each session by compliance checklists for both client and therapist.

In addition to methodological improvements, it will also be essential to adhere high-quality standards of scientific reporting. The quality assessment revealed that several

aspects (e.g., therapy/therapist quality) were inadequately reported. This is problematic as the quality of poorly reported studies might be underestimated because some procedures were not adequately described rather than not performed. Online supplementary files may be useful for this and are offered by several journals. In addition, we fully appreciate that clinical studies require much time, effort, and funding. Therefore, we encourage a detailed pre-registration or study protocol publication with peer review to support adequate reporting and transparency before start of data collection. This will also reduce publication bias and improve reproducibility.

Last, a challenge for ST research is that, although it is a structured and phased therapy, it cannot be protocolized as strictly as, for example, CBT. This means that ST can be delivered in different forms, varying in frequency, intensity, group composition, and techniques. Research is needed to investigate different elements within ST separately in dismantling studies and lab models for experimental research to gain insight into the working mechanisms of ST.

Also, due to these methodological differences in ST application, findings are more difficult to generalize. It is therefore especially important that studies use and cite published manuals or add a supplement containing treatment protocol details. This will boost the feasibility of replication and clinical implementation.

Conclusion

Taken together, this systematic review provides preliminary evidence that ST may lead to beneficial effects in disorder-specific symptoms and EMS in patients with anxiety disorders, OCD, or PTSD. However, it also showed that there were serious methodological shortcomings in current studies. We, therefore, provided a research agenda that will hopefully help push forward the research on ST effectiveness for anxiety, OCD, and PTSD.

Conflicts of interest

All authors declare no conflict of interest.

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Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study. Data sharing is not applicable to this article as no new data were created or analysed in this study.

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