

The efficacy of short-term psychodynamic psychotherapy for depression: A meta-analysis update



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HIGHLIGHTS

- Short-term psychodynamic psychotherapy (STPP) is a treatment for depression.
- STPP results in symptom reduction and function improvement during treatment.
- These gains are either maintained or further improved at follow-up.
- STPP is efficacious when compared to control conditions.
- Individual STPP does not differ from other psychotherapies on depression outcomes.

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ABSTRACT

Objectives: The efficacy of short-term psychodynamic psychotherapy (STPP) for depression is debated. Recently, a number of large-scale and high-quality studies have been conducted. We examined the efficacy of STPP by updating our 2010 meta-analysis.
Results: After a thorough literature search, 54 studies (33 randomized clinical trials) totaling 3946 subjects were included. STPP was significantly more effective than control conditions at post-treatment on depression, general psychopathology and quality of life measures ($d = 0.49$ to 0.69). STPP pre-treatment to post-treatment changes ($d = 0.57$ to 1.18) indicated significant improvements on all outcome measures, which either significantly improved further ($d = 0.20$ to 1.04) or were maintained from post-treatment to follow-up. No significant differences were found between individual STPP and other psychotherapies at post-treatment ($d = -0.14$) and follow-up ($d = -0.06$) in analyses that were adequately powered to detect a clinically relevant difference. STPP was significantly more efficacious than other psychotherapies on anxiety measures at both post-treatment ($d = 0.35$) and follow-up ($d = 0.76$).
Conclusion: We found clear indications that STPP is effective in the treatment of depression in adults. Although more high-quality studies are needed, particularly to assess the efficacy of STPP compared to control conditions at follow-up and to antidepressants, these findings add to the evidence-base of STPP for depression.

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Contents

1. Introduction ¹	2
2. Methods	3
2.1. Protocol registration	3
2.2. Search strategy	3

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2.3.	Selection of studies	3
2.4.	Data-extraction.	3
2.5.	Meta-analyses	3
2.6.	Moderation analyses	4
2.6.1.	Participant characteristics	4
2.6.2.	STPP characteristics.	5
2.6.3.	Study quality characteristics.	5
3.	Results	5
3.1.	Inclusion of studies	5
3.2.	Study characteristics	5
3.3.	Study quality.	6
3.4.	STPP versus control conditions	6
3.5.	STPP pre- to post-treatment change	9
3.6.	STPP post-treatment to follow-up change	10
3.7.	STPP versus other psychotherapies at post-treatment	11
3.8.	STPP versus other psychotherapies at follow-up	11
3.9.	STPP versus antidepressant medication	12
3.10.	STPP + antidepressant medication versus another psychotherapy + antidepressant medication	12
3.11.	Publication bias analyses	12
4.	Discussion	12
4.1.	Findings	12
4.2.	Strengths and limitations	13
4.3.	Clinical and research implications	13
5.	Conclusion	14
	Role of the funding sources	14
	Contributors	14
	Conflicts of interest statement	14
	Acknowledgments	14
	Appendix A, B and C. Supplementary data	14
	References.	14

1. Introduction¹

Affecting more than 150 million people worldwide (World Health Organization, 2003), depression is a highly prevalent and disabling disorder associated with major personal and societal costs (Kessler, 2012). Major depression is the fourth leading cause of disease burden worldwide and it is expected to rank first in high-income countries by the year 2030 (Mathers & Loncar, 2006). Given the tremendous disease burden, there is a high need for effective and efficient treatments for depression. Antidepressant medications and different psychological therapies constitute the predominant treatments for depressive disorders (Marcus & Olfson, 2010). Short-term psychodynamic psychotherapy (STPP) is one of the oldest psychological treatments for depression and has been used to treat this condition for decades.

STPP refers to a family of treatments that share the common feature of being rooted in psychoanalytical theories, such as drive psychology, ego psychology, object relations psychology and attachment theory. Psychodynamic approaches to the treatment of depression focus on the patient's internal world, emphasizing "how (unconscious) motivational factors lead the patient to (mis)perceive and (mis)interpret external reality and experiences and to create, unwillingly, problems that maintain depressive symptoms, particularly in interpersonal relationships" (Luyten & Blatt, 2012; p. 113). Psychodynamic approaches to the treatment of depression are more person- than disorder-centered. In changing attitudes and feelings in the present, they emphasize the importance of a developmental perspective as well as the role of insight into the past (Luyten & Blatt, 2012).

Although STPP is a time-honored treatment for depression, its efficacy in this regard has not been studied as extensively as the efficacy of other psychotherapies, such as cognitive behavioral therapy (e.g., Cuijpers, van Straten, Andersson, & van Oppen, 2008; Thase, 2013). This is reflected in treatment guidelines, which typically have

not considered STPP a first-choice treatment for depression (e.g., American Psychiatric Association, 2010; National Institute for Health and Clinical Excellence, 2009). Relatedly, Connolly-Gibbons, Crits-Christoph, and Hearon (2008) argued that STPP for depression does not meet the criteria for empirically supported psychological treatments formulated by Chambless and Hollon (1998), due to different STPP types studied and the methodological quality of studies.

In 2010, we conducted a meta-analysis in order to summarize the available literature examining the efficacy of STPP for depression (Driessen et al., 2010). This meta-analysis included 23 studies totaling 1365 subjects. STPP was found to be significantly more effective than control conditions at post-treatment ($d = 0.69$). STPP pre-treatment to post-treatment effect size ($d = 1.34$) indicated a significant symptom improvement that was maintained until 1-year follow-up. Comparing (group and individual) STPP to other psychotherapies, a small but significant effect size ($d = -0.30$) was found, indicating the superiority of other treatments over STPP immediately post-treatment, but no significant differences were found at follow-up. Studies examining individual STPP ($d = 1.48$) found larger pre- to post-treatment effect sizes than studies examining group STPP ($d = 0.83$), and no significant differences were found between individual STPP and other individual psychotherapies at post-treatment and follow-up (Abbass & Driessen, 2010). These findings indicated that STPP is effective in the treatment of depression in adults and added to the evidence-base of STPP for depression (Driessen et al., 2010). However, these results must be interpreted with caution, bearing in mind the limitations of the body of literature that was reviewed. First, the quality of the included studies was highly variable. Only 13 of the 23 included studies were randomized clinical trials and various studies lacked quality standards or had a small sample. Secondly, this meta-analysis used depression level as the sole outcome measure. Reliable effect sizes could not be computed for other outcome measures due to the diverse use of these measures in the primary studies, but examining the efficacy of STPP on additional outcome measures (e.g., interpersonal functioning, personality functioning, general psychopathology, and quality of life) would be desirable as these are also important aspects of patient functioning (Driessen et al., 2010).

¹ STPP = short-term psychodynamic psychotherapy.

Since the publication of the abovementioned meta-analysis, a number of relative large-scale and high-quality studies have been conducted (e.g., Barber, Barrett, Gallop, Rynn, & Rickels, 2012; Driessen et al., 2013). Adding these studies to the meta-analysis described above would augment the patient sample size, increase the precision of the effect size estimates and possibly change the pattern of results. Moreover, the increased number of studies would facilitate both the power of moderator analyses and the examination of outcome measures other than depression. Since the publication of the abovementioned meta-analysis, other reviews concerning STPP have been published too, most notably by Abbass et al. (2014) and Barber, Muran, McCarthy, and Keefe (2013). Abbass et al. (2014) have updated their Cochrane Review of STPP for common mental disorders, including five studies focusing on depression specifically, but their review is restricted to comparisons of STPP with control conditions. Barber and colleagues' meta-analysis compared STPP to control and active treatment conditions. Yet in this last meta-analysis depression was used as the sole outcome measure and some of the more recent large studies (e.g., Beutel et al., 2014; Driessen et al., 2013) were not included (Barber et al., 2013).

We therefore decided to update the abovementioned meta-analysis (Driessen et al., 2010). We aimed to examine the efficacy of STPP for depression by means of computing STPP pre- to post-treatment and post-treatment to follow-up effect sizes, and by means of comparing STPP with control conditions and alternative treatments at post-treatment and follow-up. We also performed moderator analyses to examine the association between effect size on the one hand and participant, intervention, and study quality characteristics on the other hand. The present review adds to the available body of evidence by not focusing on a specific comparison of STPP with another condition only, but aiming to examine all aspects of STPP efficacy on multiple outcome measures.

2. Methods

2.1. Protocol registration

The protocol for this meta-analysis update was registered in the PROSPERO International prospective register of systematic reviews before the screening of search results against the eligibility criteria started (CRD42014005894; Driessen et al., 2014).

2.2. Search strategy

We used an extensive search strategy including six different search methods in order to retrieve as many relevant studies as possible. The searches were performed in March 2014. First, we searched the electronic databases PubMed, PsychINFO, Embase.com, Web of Science (SSCI) and Cochrane's Central Register of Controlled Trials (CENTRAL). Search terms included a wide range of synonyms, both in MeSH or index terms and text words, for 1) psychodynamic psychotherapy (e.g., psychotherapy, psychoanalytic [Mesh]), 2) therapy (e.g., psychotherapy), 3) psychodynamic (e.g., insight*), and 4) depression (e.g., depressive disorder). These four sets of search terms were combined as follows: (#1 OR (#2 AND #3)) AND #4. The complete search terms are available on request from the corresponding author. No language or date restrictions were applied in the searches. After induplication with the other databases, this search resulted in 11,490 hits (PubMed 1877; PsychINFO 1854; Embase.com 3599; Web of Science (SSCI) 3675; CENTRAL 485). After induplication with the search for the previous meta-analysis, 4280 hits remained for further screening.

Second, in order to identify relevant studies from the so-called 'gray literature', we searched GLIN, a Dutch electronic database for gray literature (0 hits) and UMI database ProQuest for digital dissertations (102 hits). Third, prospective trial registers were searched for unpublished ongoing research (<http://www.controlled-trials.com>; 49 hits). The gray literature and prospective trial register searches were conducted

using the search strategy described above. Fourth, we searched an internet database of controlled and comparative outcome studies on psychological treatments of depression (<http://www.psychotherapytrials.org>; Cuijpers, van Straten, Warmerdam, & Andersson, 2008) for studies examining STPP. This resulted in 23 hits. Fifth, 19 reviews and meta-analyses concerning the efficacy of psychodynamic treatments for depression or psychiatric disorders in general were retrieved when screening the 4280 references resulting from the first search method. Three additional reviews were known to the authors. We screened these 22 reviews and meta-analyses for studies that were not located by means of the other search methods. This resulted in 10 additional potentially relevant papers. Sixth, we contacted an email list of researchers in the field of psychodynamic therapy to ask for ongoing or unpublished studies. This did not result in additional unidentified studies.

2.3. Selection of studies

We included studies if they reported (a) outcomes on standardized measurements of (b) depressed (c) adult patients (d) receiving STPP. Participants were considered depressed if they met specified criteria for major depressive disorder or another mood disorder, or if they presented an elevated score on a standardized measure of depression. Participants had to be at least 18 years old, and studies concerning older adults (mean age > 55) were included as well. We included studies in which STPP (a) was based on psychoanalytic theories and practices, (b) was time-limited from the onset (i.e. not a therapy that was brief only in retrospect), and (c) applied verbal techniques (e.g., therapies applying art as expression form were not considered STPP). Studies assessing the efficacy of Interpersonal Psychotherapy (IPT) were excluded, as IPT was not regarded as a psychodynamic psychotherapy by the founders of this treatment method (Klerman, Weissman, Rounsaville, & Chevron, 1984; Klerman & Weissman, 1987). Studies had to include at least 10 subjects. Case studies were therefore excluded. We also included naturalistic studies with a heterogeneous study sample, if those studies included more than 10 participants diagnosed as depressed. For these studies the authors were contacted with a request for subgroup data.

The screening process consisted of three phases. At first, the selection criteria were applied to the citations generated from the searches independently by two raters (ED and LMH). Disagreements were discussed and resolved in consensus. Unless they could be definitely excluded, titles identified as potentially relevant were requested in full text. During the second screening phase, two independent raters (ED and LMH) applied the selection criteria to the full-text papers. Disagreements were discussed and resolved in consensus. During the third phase, the included papers were checked by two of four authors (AAA, JPB, JJMD, HLV) to confirm that the therapy examined met the criteria for STPP. Again, disagreements were discussed and resolved in consensus. When disagreements could not be resolved in this way, a third author was consulted.

2.4. Data-extraction

Two raters (ED and LMH) independently extracted effect size data and the study characteristics described below from the included papers. Boolean formulas in Excel were used to compare and flag any mismatches between the two sets of data-extractions. Discrepancies were resolved in consensus after checking the full-text papers. When discrepancies could not be resolved in this way, a third author was consulted (PC).

2.5. Meta-analyses

We conducted different meta-analyses, assessing pre- to post-treatment change and post-treatment to follow-up change in the STPP conditions, and assessing comparisons of STPP with control conditions or alternative treatments at post-treatment and follow-up. Therefore,

different effect sizes (Cohen's *d*) were computed for each of the primary studies. If the treatment conditions included independent subgroups (for instance typical and atypical depressed participants), a single mean effect size from these different groups was computed for the study. Effect sizes of 0–0.32 are assumed to be small, whereas effect sizes of 0.33–0.55 and 0.56–1.2 are considered to be moderate and large, respectively (Lipsey & Wilson, 1993). We only conducted meta-analyses for comparisons including three or more studies.

With regard to within-group effect sizes (pre- to post-treatment and post-treatment to follow-up change in the STPP conditions), Cohen's *d* was preferably calculated using a paired group *t*-value or *p*-value in combination with (the difference between) pre- and post-treatment means and/or sample size. When this data was not reported, Cohen's *d* was calculated based upon a paired raw difference or Cohen's paired *d*, standard error and sample size. When this data was not reported, nor any other paired data that facilitated the calculation of an effect size, Cohen's *d* was calculated by subtracting the average post-treatment (or follow-up) score from the average pre-treatment (or post-treatment) score and dividing the result by the pooled standard deviations of both groups (Dunlop, Cortina, Vaslow, & Burke, 1996). When none of the abovementioned data was presented, the effect size could not be calculated and the study was excluded from the meta-analysis. All within-group effect sizes were coded in such a way that a positive sign indicated an increase in functioning (or decrease in symptom level) from pre- to post-treatment or from post-treatment to follow-up, while a negative sign indicated a decrease in functioning (or an increase in symptom level) from pre- to post-treatment or from post-treatment to follow-up. For the calculation of mean pooled within-group effect sizes in the STPP conditions, all studies were included regardless of study type (randomized clinical study, non-random comparative study, naturalistic study).

Concerning between-group effect sizes (STPP versus control conditions or alternative treatments at post-treatment and at follow-up), Cohen's *d* was preferably calculated by subtracting the average mean score in the alternative condition (at post-treatment or at follow-up) from the average mean score in the STPP condition (at post-treatment or at follow-up) and dividing the result by the pooled standard deviations of both conditions. When this data was not available, Cohen's *d* was calculated based upon event rates, differences in means, independent *t*-values or *p*-values, or reported standardized differences (in this order). When none of the abovementioned data was presented, the effect size could not be calculated and the study was excluded from the meta-analysis. All between-group effect sizes were coded in such a way that a positive sign indicated a superiority of STPP over the comparison condition, while a negative sign indicated a superiority of the comparison condition over STPP. We calculated between-group effect sizes using only randomized studies. For all between-group effect sizes, we reported the number needed to treat (NNT) in addition to Cohen's *d*, as this measure better reflects the clinical relevance of the results. The NNT is defined as the number of patients one would expect to treat with one treatment condition to have one more successful outcome than if the same number of patients were treated with the alternative treatment condition.

Effect size data were extracted for as many outcome measures as possible for a given study. Outcome measures were categorized as *Depression* (e.g., Hamilton Depression Rating Scale, Beck Depression Inventory [BDI]), *Anxiety* (e.g., Beck Anxiety Inventory, Brief Symptom Inventory – Anxiety subscale), *General Psychopathology* (e.g., Brief Symptom Inventory – Global Severity Index, Clinical Global Impression Scales), *Interpersonal functioning* (e.g., Inventory of Interpersonal Problems), *Cost-effectiveness*, *Personality* (e.g., NEO Five-factor Inventory), and *Other* (e.g., Self-esteem [Rosenberg Self-Esteem Scale], Quality of life [EuroQol]). Only instruments explicitly measuring these concepts were used in the calculation of effect sizes. If more than one outcome measure for a given category was used, a mean effect size from the different measures for that category was computed for the study.

To calculate the effect sizes per study and the mean pooled effect sizes, we used the computer program Comprehensive Meta-analysis (version 2.2.064; Biostat, Englewood, NJ, USA). As considerable heterogeneity of the included studies was expected, we computed the mean pooled effect sizes using the random effects model. As an indicator of homogeneity, we calculated the *Q*-statistic. A significant *Q*-value rejects the null hypothesis of homogeneity. We also calculated the *I*²-statistic, which is an indicator of heterogeneity in percentages. A value of 0% indicates no observed heterogeneity, and larger values show increasing heterogeneity, with 25% indicating low, 50% indicating moderate, and 75% indicating high heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003).

Because we expected a small number of studies in some of the meta-analyses, we conducted a power calculation to examine how many studies would have to be included in order to have sufficient statistical power to identify clinically significant between-group effects. We used the threshold for a clinically relevant effect that was estimated by Cuijpers, Turner, Koole, van Dijke, and Smit (2014) to be $d = 0.24$. We conducted a power calculation according to the procedures described by Borenstein, Hedges, Higgins, and Rothstein (2009). These calculations indicated that in order to find a significant effect of $d = 0.24$, we would need to include at least 12 studies with a mean sample size of 78 (39 participants per condition), conservatively assuming a medium level of between-study variance, τ^2 , a statistical power of 0.80, and a significance level, α , of 0.05. Alternatively, we would need 16 studies with a mean sample size of 58 participants (29 participants per condition) to detect an effect size of $d = 0.24$, 23 studies with 40 participants each (20 participants per condition), or 46 studies with 20 participants each (10 participants per condition). For the mean pooled between-group effect sizes calculated, we reported the average number of participants in the STPP and the comparison conditions. For meta-analyses that resulted in non-significant treatment differences, we compared the number of studies and the mean numbers of participants per condition to the abovementioned numbers as to determine whether the meta-analysis was adequately powered to detect a clinically relevant effect.

We tested for publication bias by means of Duval and Tweedie's trim and fill procedure (Duval & Tweedie, 2000; as implemented in Comprehensive Meta-analysis, version 2.2.064). This procedure yields an estimate of the effect size after publication bias has been taken into account, by calculating adjusted values of the mean pooled effect size and 95%-confidence interval. In this procedure, we used the random effects model too. We only conducted publication bias analyses for meta-analyses that were based on 10 or more studies.

2.6. Moderation analyses

Aiming to explain heterogeneity in the mean pooled effect sizes, we conducted moderation analyses for meta-analyses including at least 10 studies with significant heterogeneity. We conducted subgroup analyses for categorical moderation variables and meta-regression analyses for continuous moderation variables. Subgroup analyses were conducted using Comprehensive Meta-analysis (version 2.2.064), applying a fully random effects analysis and pooling study-to-study variance across subgroups, as is recommended when subgroups involve small numbers of studies (Borenstein et al., 2009; page 163). Meta-regression analyses were conducted using Comprehensive Meta-analysis (version 2.2.064), applying a mixed effects regression model (method of moments). We conducted moderation analyses for the following participant, STPP and study quality characteristics:

2.6.1. Participant characteristics

Subgroup analyses were conducted for the following participant characteristics:

- *Recruitment method*: community (recruiting participants from general community through local media announcements or flyers, with

participants taking the initiative to participate in the study), clinical (recruiting participants from general practice populations or outpatient samples, who actively sought help for depression first and were then asked to participate in the study) or others (for instance, systematic screening, recruiting participants from hospital populations, a combination of methods, or no recruitment method reported);

- *Depression diagnosis*: major depressive disorder, other or mixed mood disorders, or others (typically a high score on a standardized depression measure);
- *Target group*: adults, older adults (mean age > 55), student populations, women with post-partum depression, people with general medical disorders, or others.

Meta-regression analyses were conducted to assess whether *pre-treatment BDI-score*, *percentage of women*, and *mean age* (all in the STPP condition) were associated with effect size.

2.6.2. STPP characteristics

Subgroup analyses were conducted for the following STPP characteristics:

- *Intervention format*: individual, group, or bibliotherapy/online;
- *Supportive or expressive STPP mode*: With regard to the interventions used, various STPP types can be placed on a continuum between a purely 'expressive' and a purely 'supportive' pole (Luborsky, 1984). The more expressive therapies define the therapeutic relationship by its transference aspects and focus on interpreting conflicts concerning thrives and/or defenses that the patient uses to protect him-/herself against less conscious and anxiety provoking emotions and wishes. They emphasize insight as being curative and consider personality restructuring to be paramount. The more supportive therapies define the therapeutic relationship by its actual interpersonal aspects, rely heavily on a strong therapeutic alliance, and consider growth by focusing on ego functioning, self-esteem and self-acceptance to be paramount. It must be emphasized, however, that this distinction is a continuum and not a dichotomy. Most STPPs include both expressive and supportive interventions. However, the relative weight they place on either one of the poles merits the division into supportive and expressive therapy modes. Supportive or expressive STPP mode was rated by two of four authors (AAA, JPB, JJMD, HLV) by means of the abovementioned definitions. Disagreements were resolved in consensus. When disagreements could not be resolved a third author was consulted.
- *Emotion-focused or interpretive STPP mode*: STPP models differ with regard to the main expected therapeutic ingredients; i.e. some models assume that change happens through interpretation relatively independent of emotional experience, while other models always focus on a deep or new emotional experience during treatment in order to achieve change. With emotion-focused STPPs the main therapy factor is to mobilize (unconscious) emotions and work through these emotions by challenging the defenses against emotional experiencing. By contrast, the main therapy factor of interpretive STPP modes is the use of interpretation and insight building, i.e. making the patient more aware of the way he or she relates to others and to the therapist and how this is related to earlier experiences. Resistances are handled indirectly or bypassed by supportive techniques, as opposed to challenging them. We considered the Davanloo model (Davanloo, 1980) a prototype of emotion-focused STPP and we considered Malan's (1979) model as a prototype of primarily interpretive STPP. Luborsky's (1984) model was considered to be more in the interpretive representative. Emotion-focused or interpretive STPP was rated by two of four authors (AAA, JPB, JJMD, HLV) by means of the abovementioned definitions. Disagreements were resolved in consensus. When disagreements could not be resolved a third author was consulted.

Meta-regression analyses were conducted to assess whether *number of sessions* in the STPP condition was associated with effect size.

2.6.3. Study quality characteristics

Subgroup analyses were conducted for the following study quality characteristics:

- *Study type*: randomized clinical trial (RCT), non-random comparative study, or open study;
- *Use of antidepressants during STPP*: yes (antidepressant use was permitted during STPP or no information on antidepressant use was reported) or no (antidepressant use was not permitted during STPP);
- *Blinding of the outcome assessor*: yes or no (outcome assessors were not blinded or blinding was not reported);
- *Outcome analyses*: intention-to-treat analyses, completers-only analyses, or unclear;
- *Use of a treatment manual*: yes or no (no manual used or no manual use reported);
- *Treatment integrity check*: yes (integrity check by means of supervision of the therapists during treatment and/or the recording of treatment sessions) or no (no integrity check used or no check reported);
- *Therapist training*: yes (therapists were specifically trained for the treatment in general, or received specific training for the study intervention) or no (therapists were not trained or no training was reported).

3. Results

3.1. Inclusion of studies

As shown in Fig. 1, the literature search resulted in 4454 records, of which the majority (4234) was excluded in the first screening phase. A total of 220 titles were reviewed in full-text. Of these, 30 primary studies were included. Three studies were later excluded because the paper did not provide the information necessary to confirm that the therapy met the criteria for STPP and we were unable to reach the investigators for additional information (Klasik, Krysta, & Krzystanek, 2012; Quilty et al., 2008; Rolland et al., 2011). Three additional studies were further excluded because the papers did not include the data required to analyze the results in a meta-analysis and we were not able to receive this data from the authors (Paley et al., 2008; Stagno et al., 2007; Trijsburg, Trent, & Perry, 2004). Thus, we ended up with 24 studies following the literature search update.

In addition to these 24 studies, the previous meta-analysis included 23 other studies (Driessen et al., 2010). In addition, we included four trials that were excluded from the previous meta-analysis because they studied the comparisons of combined treatment of STPP and antidepressant medication versus antidepressant medication alone or versus antidepressants combined with another therapy, which were not examined in the previous meta-analysis. Three additional studies that were excluded from the previous meta-analysis because they did not report the data required for effect size calculation in that review were now included (using event rates to calculate effect sizes). Accordingly, a total of 54 studies were included in the current meta-analysis. The references of the included studies are provided in Appendix A.

3.2. Study characteristics

In Appendix B, an overview is provided of the study characteristics of the 54 included studies encompassing a total of 3946 subjects. The majority of the studies included adults recruited from clinical populations, who met diagnostic criteria for major depressive disorder or another mood disorder and who showed an elevated score on a depression measure. The percentage of women in the STPP conditions ranged from 42.2% to 100%, with an average of 74.7%. Mean age of the participants in the STPP conditions ranged from 21.5 to 69 years, with an average of 40.1 years.

Most of the studies (n = 43, 79.6%) employed STPP in an individual treatment format; nine studies (16.7%) employed STPP in a group format

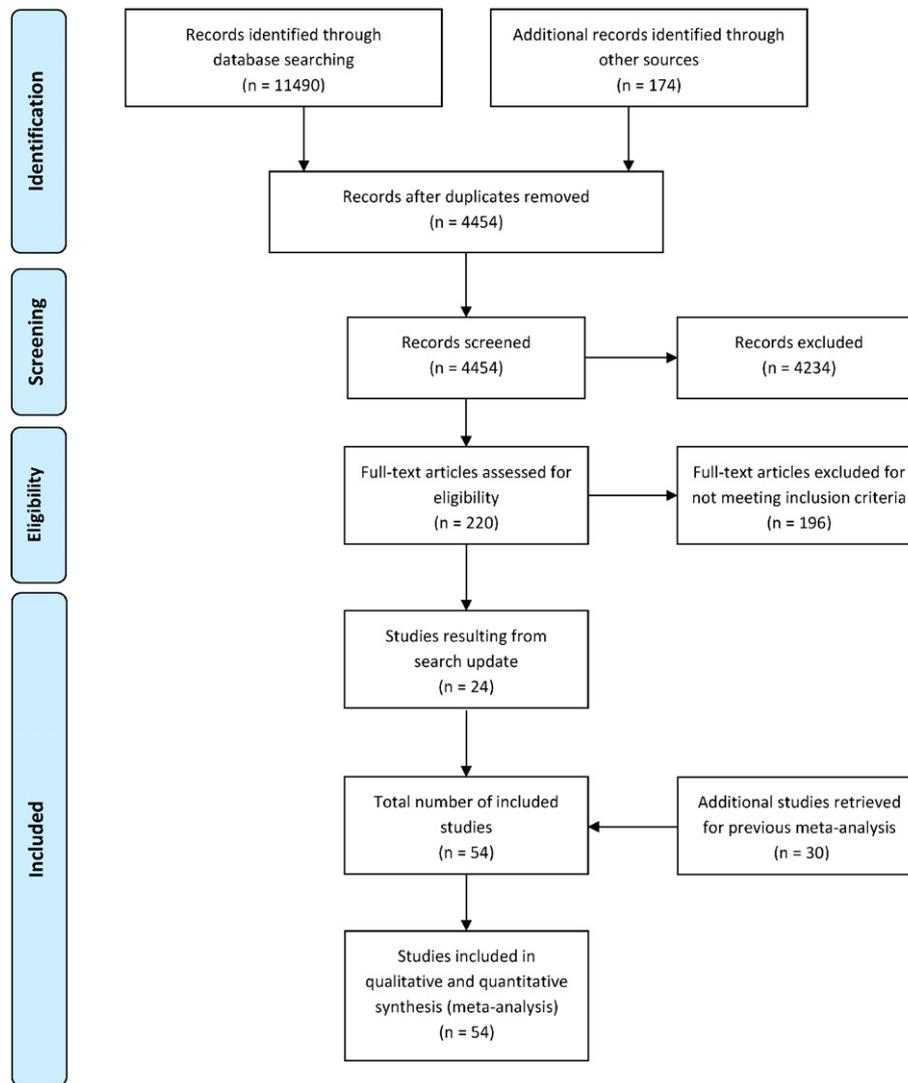


Fig. 1. PRISMA flow diagram of included studies.

and two studies (3.7%) examined online STPP. Different STPP types were used, 28 (51.9%) of which were rated as more supportive and 21 (38.9%) as more expressive; five studies (9.3%) could not be rated in this regard. In addition, the majority of the studies ($n = 47$, 87.0%) employed an STPP type that was rated as more interpretive, only 6 studies (11.1%) employed an STPP type that was rated as more emotion-focused, and 1 study (1.9%) could not be rated in this regard. The mean number of therapy sessions in the STPP conditions was 18 (range 3–80). In most studies ($n = 52$, 96.3%), outcome measures of depression were assessed, while measures of anxiety ($n = 18$, 33.3%), general psychopathology ($n = 26$, 48.1%), and interpersonal functioning ($n = 16$, 29.6%) were assessed in a number of studies too. In addition to pre- and post-treatment assessments, 29 studies (53.7%) reported follow-up assessments ranging from 2 weeks to 4.6 years after post-treatment.

3.3. Study quality

With regard to study quality, 33 studies (61.1%) were randomized clinical trials, 4 studies (7.4%) had a non-random comparative design and 17 studies (31.5%) had a naturalistic design without a comparison condition. The use of antidepressants during STPP was not permitted in 15 studies (27.8%), whereas in 39 studies (72.2%) the use of antidepressants was allowed or not reported on. Thirteen studies (24.1%) had outcome assessors who were blind to treatment assignment; the other 41

studies (75.9%) either did not include objective ratings, had assessors who were not blind to treatment assignment, or did not report on this matter. Intention-to-treat analyses were used in 20 studies (37.0%); 29 studies (53.7%) used completers-only analyses and for 5 studies (9.3%) it was unclear whether intention-to-treat or completers-only analyses had been conducted. Treatment manuals were used in 34 studies (63.0%), and not used or not reported on in the other 20 studies (37.0%). Treatment integrity was checked in 40 studies (74.1%), and not checked or reported on in 14 studies (25.9%). Therapists were trained for the therapies in 42 studies (77.8%); they were not trained or levels of training were not reported in 12 studies (22.2%).

3.4. STPP versus control conditions

The results of the meta-analyses are summarized in Table 1. Ten studies compared STPP to a control condition at post-treatment and applied depression outcome measures. In these 10 studies, STPP was compared to waitlist control conditions ($n = 4$), treatment-as-usual control conditions ($n = 4$), a placebo-control condition ($n = 1$), and an online support control condition ($n = 1$). The effect sizes and 95%-confidence intervals of these studies are plotted in Fig. 2. The mean pooled effect size of the difference between STPP and the control conditions at post-treatment was 0.61 (95% CI: 0.33–0.88), indicating a significant

Table 1
Meta-analyses of studies examining the effects of STPP for patients with depression.

Comparison	k	avN _{STPP}	avN _{comp}	d	95% CI	Z	Q	I ²	NNT
All studies									
STPP pre- to post-treatment change									
Depression	41	–	–	1.15	0.98–1.31	13.35**	191.13**	79.07	–
Anxiety	14	–	–	0.79	0.57–1.00	7.18**	49.32**	73.64	–
General psychopathology	20	–	–	1.18	0.90–1.46	8.18**	147.95**	87.16	–
Interpersonal functioning	15	–	–	0.74	0.51–0.97	6.38**	60.46**	76.85	–
Quality of life	5	–	–	0.57	0.23–0.91	3.30**	17.35**	76.95	–
Hopelessness	3	–	–	0.94	0.15–1.73	2.34*	9.17*	78.20	–
STPP post-treatment to follow-up change (≤6 months)									
Depression	12	–	–	0.13	–0.03–0.29	1.55	13.77	20.10	–
Anxiety	3	–	–	1.04	0.03–2.06	2.02*	9.14*	78.11	–
General psychopathology	6	–	–	0.20	0.01–0.39	2.08*	4.65	0.00	–
Interpersonal functioning	3	–	–	0.31	–0.09–0.72	1.51	6.25*	67.99	–
STPP post-treatment to follow-up change (>6 months)									
Depression	14	–	–	0.04	–0.08–0.17	0.65	9.21	0.00	–
Anxiety	3	–	–	0.27	–0.00–0.54	1.94	0.10	0.00	–
General psychopathology	6	–	–	0.16	–0.08–0.41	1.31	6.88	27.29	–
Interpersonal functioning	5	–	–	0.11	–0.09–0.32	1.09	1.76	0.00	–
Quality of life	3	–	–	0.28	0.06–0.51	2.51*	0.05	0.00	–
RCTs only									
STPP vs control conditions (post-treatment)									
Depression	10	26.7	26.9	0.61	0.33–0.88	4.37**	19.52*	53.90	2.99
Anxiety	5	34.2	33.6	0.48	–0.00–0.96	1.95	15.85**	74.77	3.76
General psychopathology	4	30.8	29.8	0.69	0.16–1.23	2.53*	9.36*	67.93	2.67
Quality of life	3	47.7	50	0.49	0.24–0.73	3.92**	0.38	0.00	3.68
STPP vs other psychotherapies (post-treatment)									
Depression	15	32.6	43.5	–0.25	–0.49 to –0.02	–2.13*	37.35**	62.51	7.14
Anxiety	5	29.4	38	0.35	0.12–0.59	2.94**	3.56	0.00	5.10
General Psychopathology	6	34.7	40.8	0.15	–0.10–0.39	1.16	7.26	31.08	11.90
Interpersonal functioning	5	35.2	46.4	–0.05	–0.34–0.23	–0.37	6.70	40.34	35.71
STPP vs other psychotherapies (follow-up)									
Depression	12	35.1	47.8	–0.08	–0.32–0.17	–0.63	26.38**	58.30	21.74
Anxiety	4	25	29.5	0.76	0.23–1.28	2.82**	7.85*	61.80	2.44
General Psychopathology	5	29	35	0.35	–0.00–0.70	1.95	8.27	51.62	5.10
Interpersonal functioning	4	31.3	40.5	0.15	–0.40–0.70	0.55	11.65**	74.24	11.90
STPP vs antidepressant medication (post-treatment)									
Depression	4	43.8	41.8	0.05	–0.40–0.51	0.22	11.20*	73.20	35.71
Interpersonal functioning	3	42.3	37.7	0.10	–0.30–0.50	0.51	3.66	45.38	17.86
STPP + antidepressants vs other psychotherapy + antidepressants (post-treatment)									
Depression	5	33.8	36	0.09	–0.21–0.39	0.59	7.37	45.74	20.00
Anxiety	4	25.3	25.5	–0.04	–0.42–0.33	–0.22	5.14	41.59	45.45
General Psychopathology	5	26.8	27.8	0.10	–0.41–0.60	0.37	16.36**	75.55	17.86
STPP + antidepressants vs other psychotherapy + antidepressants (follow-up)									
Depression	3	37.7	39.7	0.26	–0.46–0.97	0.70	12.54**	84.05	6.85
Anxiety	3	22	24.7	0.35	–0.11–0.81	1.51	2.95	32.30	5.10
General Psychopathology	3	19	22.3	0.33	–0.03–0.69	1.82	1.87	0.00	5.43

Note: avN_{comp} = average number of participants in the comparison conditions; avN_{STPP} = average number of participants in the STPP conditions; STPP = short-term psychodynamic psychotherapy; RCT = randomized clinical trial; NNT = number needed to treat.

Numbers printed in italics indicate an effect at the level of a non-significant trend (*p* = .05–.10).

* *p* < .05.

** *p* < .01.

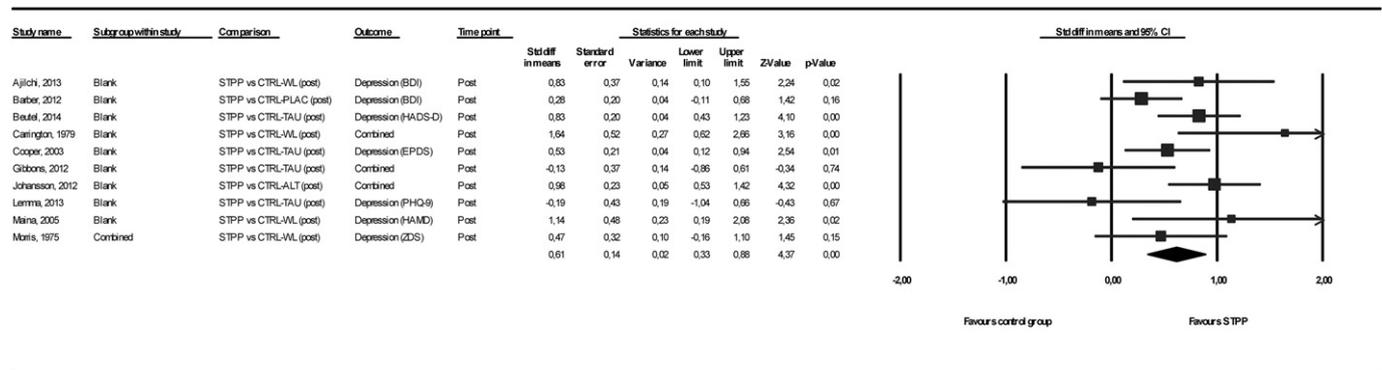


Fig. 2. STPP versus control conditions at post-treatment – depression outcomes. Note: BDI = Beck Depression Inventory; CTRL-ALT = alternative treatment control condition; CTRL-PLAC = pill placebo control condition; CTRL-TAU = treatment as usual control condition; CTRL-WL = waitlist control condition; EPDS = Edinburg Postnatal Depression Scale; HADS-D = Hospital Anxiety and Depression Scale – Depression subscale; HAMD = Hamilton Depression Rating Scale; PHQ-9 = 9-item Patient Health Questionnaire; STPP = short-term psychodynamic psychotherapy; ZDS = Zung Depression Scale.

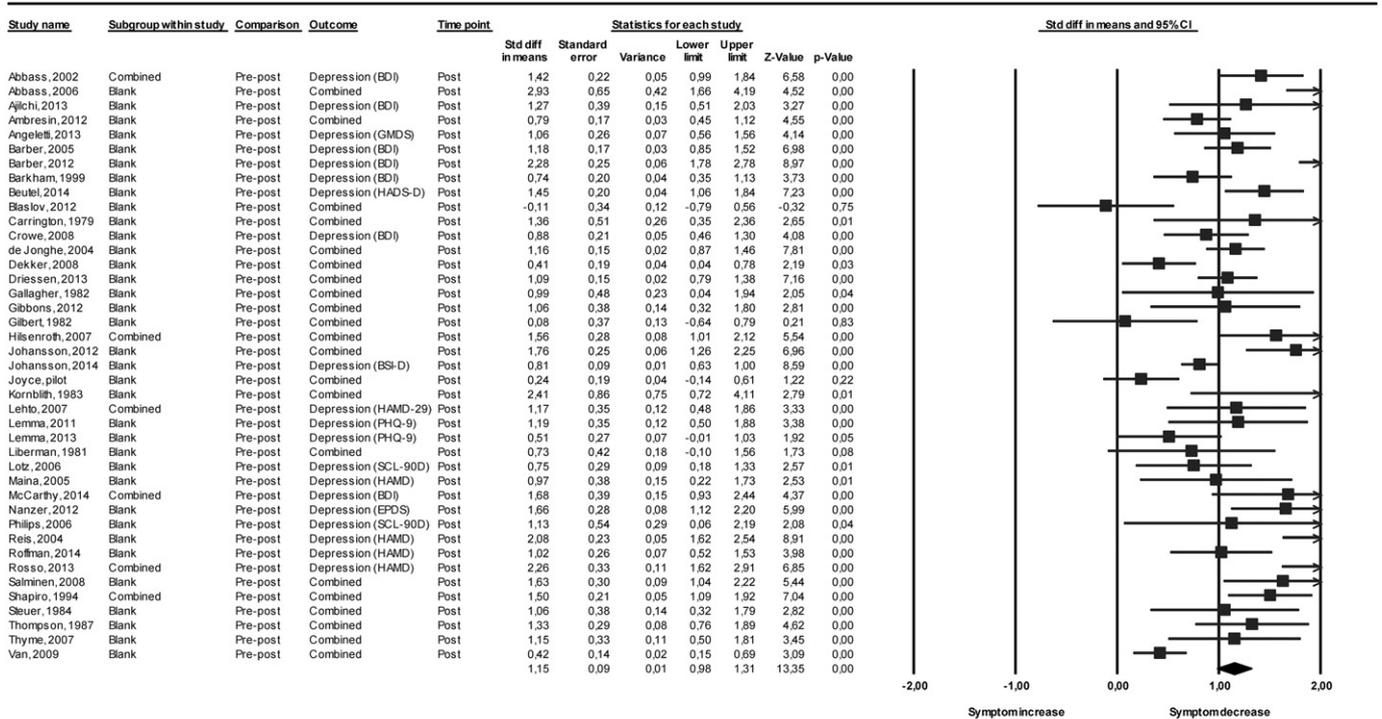


Fig. 3. STPP pre- to post-treatment change in depression. Note: BDI = Beck Depression Inventory; BSI-D = Brief Symptom Inventory – Depression subscale; EPDS = Edinburg Postnatal Depression Scale; GMD5 = Gotland Scale for Male Depression; HADS-D = Hospital Anxiety and Depression Scale; HAMD = Hamilton Depression Rating Scale; HAMD-29 = 29-item Hamilton Depression Rating Scale; PHQ-9 = 9-item Patient Health Questionnaire; SCL-90D = 90-item Symptom Checklist – Depression subscale.

superiority of STPP that corresponds with an NNT of 2.99. Heterogeneity was moderate (Table 1).

With regard to treatment format, the difference between STPP and the control conditions at post-treatment in the subgroup of studies that applied STPP in an individual format was 0.65 (95% CI: 0.28–1.01; $k = 7$), indicating a significant superiority of STPP. Only one study compared STPP in group format to a control condition, reporting a non-significant difference between STPP and the control condition ($d = 0.47$; 95% CI: -0.51 – 1.44 ; Appendix C – Table 1). However, this last analysis focusing on group STPP was not adequately powered to detect a clinically relevant effect. Moderator analyses showed diagnosis to be a significant moderator of STPP versus control condition effect size at post-treatment ($p = .001$; Appendix C – Table 1). The other participant, intervention and study quality characteristics were not found to be significantly moderating

STPP versus control condition effect size for depression outcome measures at post-treatment.

Five studies assessed outcome measures of anxiety at post-treatment, resulting in a mean pooled effect size of 0.48 (95% CI: -0.00 – 0.96 , NNT = 3.76), indicating superiority of STPP at the level of a non-significant trend ($Z = 1.95$, $p = .05$ – $.10$). Four and three studies assessed general psychopathology and quality of life outcomes, resulting in mean pooled effect sizes of respectively 0.69 (95% CI: 0.16 – 1.23) and 0.49 (95% CI: 0.24 – 0.73), both indicating a significant superiority of STPP over control conditions at post-treatment and corresponding with NNTs of 2.67 and 3.68, respectively. STPP was not compared with a control condition at follow-up in three or more studies. Therefore, we did not conduct a meta-analysis comparing STPP with control conditions at follow-up.

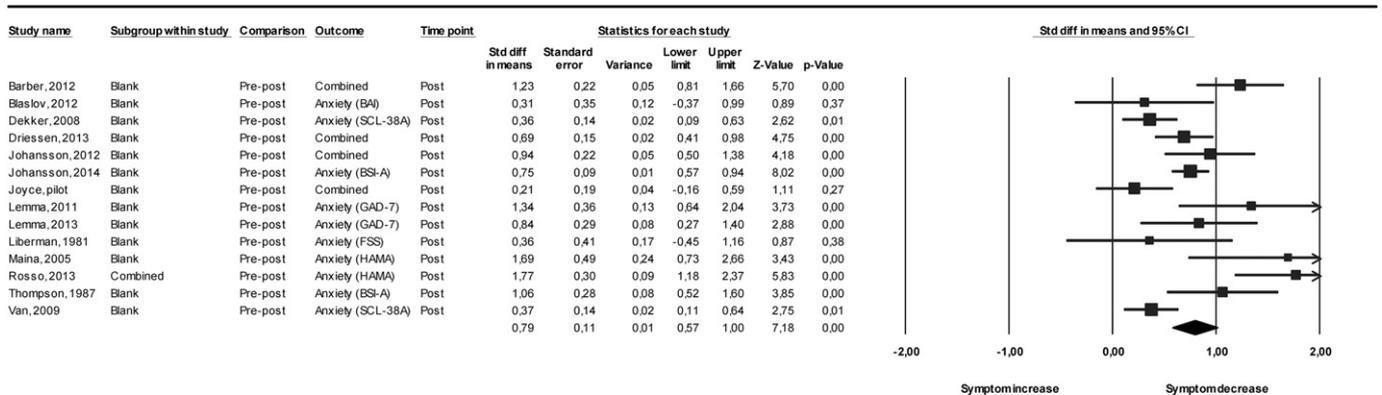


Fig. 4. STPP pre- to post-treatment change in anxiety. Note: BAI = Beck Anxiety Inventory; BSI-A = Brief Symptom Inventory – Anxiety subscale; FFS = Fear Survey Schedule; GAD-7 = 7-item Generalized Anxiety Disorder scale; HAMA = Hamilton Anxiety Rating Scale; SCL-38A = 38-item Symptom Checklist – Anxiety subscale.

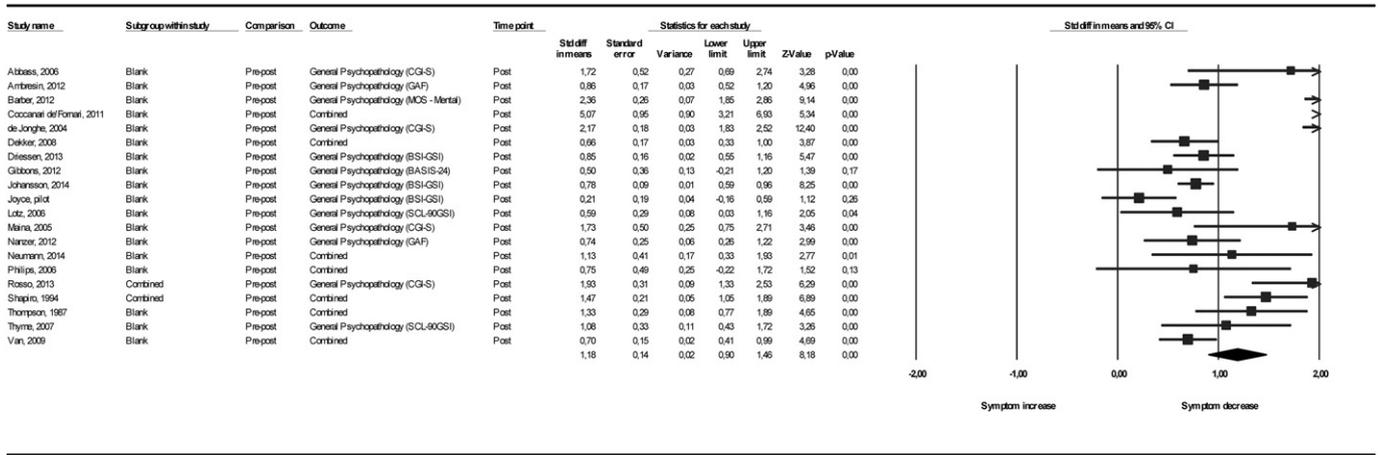


Fig. 5. STPP pre- to post-treatment change in general psychopathology. Note: BASIS-24 = 24-item BASIS questionnaire for mental health status; BSI-GSI = Brief Symptom Inventory – Global Severity Index; CGI-S = Clinical Global Impression – Severity subscale; GAF = Global Assessment of Functioning Scale; MOS-Mental = Medical Outcomes Study 36-Item Health Survey – Mental Health component score; SCL-90GSI = 90-item Symptom Checklist – Global Severity Index.

3.5. STPP pre- to post-treatment change

STPP pre- to post-treatment depression change was reported in 41 studies (Table 1) with a mean pooled effect size of 1.15 (95% CI: 0.98–1.31). Heterogeneity was high, suggesting that effect sizes differed from study to study. The effect sizes and 95%-confidence intervals of the included studies in this meta-analysis are plotted in Fig. 3. With regard to treatment format, both the subgroup of studies applying STPP in an individual format ($d = 1.22$; 95% CI: 1.03–1.41; $k = 32$) as well as the subgroup of studies applying STPP in a group format ($d = 0.71$; 95% CI: 0.26–1.16; $k = 7$) showed significant depression symptom improvements from pre- to post-treatment (Appendix C – Table 2). Moderator analyses showed that recruitment method ($p = .009$), pre-treatment mean BDI score ($p < .001$) and blinding of the outcome assessor ($p = .024$) were significantly associated with STPP pre- to post-treatment depression effect size (Appendix C – Table 2). None of the other variables were found to be significantly moderating STPP pre- to post-treatment effect size for depression outcomes.

Pre- to post-treatment change in anxiety was reported in 14 studies (Table 1; Fig. 4), generating a mean pooled effect size of 0.79 (95% CI: 0.57–1.00). Heterogeneity was high, suggesting that effect sizes differed from study to study. With regard to treatment format, the pre- to post-treatment change in anxiety was significant in the subgroup of studies that applied STPP in an individual format ($d = 0.81$; 95% CI: 0.56–1.05; $k = 11$). Only one study assessed pre- to post-treatment

anxiety change in an STPP group format, resulting in a non-significant difference ($d = 0.31$; 95% CI: -0.64 – 1.26 ; Appendix C – Table 3). Moderator analyses showed that pre-treatment mean BDI score ($p < .001$), blinding of the outcome assessor ($p < .001$), and type of outcome analyses ($p = .002$) were significantly associated with STPP pre- to post-treatment anxiety effect size (Appendix C – Table 3). The other participant, intervention and study quality characteristics were not found to be significantly moderating STPP pre- to post-treatment effect size for anxiety outcomes.

Twenty studies assessed general psychopathology change (Table 1; Fig. 5), resulting in a mean pooled effect size of 1.18 (95% CI: 0.90–1.46). Heterogeneity was high, suggesting that effect sizes differed from study to study. With regard to treatment format, the pre- to post-treatment change in general psychopathology was significant in the subgroup of studies that applied STPP in an individual format ($d = 1.23$; 95% CI: 0.93–1.53; $k = 18$). Only two studies examined general psychopathology change for an STPP group format, resulting in a non-significant pre- to post-treatment difference ($d = 0.66$; 95% CI: -0.30 – 1.62 ; Appendix C – Table 4). Moderator analyses showed that diagnosis ($p = .034$), pre-treatment mean BDI score ($p < .001$), and blinding of the outcome assessor ($p < .001$) were significantly associated with STPP pre- to post-treatment general psychopathology effect size (Appendix C – Table 4). No other variables were found to be significantly moderating STPP pre- to post-treatment effect size for general psychopathology outcomes.

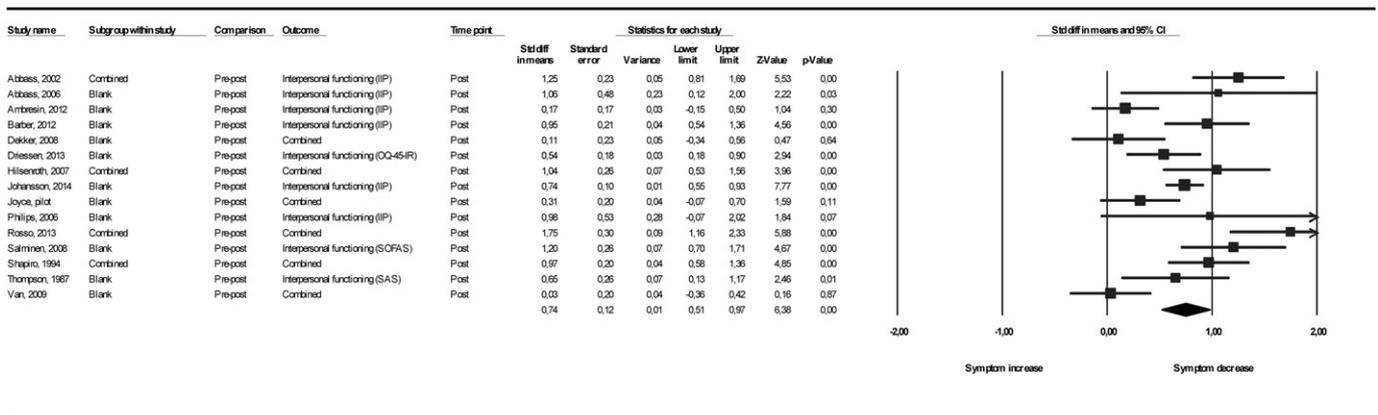


Fig. 6. STPP pre- to post-treatment change in interpersonal functioning. Note: IIP = Inventory of Interpersonal Problems; OQ-45-IR = 45-item Outcome Questionnaire – Interpersonal Relations subscale; SOFAS = Social and Occupational Functioning Assessment Scale; SAS = Social Adjustment Scale.

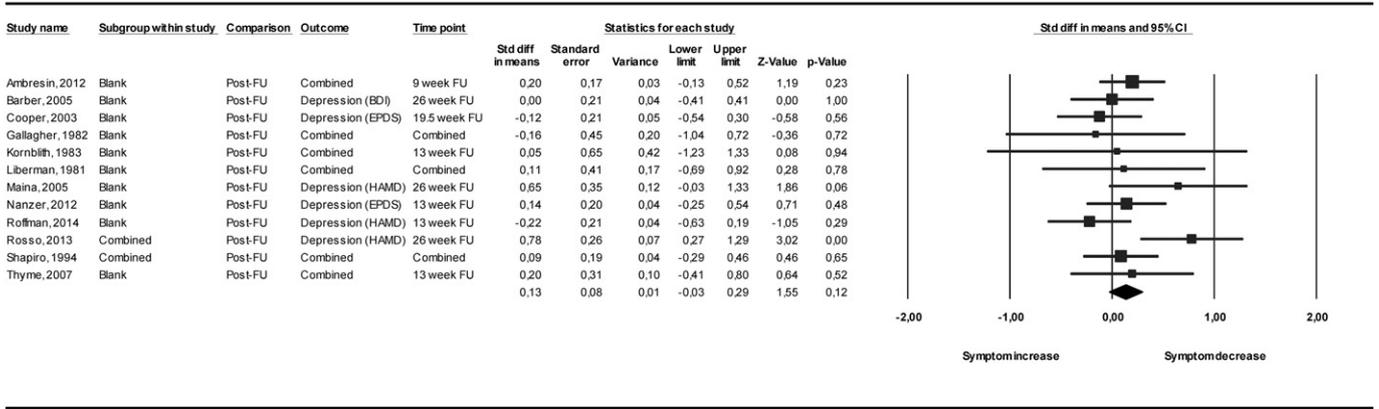


Fig. 7. STPP post-treatment to follow-up (≤6 months) change in depression. Note: BDI = Beck Depression Inventory; EPDS = Edinburg Postnatal Depression Scale; FU = follow-up; HAMD = Hamilton Depression Rating Scale.

STPP pre- to post-treatment change in interpersonal functioning was reported in 15 studies (Table 1; Fig. 6) with a mean pooled effect size of 0.74 (95% CI: 0.51–0.97). Heterogeneity was high, suggesting that effect sizes differed from study to study. With regard to treatment format, the pre- to post-treatment change in interpersonal functioning was significant in the subgroup of studies that applied STPP in an individual format ($d = 0.73$; 95% CI: 0.50–0.97; $k = 14$). Only one study examined interpersonal functioning for an STPP group format, resulting in a non-significant pre- to post-treatment difference ($d = 0.98$; 95% CI: -0.31 – 2.26 ; Appendix C – Table 5). Moderator analyses showed that supportive versus expressive STPP type ($p = .047$), blinding of the outcome assessor ($p = .045$), and STPP manual use ($p = .049$) were significantly associated with STPP pre- to post-treatment general psychopathology effect size (Appendix C – Table 5). The other participant, intervention and study quality characteristics were not found to be significantly moderating STPP pre- to post-treatment effect size for interpersonal functioning outcomes.

Finally, five and three studies reported pre- to post-treatment change at measures of quality of life and hopelessness (Table 1), generating mean pooled effect sizes of, respectively, 0.57 (95% CI: 0.23–0.91) and 0.94 (95% CI: 0.15–1.73). Again, heterogeneity was high. All the above-mentioned mean pooled effect sizes were significant and indicate pre- to post-treatment symptom decrease or function increase in the STPP conditions.

3.6. STPP post-treatment to follow-up change

Change from post-treatment up until 6 months follow-up resulted in effect sizes of 0.13 (95% CI: -0.03 – 0.29 ; $k = 12$) for depression (Fig. 7) and 0.31 (95% CI: -0.09 – 0.72 ; $k = 3$) for interpersonal functioning, both indicating a non-significant change from post-treatment up until 6 months follow-up (Table 1). With regard to anxiety ($d = 1.04$; 95% CI: 0.03–2.06; $k = 3$) and general psychopathology measures ($d = 0.20$; 95% CI: 0.01–0.39; $k = 6$) effect sizes indicated significant symptom decreases from post-treatment to follow-up. Heterogeneity was moderate and high for the meta-analyses of interpersonal functioning and anxiety outcomes, respectively, and low for the meta-analyses of depression and general psychopathology outcomes. Given the non-significant heterogeneity in the meta-analysis of studies with depression outcome measures ($k \geq 10$), no moderation analyses were conducted for this comparison.

Change from post-treatment to follow-up longer than 6 months (Table 1) resulted in mean pooled effect sizes of 0.04 (95% CI: -0.08 – 0.17 ; $k = 14$) for depression (Fig. 8), 0.27 (95% CI: -0.00 – 0.54 ; $k = 3$) for anxiety, 0.16 (95% CI: -0.08 – 0.41 ; $k = 6$) for general psychopathology, and 0.11 (95% CI: -0.09 – 0.32 ; $k = 5$) for interpersonal functioning measures, all indicating non-significant changes from post-treatment to follow-up. With regard to quality of life measures, the mean pooled effect size of 0.28 (95% CI: 0.06–0.51;

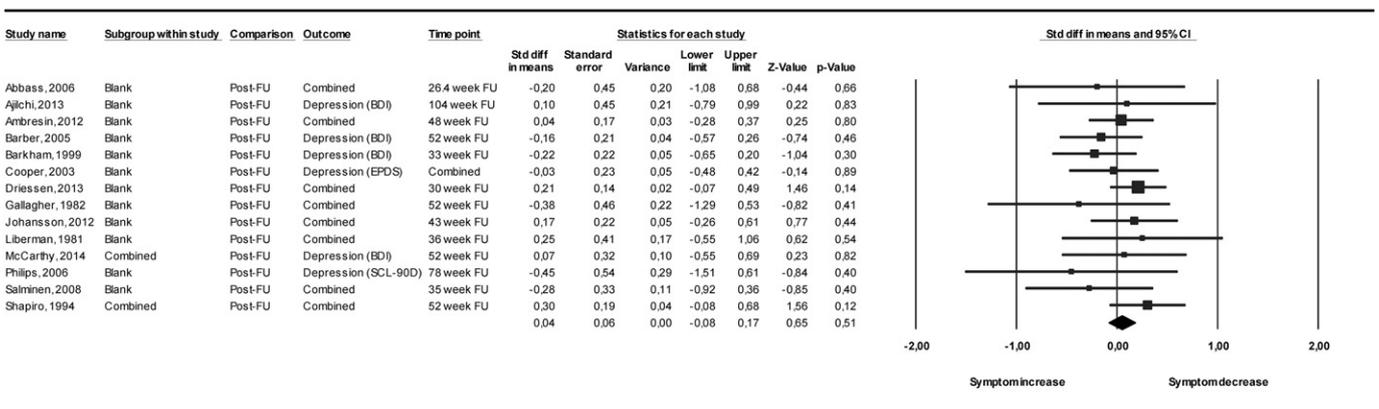


Fig. 8. STPP post-treatment to follow-up (>6 months) change in depression. Note: BDI = Beck Depression Inventory; EPDS = Edinburg Postnatal Depression Scale; FU = follow-up; SCL-90D = 90-item Symptom Checklist – Depression subscale.

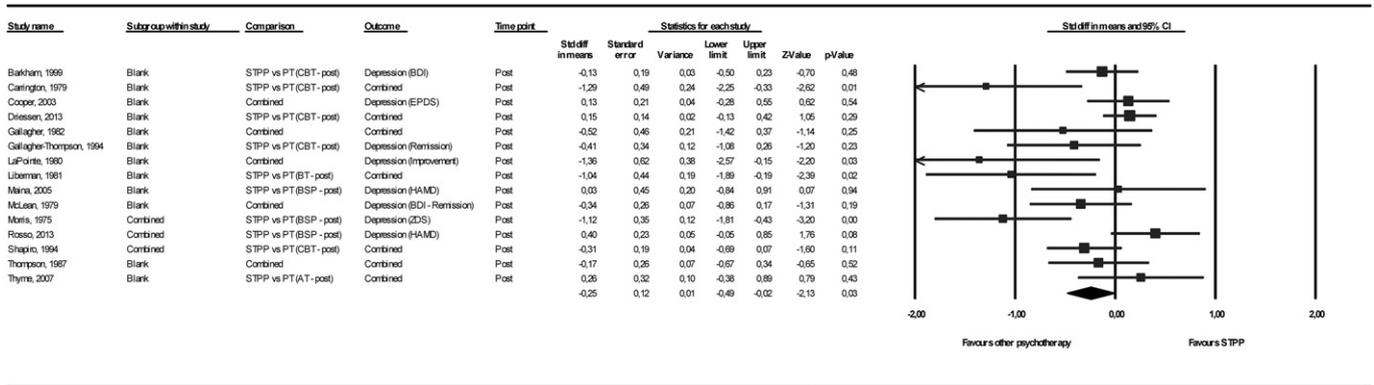


Fig. 9. STPP versus other psychotherapies at post-treatment – depression outcomes. Note: AT = Art Therapy; BDI = Beck Depression Inventory; BT = Behavior Therapy; BSP = Brief Supportive Psychotherapy; CBT = Cognitive Behavioral Therapy; EPDS = Edinburg Postnatal Depression Scale; HAMD = Hamilton Depression Rating Scale; PT = psychotherapy; STPP = short-term psychodynamic psychotherapy; ZDS = Zung Depression Scale.

$k = 3$) indicated a significant improvement from post-treatment to follow-up. Heterogeneity was low for all these meta-analyses. Given the non-significant heterogeneity in the meta-analysis of studies with depression outcome measures ($k \geq 10$), no moderation analyses were conducted for this comparison.

3.7. STPP versus other psychotherapies at post-treatment

In the meta-analysis of 15 studies reporting depression outcome at post-treatment, a significant superiority of the other psychotherapies across all studies of STPP (both group and individual) was found ($d = -0.25$; 95% CI: -0.49 to -0.02 ; NNT = 7.14; Table 1). The effect sizes and 95%-confidence intervals of the included studies are plotted in Fig. 9. Heterogeneity was moderate, suggesting that effect sizes might differ from study to study.

Moderator analyses (Appendix C – Table 6) suggested that STPP format was significantly related to STPP versus other psychotherapies depression effect size at post-treatment ($p = .005$). The other psychotherapies were found to be significantly superior to STPP in two studies that applied STPP in a group format ($d = -1.19$; 95% CI: -1.90 to -0.49). In the 13 studies examining individual STPP, no significant differences between STPP and other psychotherapies at post-treatment were found ($d = -0.14$; 95% CI: -0.34 – 0.06). This latter analysis was adequately powered to detect a clinically relevant effect (13 studies, averaging 41 participants per condition). Moderator analyses further showed that emotion-focused versus interpretive STPP type ($p = .044$) and STPP manual use ($p = .039$) were significantly associated with effect size (Appendix C – Table 6). STPP versus other psychotherapies effect size was higher in 14 studies examining an STPP that

was rated more interpretive ($d = -0.18$; 95% CI: -0.40 – 0.04) than in 1 study that examined an STPP that was rated more emotion-focused ($d = -1.12$; 95% CI: -2.01 to -0.23). STPP versus other psychotherapies effect size was also higher in 10 studies that applied an STPP treatment manual ($d = -0.11$; 95% CI: -0.36 – 0.13) than in 5 study that did not apply an STPP treatment manual or did not report on this ($d = -0.65$; 95% CI: -1.10 to -0.20). No other variables were found to be significantly moderating STPP versus other psychotherapies depression effect size at post-treatment (Appendix C – Table 6).

In contrast, when focusing on the 5 studies which reported measures of anxiety outcome, a significant superiority of STPP over the other psychotherapies was found ($d = 0.35$; 95% CI: 0.12 – 0.59 ; NNT = 5.10), with no heterogeneity. In these 5 studies, STPP was compared to cognitive and/or behavioral therapy ($n = 3$) and brief supportive therapy ($n = 2$). Mean pooled effect sizes of general psychopathology ($d = 0.15$; 95% CI: -0.10 – 0.39 ; NNT = 11.90; $k = 6$) and interpersonal functioning ($d = -0.05$; 95% CI: -0.34 – 0.23 ; NNT = 35.71; $k = 5$) indicated no differences between STPP and other psychotherapies at post-treatment for these outcome measures. However, these latter two analyses lacked the power to show a clinically relevant effect. Heterogeneity was low for these two analyses.

3.8. STPP versus other psychotherapies at follow-up

At follow-up, no significant differences between STPP and other psychotherapies were found on outcome measures of depression ($d = -0.08$; 95% CI: -0.32 – 0.17 ; $k = 12$; NNT = 21.74; Table 1), even though this meta-analysis was adequately powered to detect a

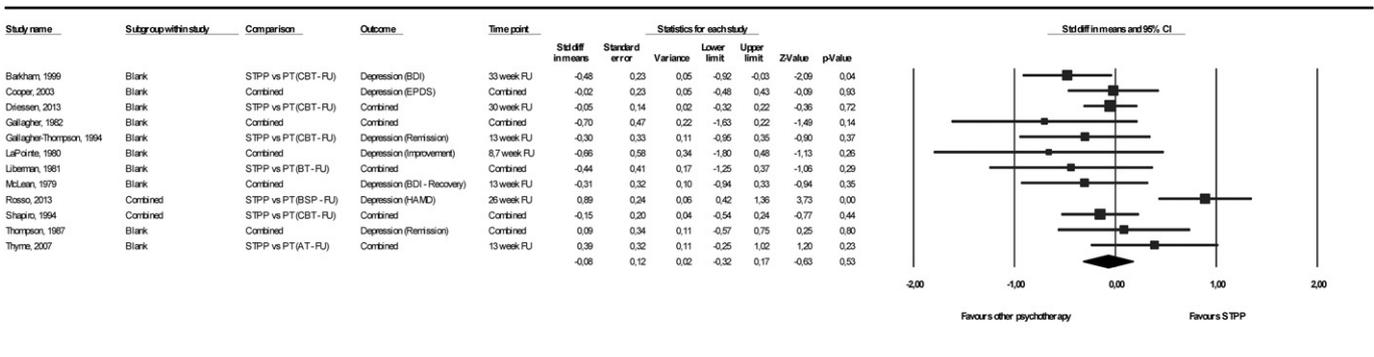


Fig. 10. STPP versus other psychotherapies at follow-up – depression outcomes. Note: AT = Art Therapy; BDI = Beck Depression Inventory; BT = Behavior Therapy; BSP = Brief Supportive Psychotherapy; CBT = Cognitive Behavioral Therapy; EPDS = Edinburg Postnatal Depression Scale; FU = follow-up; HAMD = Hamilton Depression Rating Scale; PT = psychotherapy; STPP = short-term psychodynamic psychotherapy.

clinically relevant effect (12 studies, averaging 41 participants per condition). The effect sizes and 95%-confidence intervals of the included studies are plotted in Fig. 10. With regard to treatment format, the STPP versus other psychotherapies depression effect size at follow-up was $d = -0.06$ in 11 studies that applied STPP in an individual format (95% CI: $-0.31-0.19$), indicating a non-significant difference. This meta-analysis was adequately powered to detect a clinically relevant effect (11 studies, averaging 44 participants per condition). Only one study compared STPP in a group format to another psychotherapy at follow-up, also resulting in a non-significant difference ($d = -0.66$; 95% CI: $-1.96-0.64$; Appendix C – Table 7). This latter meta-analysis was not adequately powered to detect a clinically relevant effect. Moderator analyses suggested that blinding of the outcome assessor was significantly associated with STPP versus other psychotherapies effect size ($p = .014$; Appendix C – Table 7). The other participant, intervention and study quality characteristics were not found to be significantly moderating the STPP versus other psychotherapies depression effect size at follow-up.

The mean pooled effect size of four studies assessing symptoms of anxiety at follow-up again indicated a significant superiority STPP over the other psychotherapies ($d = 0.76$; 95% CI: $0.23-1.28$; NNT = 2.44; Table 1). The mean pooled effect size of five studies assessing general psychopathology at follow-up indicated a superiority STPP over the other psychotherapies that marginally failed to reach significance ($d = 0.35$; 95% CI: $-0.00-0.70$; $Z = 1.95$; $p = .051$; NNT = 5.10). The meta-analysis for outcomes of interpersonal functioning ($d = 0.15$; 95% CI: $-0.40-0.70$; NNT = 11.90) indicated no significant differences between STPP and other psychotherapies at follow-up. However, this latter analysis was not adequately powered to detect a clinically relevant effect.

3.9. STPP versus antidepressant medication

At post-treatment, no significant differences were found between STPP and antidepressant medication in four studies that applied depression outcome measures ($d = 0.05$; 95% CI: $-0.40-0.51$; NNT = 35.71) and in three studies that applied measures of interpersonal functioning ($d = 0.10$; 95% CI: $-0.30-0.50$; NNT = 17.86; Table 1). However, both of these meta-analyses were not adequately powered to detect a clinically relevant effect. Heterogeneity was moderate to high in these analyses. STPP was not compared with antidepressant medication at follow-up in more than two studies. Therefore, we did not conduct a meta-analysis comparing STPP with antidepressant medication at follow-up.

3.10. STPP + antidepressant medication versus another psychotherapy + antidepressant medication

At post-treatment, no significant differences were found between combined treatment of STPP and medication on the one hand and combined treatment of another psychotherapy and medication on the other hand with regard to outcomes of depression ($d = 0.09$; 95% CI: $-0.21-0.39$; NNT = 20.00; $k = 5$), nor with regard to outcomes of anxiety ($d = -0.04$; 95% CI: $-0.42-0.33$; NNT = 45.45; $k = 4$) and general psychopathology ($d = 0.10$; 95% CI: $-0.41-0.60$; NNT = 17.86; $k = 5$; Table 1). However, none of these analyses were adequately powered to detect a clinically relevant effect. Heterogeneity was moderate to high in these analyses.

Similarly, at follow-up, no significant differences were found between these two treatments on measures of depression ($d = 0.26$; 95% CI: $-0.46-0.97$; NNT = 6.85; $k = 3$) and anxiety ($d = 0.35$; 95% CI: $-0.11-0.81$; NNT = 5.10; $k = 3$). Again, both of these analyses were not adequately powered to detect a clinically relevant effect. A meta-analysis of three studies with general psychopathology outcomes indicated the superiority of combined treatment of STPP over combined treatment of other psychotherapies at the level of a non-significant trend ($d = 0.33$; 95% CI: $-0.03-0.69$, $Z = 1.82$, $p = .05-10$; NNT =

5.43; Table 1). No significant heterogeneity was present in this last analysis, but heterogeneity was low for the analysis with anxiety measures and high for the analysis with depression measures.

3.11. Publication bias analyses

Adjusting for publication bias resulted in the addition of two 'trimmed' studies and an adjusted mean pooled effect size of 1.11 (95% CI: $0.95-1.28$) for STPP pre- to post-treatment change in depression. Similarly, the addition of two 'trimmed' studies resulted in an adjusted effect size of 0.69 (95% CI: $0.46-0.92$) for STPP pre- to post-treatment change in anxiety symptoms. With regard to measures of interpersonal functioning, the STPP pre- to post-treatment mean pooled effect size was adjusted to 0.59 (95% CI: $0.35-0.83$) with the addition of three 'trimmed' studies. Although somewhat lower than the unadjusted values, these mean pooled effect sizes still indicate significant pre- to post-treatment improvements during STPP. The STPP pre- to post-treatment effect size of general psychopathology measures was unaffected by publication bias, as were both the STPP post-treatment to ≤ 6 month follow-up and the STPP post-treatment to >6 month follow-up effect sizes for depression measures.

Adjusting for publication bias resulted in the addition of one 'trimmed' study and an adjusted mean pooled effect size of 0.55 (95% CI: $0.26-0.83$) for STPP versus control conditions at post-treatment (depression outcome measures). Although somewhat lower than the unadjusted value, this mean pooled effect sizes still indicates a significant superiority of STPP over the control conditions. The mean pooled effect size of STPP (group and individual combined) versus other psychotherapies at post-treatment for depression outcome measures was adjusted to -0.18 (95% CI: $-0.42-0.05$) with the addition of two 'trimmed' studies. The adjusted effect size indicated no significant difference between STPP (group and individual combined) and the other psychotherapies at post-treatment. The mean pooled effect size of STPP versus other psychotherapies at follow-up for depression outcome measures was adjusted to 0.03 (95% CI: $-0.20-0.27$) with the addition of three 'trimmed' studies, still indicating no significant differences between STPP and the other psychotherapies.

4. Discussion

4.1. Findings

In the last years, there has been a vast increase in the number of studies that examined the efficacy of STPP for depression. While 30 of such studies were retrieved for our previous meta-analysis, which covered the literature up to 2007, 24 additional studies meeting the same inclusion criteria were published in the last 7 years. With regard to total number of study participants, the sample almost tripled (from 1365 to 3946) as a result of this. The field has also benefitted from the recent publication of a number of large RCTs of relative good quality that compared STPP to control conditions (e.g., Barber et al., 2012; Beutel et al., 2014).

The findings of this meta-analysis are supportive of the efficacy of STPP for depression. STPP was found to be significantly more efficacious than control conditions at post-treatment on measures of depression, general psychopathology and quality of life, and superiority of STPP over control conditions at the level of a non-significant trend was apparent for anxiety outcomes. STPP pre-treatment to post-treatment effect sizes indicated significant improvements on all outcome measures, which significantly improved further from post-treatment up to 6 month follow-up for anxiety and general psychopathology measures, and from post-treatment to follow-up longer than 6 months for quality of life measures. With regard to the other outcome measures, pre- to post-treatment changes were maintained at follow-up. These findings are in line with our previous meta-analysis (Driessen et al., 2010), which also reported significant pre- to post-treatment change in

depression that was maintained at one-year follow-up and a superiority of STPP over control conditions at post-treatment. However, the present study shows that these effects are also apparent on measures other than depression. Furthermore, the present study indicates significant improvements from post-treatment to follow-up. This finding corroborates other meta-analyses reporting increased gains in follow-up after psychodynamic psychotherapy (Abbass et al., 2014; Town et al., 2012).

When studies examining individual and group STPPs were considered together, other psychotherapies were significantly more efficacious than STPP on depression measures at post-treatment, but no significant differences were found at follow-up in an adequately powered analysis. However, the format of delivering STPP was a significant moderator of STPP versus other psychotherapies depression post-treatment effect size. When only studies examining STPP in an individual format were considered, no significant differences between STPP and other psychotherapies were found both at post-treatment and at follow-up in analyses that were adequately powered to detect a clinically relevant effect. STPP in group format was found to be significantly less efficacious than other psychotherapies in two studies. These findings are in line with previous meta-analyses, in which no significant differences between individual STPPs and other psychotherapies were found for depression outcome measures (Barber et al., 2013; Abbass & Driessen, 2010).

When looking at anxiety as a measure of outcome, STPP for depression was significantly more efficacious than other psychotherapies at both post-treatment and follow-up in a smaller subgroup of five studies. In that same subgroup of studies, however, no significant difference between STPP and other psychotherapies was found with regard to depression level at both post-treatment ($d = -0.02$; -0.38 to 0.34 ; $Z = -0.11$, $p = .92$) and follow-up ($d = 0.16$; -0.38 to 0.70 ; $Z = 0.59$, $p = .55$). This suggests that the superiority of STPP over other psychotherapies was not the consequence of the selection of a smaller set of studies with more favorable outcomes for STPP in general. This finding of superior effects on anxiety reduction is new and highly relevant since residual anxiety symptoms are a known predictor for relapse and ongoing morbidity in major depression (D'Avanzato et al., 2013). This anxiety reducing effect may relate to sustained and increased clinical gains after STPP. While the other main findings were in line with our previous meta-analysis, the superiority of STPP over other psychotherapies with regard to anxiety measures is a new finding.

Heterogeneity was apparent on a number of the analyses and moderation analyses suggested that certain participant, intervention, and study quality characteristics were associated with STPP efficacy. Interestingly, effect sizes were typically higher in studies that applied quality characteristics (e.g., blind outcome assessment) than in studies that did not apply these quality measures or did not report upon them. However, it must be noted that these moderation analyses are correlational, and cannot be taken to imply causality. STPP format and STPP type were found to be significant moderators of some of the effect sizes. However, we identified no studies that directly compared STPP in group with STPP in individual format, more supportive STPP with more expressive STPP, or more emotion-focused with more interpretive STPP. Thus, the questions whether group STPP is less efficacious than STPP applied in an individual format, and whether certain STPP types are more efficacious than others in the treatment of depression remain to be answered.

4.2. Strengths and limitations

The main strength of this study is that, due to its thorough literature search and wide inclusion criteria, it provides a good overview of the total field of STPP for depression outcome research. This overview is broadened further by conducting meta-analyses using multiple outcome measures other than depression. However, the abovementioned results must be interpreted bearing in mind the limitations of this study and of the body of literature that it reviewed. First, although

much effort was made to retrieve a maximum number of relevant studies, we were not able to include outcomes of all studies that seemed to meet our inclusion criteria, for instance because studies did not report effect size data and we were not able to retrieve this data from the investigators. We also cannot rule out the possibility that we have missed additional studies meeting the inclusion criteria, although we have tried to minimize this possibility by using an extensive search strategy and contacting authors in the case of missing data. Publication bias analyses suggest that the general pattern of findings was not affected when adjusting for publication bias, with the exception that STPP (both group and individual) versus other psychotherapy differences were no longer significant when adjusting for publication bias. Second, a number of the meta-analyses include a rather small number of studies. This is especially the case for meta-analyses of outcome measures other than depression. For this reason, both at post-treatment and follow-up, meta-analyses were not adequately powered to detect clinically relevant differences between STPP and other psychotherapies for general psychopathology and interpersonal functioning measures, between STPP and medication (all outcome measures), and between combined treatment of STPP and medication versus combined treatment of another psychotherapy and medication (all outcome measures). Third, the quality of some of the included studies was less than optimal. A number of studies did not include a treatment integrity check or a treatment manual; they allowed or did not report upon the use of antidepressants in addition to psychotherapy, did not report training of therapists, or did not include a control group. However, subgroup analyses of the association between study quality and effect sizes showed few indications that low study quality was significantly associated with increased effect sizes. In contrast, studies that were rated positive on a study quality criterion (assessors unaware of treatment condition, use of intention-to-treat analyses) were typically associated with higher effect sizes than studies that were rated negative on that same criterion. It remains a main issue for meta-analysis how to include and control for quality of studies, as any attempt to remove studies might be associated with bias of the reviewer. Fourth, and related, although we aimed at using intention-to-treat data of a study for the effect size calculations, this was not always possible and observed values had to be used instead; this might have led to an overestimation of the effect sizes. Fifth, the use of within-group effect sizes has been criticized for being overly dependent on the range of pre-treatment scores (with restricted ranges due to study inclusion criteria resulting in artificially large effect sizes). Finally, STPP efficacy estimates were based on studies employing different STPP methods. Therefore, this meta-analysis' results might not generalize to all STPP modes.

4.3. Clinical and research implications

With the range of studies included in this review, there is increasing evidence that STPP as a collective now merits designation as an empirically supported treatment. In the same way as cognitive behavioral therapy, cognitive therapy, behavioral therapy, and their many variants are considered as a collective, STPP and its variants share common core features that distinguish it from other treatments (Blagys & Hilsenroth, 2000). For instance, Leichsenring and Schauenburg (2014) have recently described a unified, overarching model of STPP for depression, in which we think the various STPP models examined in the studies included in this meta-analysis may well fit. Moreover, Leichsenring, Leweke, Klein, and Steinert (2015) conclude in their recent review of the empirical status of psychodynamic therapy that psychodynamic therapy and psychodynamic therapy combined with medication can presently be designated as efficacious in major depressive disorder according to the criteria for empirically supported psychological treatments formulated by Chambless and Hollon (1998).

Despite the supportive findings of this review, further research in STPP for depression is necessary. First, the field needs further high-quality, rigorous, controlled (non-inferiority) trials, especially with regard to the comparison of STPP versus control groups at follow-up, the

comparison of STPP versus antidepressant medication, and with regard to the effects of STPP added to medication in comparison to medication mono-treatment. However, we recognize that long-term follow-up in RCTs are very difficult to conduct in a satisfactory fashion. Second, since STPP also aims at reducing personality-based vulnerability to depression, its impact on depression relapse and recurrence rates relative to cognitive behavioral therapy and antidepressant medication should be studied. Third, as other treatments for depression, STPP is not efficacious for all patients and longer treatments might be needed for certain patients. We think that the dose–effect relationship of psychotherapy is important and should be studied primarily in subgroups with unfavorable treatment outcomes, such as patients with comorbid depression and personality disorders (Newton-Howes et al., 2014). Fourth, as STPP treatment format and STPP type have been associated with STPP efficacy in correlational analyses, head-to-head comparisons of group STPP versus individual STPP and of different STPP types would help answer the questions whether certain STPP types or formats might be related to STPP for depression efficacy. Fifth, internet-guided self-help treatments as were seen to show promise in this review (Lemma & Fonagy, 2013; Johansson et al., 2012), should be further examined with their potential benefits of reaching patients who are less inclined to seek help in general mental health care and of reducing costs by requiring less therapist time.

5. Conclusion

In recent years, there has been a major increase in the number of studies examining the efficacy of STPP for depression. The findings of this meta-analysis are supportive of the efficacy of STPP for depression. This study indicates that STPP is more efficacious than control conditions at post-treatment on depression, general psychopathology and quality of life outcome measures. Significant STPP pre-treatment to post-treatment improvements were apparent for all outcome measures. These gains significantly improved further from post-treatment to follow-up on a number of outcome measures and were maintained on the other measures. No significant differences on depression outcome measures were found between individual STPP and other psychotherapies at post-treatment and follow-up in analyses that were adequately powered to detect a clinically relevant effect. STPP was significantly more efficacious than other psychotherapies on anxiety measures at both post-treatment and follow-up. On the basis of these findings, it can be argued that STPP can be considered an empirically validated treatment method for depression. Although further high-quality study remains necessary, particularly to assess the efficacy of STPP compared to control conditions at follow-up and to antidepressants, the current findings strengthen the evidence-base of STPP for depression.

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Contributors

ED wrote the study protocol. IJ and ED updated the search strategy. IJ conducted the searches. ED and LMH screened the search records and full-text papers against the inclusion criteria. AAA, JPB, JJMD and HLV checked the full-text papers to confirm that the therapy used met the criteria for STPP and rated the STPP types. ED and LMH extracted effect size data and study characteristics. PC advised on data-extraction disagreements and data-analysis. ED conducted the analyses and wrote the manuscript. All authors provided feedback on and approved the final manuscript.

Conflicts of interest statement

The authors declare that they have no conflicts of interest.

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Appendix A, B and C. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.cpr.2015.07.004>.

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² References of the studies included in the meta-analysis are listed in Appendix A.

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