Psychodynamic Therapy: As Efficacious as Other Empirically Supported Treatments? A Meta-Analysis Testing Equivalence of Outcomes

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Objective: Pharmacotherapy, cognitive-behavioral therapy (CBT), and psychodynamic therapy are most frequently applied to treat mental disorders. However, whether psychodynamic therapy is as efficacious as other empirically supported treatments is not yet clear. Thus, for the first time the equivalence of psychodynamic therapy to treatments established in efficacy was formally tested. The authors controlled for researcher allegiance effects by including representatives of psychodynamic therapy and CBT, the main rival psychotherapeutic treatments (adversarial collaboration).

Method: The authors applied the formal criteria for testing equivalence, implying a particularly strict test: a priori defining a margin compatible with equivalence (g=0.25), using the two one-sided test procedure, and ensuring the efficacy of the comparator. Independent raters assessed effect sizes, study quality, and allegiance. A systematic literature search used the following criteria: randomized controlled trial of manual-guided psychodynamic therapy in adults, testing psychodynamic therapy against a treatment with efficacy established for the disorder under study, and applying reliable and valid outcome measures. The primary outcome was "target symptoms" (e.g., depressive symptoms in depressive disorders).

Results: Twenty-three randomized controlled trials with 2,751 patients were included. The mean study quality was good as demonstrated by reliable rating methods. Statistical analyses showed equivalence of psychodynamic therapy to comparison conditions for target symptoms at posttreatment (g=−0.153, 90% equivalence CI=−0.227 to −0.079) and at follow-up (g=−0.049, 90% equivalence CI=−0.137 to −0.038) because both CIs were included in the equivalence interval (−0.25 to 0.25).

Conclusions: Results suggest equivalence of psychodynamic therapy to treatments established in efficacy. Further research should examine who benefits most from which treatment.

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Mental disorders are common and represent a significant public health concern (1). They are associated with a high negative impact on all areas of life and cause more burden of disease than other illnesses (2). Up to 45% of primary care patients have been found to have at least one mental disorder (3). Current reviews and practice guidelines regard specific forms of psychotherapy (e.g., cognitive-behavioral therapy [CBT], interpersonal therapy) and specific forms of pharmacotherapy as empirically supported for the treatment of common mental disorders (4, 5). Psychodynamic therapy, another method of psychotherapy, has a long tradition, and a considerable proportion of therapists report a primary psychodynamic orientation (6, 7), with some differences between countries.

Thus, the efficacy of psychodynamic therapy is of high relevance to patients, therapists, and the health care system in general. For common mental disorders, evidence for psychodynamic therapy is available (8). A Cochrane review investigating the efficacy of psychodynamic therapy for common mental disorders found psychodynamic therapy to be superior over control conditions (waiting list, treatment as usual, minimal contact) (9). In addition, several meta-analyses found no statistically significant differences when psychodynamic therapy was compared with other forms of psychotherapy in patients with anxiety or depressive disorders (10, 11). Other meta-analyses, however, reported psychodynamic therapy to be inferior to CBT, which is regarded as an established treatment (12–14). These inconsistent findings and the frequent use of psychodynamic therapy suggest a need to examine whether psychodynamic therapy is as efficacious as treatments with established efficacy.

A comparison with a rival treatment can be considered a particularly strict test because both specific (e.g., techniques, ingredients, and procedures) and nonspecific (e.g., expectation and attention) factors are controlled for (15). Comparisons of this kind are rare in the whole field of medicine (16). Such a test is even more strict if the rival treatment has

been established in efficacy. Comparisons for which no differences in outcomes are expected are referred to as equivalence trials (17, 18). eAppendix A, in the data supplement that accompanies the online edition of this article, highlights the differences between equivalence testing and the far more common superiority testing.

Of note, in psychotherapy research, presently no single individual study seems to exist that is sufficiently powered to test for equivalence if a small margin is used as compatible with equivalence (8, 19). In contrast, meta-analyses may yield a higher power than individual studies and are therefore especially suitable to test for equivalence; the logic of equivalence testing as outlined in eAppendix A in the data supplement applies to meta-analyses, as well. Nevertheless, despite available guidelines (20), equivalence testing in meta-analysis is almost nonexistent.

Applying the procedures of equivalence testing, we investigated whether psychodynamic therapy is equivalent in outcome to treatments established in efficacy for the respective disorder (i.e., other forms of psychotherapy and pharmacotherapy).

METHOD

Study Design and Choice of Equivalence Margin

We conducted the meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (21). A prespecified protocol is registered at PROSPERO (International Prospective Register of Systematic Reviews; registration number: CRD42016038161).

The design, study selection, and statistical analyses follow the logic of equivalence testing; that is, defining a margin, searching for studies with one or more established comparators, and applying the two one-sided test procedure (17, 20).

For defining an equivalence margin (i.e., "the minimum difference between two groups that would be important enough to make the two groups nonequivalent" [20, p. 554]), there are no generally accepted standards. What is considered to be a clinically meaningful minimum difference relative to a clinically irrelevant minimum difference depends on the field of research. If the outcome is a vital event, such as mortality, smaller margins are required than in other fields (18). Small margins make it more difficult to establish equivalence (17). As emphasized by Walker and Nowacki, the equivalence margin not only determines the result of the test but also gives scientific credibility to a study: "The value and impact of a study depend on how well the equivalence margin can be justified in terms of relevant evidence and sound clinical considerations" (17, p. 194).

Several proposals for choosing an equivalence margin in the context of mental disorders have been made (Table 1). Suggestions for the maximum difference in outcomes considered to be clinically irrelevant range from d=0.24 to d=0.60. The smallest margin was suggested by Cuijpers and colleagues (d=0.24) for the treatment of depression (22). Thus, for our study across a range of mental disorders, we decided to use a margin of 0.25 (i.e., an equivalence interval of −0.25 to 0.25), corresponding to a small effect size.

TABLE 1. Cutoffs for a Clinically Irrelevant Effect As Proposed in the Literature or Applied in Psychotherapy Trials[a]

Study Type	Cohen's d
Proposals or guidelines	
Chambless and Hollon (15)	0.65[b]
National Institute for Clinical Excellence (42)	0.5[b]
Cuijpers et al. (22)	0.24[c]
Leichsenring et al. (8)	0.5
Trials addressing noninferiority or equivalence[d]	
Hedman et al. (43)	≈0.39–0.50
Norton (44); Norton and Barrera (45)	0.6
Driessen et al. (46)	0.3
Tyrer et al. (47)	0.26[e]
Herpertz-Dahlmann et al. (48)	0.52[f]
Meuldijk et al. (49)	≈0.27[g]
Richards et al. (50)	0.35
Connolly Gibbons et al. (51)	≈0.29–0.45

[a] Noninferiority trials are conceptually similar to equivalence studies in that they aim to determine whether a test treatment is no worse than a particular reference treatment. Here, too, a margin (i.e., the largest difference still clinically compatible with noninferiority) has to be defined.
[b] Later abandoned and not replaced by a new value. Cohen's d=0.65 results from the sample size of 2×30 suggested by Chambless and Hollon if alpha is set to 0.05 and a one-sided test is performed.
[c] Corresponds to depressive disorders.
[d] These trials aimed to demonstrate noninferiority or equivalence. None of these studies was sufficiently powered (≥80%) to demonstrate noninferiority or equivalence if a small margin of 0.25 is defined as compatible with noninferiority or equivalence. Only two studies (Tyrer et al. [47] and Richards et al. [50]) were sufficiently powered to demonstrate equivalence (or noninferiority) if a small margin below 0.30 is regarded as compatible with equivalence (or noninferiority). For a margin of 0.40, the studies by Driessen et al. (46) and Connolly Gibbons et al. (51) were sufficiently powered. For a margin below 0.50 (i.e., ≤0.49), the studies by Herpertz-Dahlmann et al. (48) and Meuldijk et al. (49) were sufficiently powered.
[e] Corresponds to a difference of £150 with a standard deviation of £580.
[f] Corresponds to a difference in body mass index of 0.75 with a standard deviation of 1.45.
[g] Corresponds to a 15% difference in success rate.

Selection Criteria and Search Strategy

Participants were a sufficiently described adult population treated for a specific mental disorder according to DSM-III or later versions or ICD-10 criteria. Organic mental disorders were excluded.

Interventions were manual-guided forms of psychodynamic therapy, a talking therapy operating on an interpretive-supportive continuum (23). Interpretive interventions focus on conscious and unconscious processes or conflicts and aim at enhancing the patient's insight in repetitive patterns assumed to sustain his or her problems. Supportive interventions aim to strengthen abilities ("ego functions") that are (temporarily) not accessible to a patient because of acute stress or because they are not sufficiently developed. Characteristic techniques of psychodynamic psychotherapy include fostering

a helpful therapeutic relationship, focusing on affect and expression of emotion, exploring avoidance patterns and resistance to change, identifying recurring themes, discussing past experiences, exploring fantasies and dreams, and focusing on interpersonal issues. Moreover, processes of transference and countertransference are taken into account and interpreted, if suitable (23, 24).

Comparators were bona fide methods of psychotherapy or pharmacotherapy with efficacy demonstrated for the respective disorder according to published criteria and guidelines (4, 5, 15). For specific or new treatments not yet included in available listings, we performed our own searches for evidence. Following current standards for a designation as efficacious (15), we regarded at least two randomized controlled trials carried out in independent research settings as necessary, in which the respective treatment proved to be efficacious.

The primary outcome was "target symptoms," which included measures specific to the mental disorder under study (e.g., measures of depressive symptoms in depressive disorders or of social anxiety in social anxiety disorder). As secondary outcomes, general psychiatric symptoms and psychosocial functioning (i.e., social, occupational, and personality functioning) were examined. Posttreatment and follow-up assessments were considered.

The meta-analysis included randomized controlled trials in which psychodynamic therapy was compared with a treatment established in efficacy using reliable and valid outcome measures. For intervention and comparison groups, only manual-guided forms of psychotherapy were included. A manual or manual-like guideline is a clear description of a treatment that includes the theoretical background, a set of technical recommendations, and case examples. Concurrent medication was allowed, provided that it was given in all treatment arms. Studies in which psychodynamic therapy was systematically combined with another treatment (e.g., psychodynamic therapy plus pharmacotherapy) were excluded. To ensure effective randomization, a minimum sample size of N=20 patients per treatment group was required for inclusion (25). Treatments must have been terminated (i.e., no ongoing treatments were permitted).

The following search strategy was applied (the complete search strategy can be found in eAppendix C in the online data supplement): systematic searches in the electronic databases PubMed, PsycINFO, and CENTRAL; manual searches in relevant systematic reviews, textbooks, and reference lists of included studies; and communication with experts in the field, which included a search in a comprehensive, published, and regularly updated list (the so-called Lilliengren List) of all previously identified randomized controlled trials on psychodynamic therapy (http://w3.psychology.su.se/staff/peli/RCTs_of_PDT.pdf). No language or date limits were applied. The main electronic search was conducted on March 23, 2016. Updated searches were regularly performed until December 2016.

Study Selection and Data Extraction

After completing literature searches, all hits (N=5,142) were saved in the citation management program EndNote. After removal of duplicates (N=1,216), two authors (C.S., F.L.) independently screened titles and abstracts of the remaining 3,926 articles according to the predefined selection criteria. All potentially relevant articles were then retrieved for full-text review (N=62), which resulted in the inclusion of 23 randomized controlled trials (and a total of 30 articles, of which seven presented follow-up data or additional outcomes; see Table 2 and eAppendixes B and D in the online data supplement). To retrieve study details, a data extraction form was used. Effect sizes included in the main analysis (i.e., target symptoms at posttreatment) were independently extracted and calculated by two authors each. To determine interrater reliability for the calculation of effect sizes, the intraclass correlation coefficient (ICC) was calculated with SPSS, version 23 (SPSS, Chicago), using a two-way mixed model in combination with the absolute agreement type, single measures. Interrater reliability proved to be excellent (ICC=0.99). Disagreements in the search process and effect size calculation were resolved by consensus or by consulting a third expert. Masking of raters regarding authors of primary studies was not done because evidence suggests that such masking is unnecessary for meta-analyses (26).

Assessment of Study Quality

Study quality was assessed by use of the Randomized Controlled Trial Psychotherapy Quality Rating Scale (RCT-PQRS) (27). The RCT-PQRS provides an empirical method for evaluating the quality of published randomized controlled trials. It contains 24 items rated on a scale from 0 to 2, yielding a maximum score of 48. A quality score of 24 or above is considered to represent a cutoff for a "reasonably well done study" (28, p. 24). The RCT-PQRS was found to have good interrater reliability, internal consistency, and validity (27). RCT-PQRS ratings for each study were performed by at least two independent raters. Interrater agreement for the total score was excellent (ICC=0.82). The average total score of the respective independent ratings was used in the statistical analyses.

Assessment of Allegiance

It has been repeatedly shown that results in psychotherapy research might be heavily biased by researchers' allegiances (29, 30). Despite these findings, allegiance is rarely controlled for both in primary studies as well as in meta-analyses (31). We took allegiance into account on both levels.

First, to control for possible allegiance effects and to minimize bias on the level of performing this meta-analysis, a model of adversarial collaboration was implemented by including proponents of both psychodynamic therapy (C.S., F.L., and T.M.) and CBT (J.H. and S.R.), the treatment psychodynamic therapy was compared with most often in the present meta-analysis (k=21/23). J.H. is a CBT researcher, and S.R. is a specialist in research methods and research

TABLE 2. Characteristics of Studies Included in a Meta-Analysis Comparing Efficacy of Psychodynamic Therapy With Established Treatments[a]

Study[b]	Diagnosis	Treatment Conditions	Subjects Included in Analysis at Posttreatment (N)	Sessions (N)	Outcome Measures	Longest Follow-Up	RCT-PQRS Total Score	MARS Total Score
Depressive disorders								
Barber et al. (52)	MDD (DSM-IV), HAM-D score ≥14	1. PDT 2. ADM	51 55	20 —	T	None	41	0
Connolly Gibbons et al. (51)	MDD (DSM-IV), QIDS score ≥11	1. PDT 2. CBT	118 119	16 16	T, P	None	39	1
Cooper et al. (53)	Postpartum MDD (DSM-III), EPDS score ≥12	1. PDT 2. CBT	48 42	10 10	T	55.5 months	35	0
Driessen et al. (46)	MDD (DSM-IV), HAM-D score ≥14	1. PDT 2. CBT	177 164	11 11	T	12 months	39	0
Gallagher-Thompson and Steffen (54)	Depressed family caregivers; major, minor, or intermittent depressive disorder (RDC); BDI score ≥10	1. PDT 2. CBT	21 31	20 20	T	3 months	25.5	–1
Salminen et al. (55)	MDD (DSM-IV), HAM-D score ≥15	1. PDT 2. ADM	26 25	16 —	T, P	8 months	27.5	1
Shapiro et al. (56)	MDD (DSM-III), BDI score >16	1. PDT–8 2. PDT–16 3. CBT–8 4. CBT–16	30 28 29 30	8 16 8 16	T, G, P	12 months	34	0
Thompson et al. (57)	Depressed elders, MDD (RDC), HAM-D score ≥14, BDI score ≥17	1. PDT 2. CBT 3. BT	30 31 30	16–20 16–20 16–20	T, G, P	24 months	22	–1
Anxiety disorders								
Bögels et al. (58)	Social anxiety disorder (DSM-IV)	1. PDT 2. CBT	19 25	31 20	T, G	12 months	34	–2
Leichsenring et al. (59)	Social anxiety disorder (DSM-IV)	1. PDT 2. CBT	207 209	26 26	T, G, P	24 months	46.5	0
Leichsenring et al. (60)	Generalized anxiety disorder (DSM-IV)	1. PDT 2. CBT	28 29	29 29	T, G, P	12 months	37	0
Milrod et al. (61)	Panic disorder (DSM-IV)	1. PDT 2. CBT	81 81	19–24 19–24	T	None	44	0
Posttraumatic stress disorder (PTSD)								
Brom et al. (62)[c]	PTSD (DSM-III)	1. PDT 2. CBT	25 27	19 15	T, G, P	3 months	22	0
Eating disorders								
Garner et al. (63)	Bulimia nervosa (modified DSM-III criteria and Russell criteria)	1. PDT 2. CBT	25 25	18 18	T, G, P	None	29.5	–1
Poulsen et al. (64)	Bulimia nervosa (DSM-IV)	1. PDT 2. CBT	34 36	72 20	T, G, P	None	36.5	0
Tasca et al. (65)	Binge eating disorder (DSM-IV)	1. G-PIP 2. G-CBT	37 37	12 12	T, G, P	12 months	37	1
Zipfel et al. (66)	Full or subsyndromal anorexia (DSM-IV)	1. PDT 2. CBT	80 80	40 45	T	12 months	39.5	0

continued

TABLE 2, *continued*

Study[b]	Diagnosis	Treatment Conditions	Subjects Included in Analysis at Posttreatment (N)	Sessions (N)	Outcome Measures	Longest Follow-Up	RCT-PQRS Total Score	MARS Total Score
Substance-related disorders								
Crits-Christoph et al. (67)	Cocaine dependence (current or in early partial remission, DSM-IV)	1. PDT	91	16	T, G, P	6 months	44	
		2. CBT	97	15				0 (PDT compared with CBT)
		3. IDC	92	12				0 (PDT compared with IDC)
Woody et al. (68)[d]	Opiate addiction (DSM-III and RDC)	1. PDT	31	12	T, G, P	6 months	31	0
		2. CBT	34	9				
Personality disorders								
Clarkin et al. (69)	Borderline personality disorder (DSM-IV)	1. TFP	23	≈84	T, G, P	None	29	1 (TFP compared with DBT)
		2. PDT	22	≈42				0 (PDT compared with DBT)
		3. DBT	17	≈84[e]				
Emmelkamp et al. (70)	Avoidant personality disorder (DSM-IV)	1. PDT	22	19	T, G, P	None	26	–1
		2. CBT	18	18				
Muran et al. (71)	Cluster C personality disorder or personality disorder not otherwise specified (DSM-IV)	1. BRT	33	30	T, G, P	6 months	34	0 (BRT compared with CBT)
		2. PDT	22	30				–1 (PDT compared with CBT)
		3. CBT	29	30				
Svartberg et al. (72)	One or more cluster C personality disorders (DSM-III-R)	1. PDT	25	40	T, G, P	24 months	36.5	0
		2. CBT	25	40				

[a] ADM=antidepressant medication; BDI=Beck Depression Inventory; BRT=brief relational therapy; BT=behavior therapy; CBT=cognitive-behavioral therapy; DBT=dialectic-behavioral therapy; EPDS=Edinburgh Postnatal Depression Scale; G=general psychiatric symptom measures; G-CBT=group CBT; G-PIP=group psychodynamic interpersonal therapy; HAM-D=Hamilton Depression Rating Scale; IDC=individual drug counseling based on the 12-step philosophy ("established" comparator); MARS=Multilevel Allegiance Rating Scale (see eAppendix E in the online data supplement); MDD=major depressive disorder; P=psychosocial functioning outcome measures; PDT=psychodynamic psychotherapy; QIDS=Quick Inventory for Depressive Symptomatology; RCT-PQRS=Randomized Controlled Trial Psychotherapy Quality Rating Scale; RDC=Research Diagnostic Criteria; T=target symptom measures; TFP=transference focused psychotherapy.

[b] References to the 23 trials, including the seven trials presenting follow-up data or additional outcomes, can also be found in eAppendix B in the online data supplement.

[c] Brom et al. (62) included a third comparison condition (hypnotherapy), which was not included in the present meta-analysis because it was not considered established in efficacy.

[d] Woody et al. (68) included a third comparison condition (individual drug counseling), which was not included in the present meta-analysis because it was not considered established in efficacy.

[e] Weekly individual and group sessions.

synthesis who, although putting special emphasis on research of psychodynamic therapy, has been formally trained in CBT.

Second, researcher allegiances often find expression in design features such as poor implementation of unfavored treatments or uncontrolled therapist allegiance (29, 32). To assess allegiance on the level of included studies, we modified a scale used in a previous study by one of us (T.M.) (29). The scale consists of five items assessing allegiance on four levels (the complete scale can be found in eAppendix E in the online data supplement): researcher allegiance (two items), therapist allegiance, trainer allegiance, and supervisor allegiance.

Items were assessed separately for each treatment condition based on the information provided in the respective articles. For each condition, scores were added, and the difference in scores between the conditions was calculated. The scale yields a score from 0 (balanced allegiance) to 4 or −4 (strong allegiance toward one treatment). Each study was judged by two independent raters. Interrater agreement was excellent (ICC=0.83). Disagreements were resolved by consensus.

Statistical Analyses

Statistical analyses were performed with Comprehensive Meta-Analysis, version 3. We aggregated effect size estimates across studies, adopting a random effects model, using maximum likelihood estimation to estimate between-study variability (tau^2). Between-group effect sizes for psychodynamic therapy compared with established comparators were calculated for the primary outcome (target symptoms) as well as for two other outcome areas: general psychiatric symptoms

and psychosocial functioning. A complete list of assessed outcomes and assignment of outcomes to outcome areas can be found in eAppendix F in the data supplement. Whenever possible, we used the most basic effect size estimate (i.e., unadjusted values). For continuous outcomes, Hedges' g correcting for small sample bias was determined by calculating the difference of the mean scores of the respective treatments at posttreatment or at follow-up and dividing it by the pooled standard deviation. If means and standard deviations were not reported or could not be calculated, we used dichotomous data (e.g., remission or response). When continuous and categorical data of the same outcome instrument were provided, only the continuous data were included to avoid redundancies. Whenever a study reported data of more than one outcome instrument for an area of outcome (e.g., target symptoms), we assessed effect sizes separately for each instrument and calculated a combined effect to assess the overall outcome. In case continuous and dichotomous data were available, they were transformed into a common metric (Hedges' g). When means and standard deviations or dichotomous data to calculate effect sizes were not provided, we contacted the authors of relevant studies (k=1). In case a study included more than two comparison groups, we included pairwise comparisons separately. To avoid "double counts" in the shared intervention group, the shared group N was split in half (33). Assessments at the end of treatment and at the latest follow-up were included. Intent-to-treat data were preferred over completer data. All effect sizes were coded in such a way that a positive sign indicated an advantage of psychodynamic therapy.

To test equivalence, we applied the two one-sided test procedure (see also eAppendix A in the online data supplement) (17, 20) using a prespecified equivalence interval of −0.25 to 0.25 at a significance level of 0.05 for each of the two one-sided tests (17). Corresponding to the two one-sided tests, a 90% equivalence confidence interval (CI) was calculated according to ES ± $(z_\alpha)\times$(SE), with ES being the mean pooled effects size, SE the standard error of ES, and z_α=1.645 (20). If the CI is included in the prespecified equivalence interval, the null hypothesis of nonequivalence is rejected and equivalence is concluded (20). Here, a significant result indicates equivalence.

Heterogeneity was assessed by chi-square heterogeneity tests and I^2 statistics. The I^2 statistic expresses the ratio of true to observed variance with values of 25%, 50%, and 75%, referred to as low, moderate, or high heterogeneity, respectively. Publication bias was assessed by testing for funnel plot asymmetry and by means of the Duval and Tweedie trim and fill procedure.

Moderator analyses were performed for a range of variables by means of meta-regressions using maximum likelihood estimation. The following moderators were studied: year of publication, recruitment method (community compared with clinical compared with mixed), intent-to-treat compared with completer analyses, type of diagnosis, study quality (total score of the RCT-PQRS), allegiance, number of sessions in the psychodynamic therapy groups, patient-per-therapist ratio (as an indicator for bias from therapist effects), and average sample size per group to investigate the presence of small study bias (34).

RESULTS

Characteristics of Included Studies

Literature searches yielded 23 randomized controlled trials, published between 1983 and 2016, that fulfilled the a priori set selection criteria (Table 2). These studies included data on 2,751 patients. Twenty-one randomized controlled trials compared one or more forms of psychodynamic therapy with another form of psychotherapy, which in all cases was a method of CBT. Comparisons with other forms of psychotherapy, such as interpersonal therapy, were not identified. The remaining two studies compared psychodynamic therapy with a selective serotonin reuptake inhibitor or with a serotonin-norepinephrine reuptake inhibitor in the treatment of depression. The majority of studies (k=8) investigated participants with a depressive disorder, followed by anxiety disorders (k=4), eating disorders (k=4), personality disorders (k=4), substance dependence (k=2), and posttraumatic stress disorder (k=1). With one exception (an investigation studying group psychotherapy), all studies employed psychodynamic therapy in an individual face-to-face format.

Equivalence Testing: Psychodynamic Therapy Relative to Established Comparators

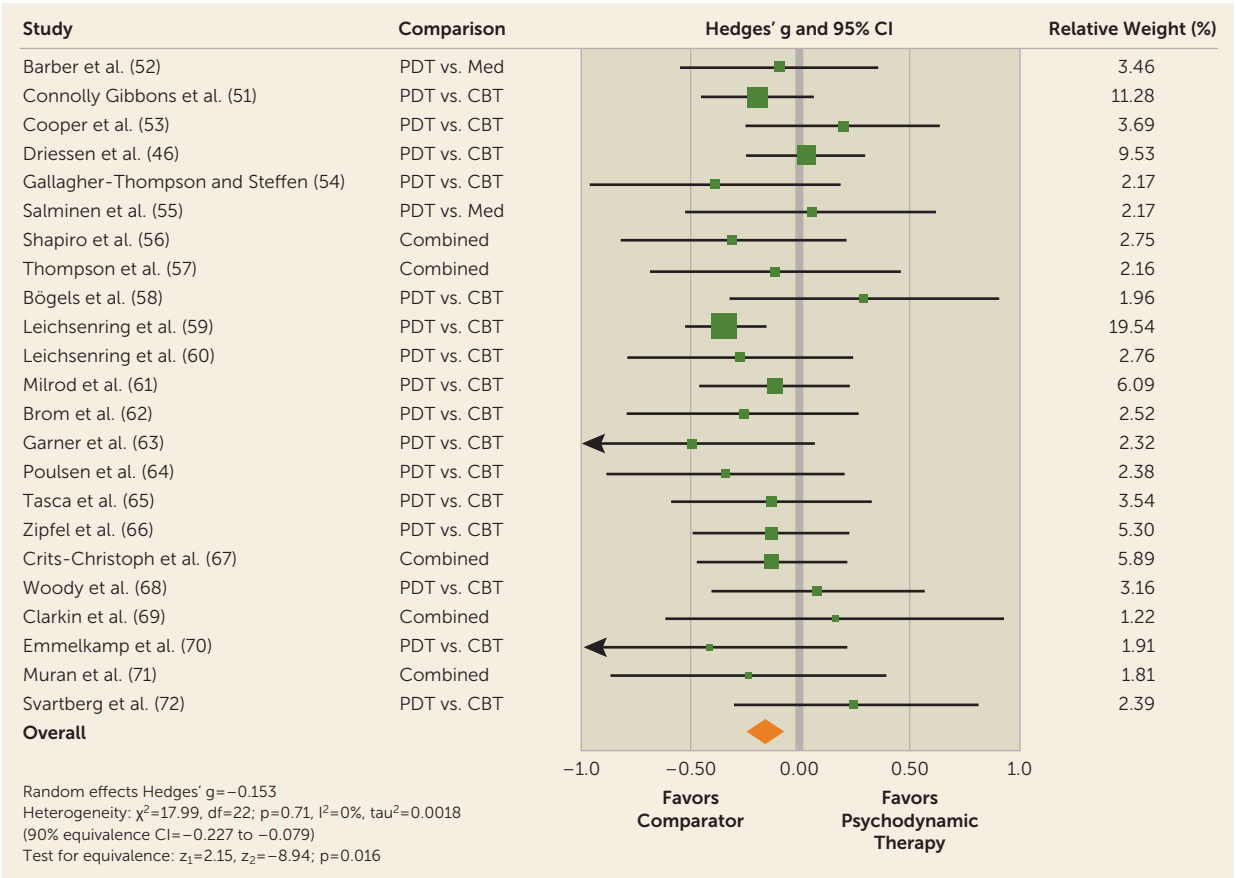
The pooled between-group difference in outcome for target symptoms at posttreatment was g=−0.153, indicating a small difference in favor of comparison treatments (Figure 1, Table 3). The 90% equivalence CI for this contrast was −0.227 to −0.079. Because this CI was included in the prespecified equivalence interval (−0.25 to 0.25), the null hypothesis of nonequivalence was rejected, and the alternative hypothesis of equivalence was accepted (p=0.016). Heterogeneity was very low (I^2=0, tau^2=0.0018). Similar results were found for target symptoms at follow-up (k=16, pooled difference g=−0.049, 90% equivalence CI=−0.137 to 0.039, p=0.0001; I^2=7.12, tau^2=0).

Equivalence was also shown for the other areas of outcome at posttreatment and follow-up (Table 3), except for psychosocial functioning. For the latter, psychodynamic therapy was not statistically equivalent to comparison treatments but was nominally better (g=0.165, 90% equivalence CI=−0.027 to 0.358, I^2=57.59), suggesting superiority of psychodynamic therapy. However, a post hoc test of superiority did not yield statistical significance (p=0.162). Excluding randomized controlled trials in which the comparison condition consisted of pharmacotherapy (k=2) did not change results, implying equivalence in outcome of psychodynamic therapy and CBT (Table 3).

Study Quality and Allegiance

Results for study quality and allegiance ratings can be found in Table 2. With a mean score of 35.3 (SD=5.7), the vast majority

FIGURE 1. Analysis of Effects of Psychodynamic Therapy Relative to Established Comparators on Target Symptoms at Posttreatment[a]



[a] CBT=cognitive-behavioral therapy; Med=pharmacotherapy; PDT=psychodynamic therapy.

of studies (k=21/23, or 91%) clearly were above the RCT-PQRS cutoff score of 24. For two studies with scores of 22, quality was below the RCT-PQRS cutoff.

Most of the studies achieved a balanced allegiance score of 0 (k=16); that is, no indicators for a favor toward one of the tested treatments were found. In k=7 of included studies, we found a minor allegiance toward the comparison treatment (score of −1 [k=6] or −2 [k=1]), while we found a minor allegiance toward psychodynamic therapy in k=4 studies (score of 1). Thus, in cases where some indication of allegiance was found, it was only minor (i.e., only one or two of four indicators were positive).

Moderator Analyses

According to moderator analyses performed for the main analysis (target symptoms at posttreatment), no moderator was significantly related to outcome (p>0.19, see Table 4), implying, for example, that the results are valid across the various disorders (no effect of diagnosis).

Publication Bias

Egger's regression test did not indicate funnel plot asymmetry (intercept=0.67, 95% CI=−0.39 to 1.73, p=0.20). Duval and Tweedie's trim and fill procedure indicated two missing studies on the left of the mean (i.e., in favor of comparisons). Adjusting for publication bias resulted in the addition of two "trimmed" studies and an adjusted pooled effect size of g=−0.176. However, this did not change the main result as the 90% equivalence CI (−0.246 to −0.106) was included in the equivalence interval (p=0.04). To assess equivalence after correcting for publication bias, the standard error (SE) was obtained via the following formula: SE=(upper limit−lower limit)/3.92=0.043 (33).

DISCUSSION

To our knowledge, this meta-analysis is the first in psychotherapy research to systematically investigate equivalence of a specific form of psychotherapy to established treatments by formally applying the logic of equivalence testing. Our meta-analysis found psychodynamic therapy to be as efficacious as other treatments with established efficacy, including CBT. Because we used high methodological standards (e.g., controlling for researcher allegiance, applying the logic of equivalence testing, using one of the smallest margins ever suggested as compatible with equivalence, and using treatments established in efficacy as comparators), the results of this meta-analysis can be expected to be robust. However, the number of studies that could be included is still limited, and further research is required.

TABLE 3. Between-Group Effects, 90% Equivalence CI, and Observed Heterogeneity of Psychodynamic Relative to Established Comparison Treatments for Target Symptoms, General Psychiatric Symptoms, and Psychosocial Functioning at Posttreatment and at Follow-Up

Symptom and Psychosocial Functioning Measures	Number of Studies (k)	Hedges' g	90% Equivalence CI	p[a]	Outcome of Equivalence Test	I^2 (%)	tau^2
All studies							
Target symptoms (posttreatment)	23	−0.153	−0.227 to −0.079	0.016	Equivalent	0	0.0018
Target symptoms (follow-up)	16	−0.049	−0.137 to 0.039	0.0001	Equivalent	7.12	0
General psychiatric symptoms (posttreatment)	15	−0.116	−0.211 to −0.020	0.01	Equivalent	0	0
General psychiatric symptoms (follow-up)	10	−0.014	−0.121 to 0.093	0.0001	Equivalent	0	0
Psychosocial functioning (posttreatment)	16	−0.088	−0.192 to 0.012	0.005	Equivalent	12.51	0.0108
Psychosocial functioning (follow-up)	9	0.165	−0.027 to 0.358[b]	0.23	Not equivalent	57.59	0.0614
Cognitive-behavioral therapy only							
Target symptoms (posttreatment)	21	−0.158	−0.236 to −0.080	0.026	Equivalent	0	0.0029
Target symptoms (follow-up)	15	−0.046	−0.135 to 0.043	0.0001	Equivalent	12.67	0
General psychiatric symptoms (posttreatment)[c]	15	−0.116	−0.211 to −0.020	0.01	Equivalent	0	0
General psychiatric symptoms (follow-up)[c]	10	−0.014	−0.121 to 0.093	0.0001	Equivalent	0	0
Psychosocial functioning (posttreatment)	15	−0.087	−0.195 to 0.021	0.006	Equivalent	18.17	0.0122
Psychosocial functioning (follow-up)[c]	9	0.165	−0.027 to 0.358[b]	0.23	Not equivalent	57.59	0.0614

[a] The p value, according to the equivalence test, was determined via equivalence z: z_1=(effect size+0.25)/standard error; z_2=(effect size−0.25)/standard error. The larger p value is displayed (significance level alpha=0.05), and a significant p value indicates that the null hypothesis of nonequivalence is rejected and that equivalence can be concluded (see also eAppendix A in the online data supplement).
[b] The equivalence test was not significant for this comparison (the 90% CI falls outside of the equivalence interval). Testing for superiority was also not significant (p=0.162).
[c] This analysis includes the same set of studies as above ("All studies").

TABLE 4. Results of Moderator Analyses Based on Target Symptoms at Posttreatment[a]

Moderator	Significance of Moderator	Slope	95% CI Slope
Year of publication	p=0.87	−0.0008	−0.01 to 0.01
Recruitment (community, clinical, or mixed)[b]	p=0.28	0.062	−0.05 to 0.17
ITT compared with completer data	p=0.77	0.027	−0.16 to 0.21
Type of diagnosis	p=0.93	0.003	−0.07 to 0.07
Number of sessions in psychodynamic groups	p=0.59	−0.002	−0.009 to 0.005
Average sample size per group	p=0.19	−0.0008	−0.002 to 0.0004
Patient-per-therapist ratio	p=0.35	0.007	−0.01 to 0.02
Study quality (RCT-PQRS total score)	p=0.38	−0.006	−0.02 to 0.01
Allegiance	p=0.91	0.008	−0.14 to 0.16

[a] ITT=intent-to-treat; RCT-PQRS=Randomized Controlled Trial Psychotherapy Quality Rating Scale.
[b] Based on k=20 studies.

Several conventional meta-analyses reported no differences in outcome between psychodynamic therapy and other treatments (e.g., 10, 11), whereas other conventional meta-analyses reported CBT to be superior to psychodynamic therapy (12–14). It is of note, however, that these previous meta-analyses did not apply the logic of equivalence testing, did not include only established comparators, and did not adequately control for researcher allegiance, thus allowing only for less definite conclusions. Our results are consistent with the conventional meta-analyses that reported no differences in outcome between psychodynamic therapy and other treatments (10, 11), adding more robust data to support the notion of equivalence between treatments. It is of note that the meta-analyses reporting inferiority of psychodynamic therapy showed both some differences in design and several methodological shortcomings (35). For example, Tolin (13) applied less strict inclusion criteria than our meta-analysis did, which resulted in the inclusion of 11 randomized controlled trials that did not fulfill our inclusion criteria. Thus, the overlap in studies between Tolin's and our meta-analysis is small (k=7). Furthermore, according to Tolin's own analysis, most of the results in favor of CBT compared with psychodynamic therapy were not robust against file drawer effects (13). The two further meta-analyses that found CBT to be superior to psychodynamic therapy are both based on only three studies of psychodynamic therapy and are therefore not representative (12, 14). Further shortcomings of these meta-analyses were discussed by Wampold et al. (35).

Our findings are limited with regard to psychopharmacology because only two studies of this treatment were

included. Previous meta-analyses concluded that psychotherapy and pharmacotherapy may be equally efficacious (36), suggesting that this may also be true for psychodynamic therapy regarding the mental disorders studied here. Furthermore, randomized controlled trials comparing psychodynamic therapy with other forms of psychotherapy, such as interpersonal therapy, were not identified. Like all meta-analyses, the present one is limited by the nature of the studies included. To the extent that some of the studies comparing psychodynamic therapy with CBT or with medication may have recruited, at least in part, patients who do not respond well to treatment, the literature may be biased toward the finding of no differences between these treatments. However, the between-studies variance was very low, suggesting no significant effects of low responsiveness.

Although efficacious treatments for mental disorders are available, it is important to note that, in general, rates of response and remission are not yet satisfactory. For anxiety disorders, for example, a recent review found a mean CBT response rate of 49.5% (37). For depressive disorders, response rates are comparable, but remission rates are even lower (38). Thus, at present, none of the available treatments may claim to be the panacea. There clearly is room for improvement. Because therapist effects seem to have a stronger impact on outcome than the treatments being compared and need to be taken into account, one promising strategy for improving treatments is enhancing therapist training and eventually therapist outcome (39). Furthermore, different patients may benefit from different approaches, which is why a shift from one empirically supported treatment to another may be helpful in case of nonresponse (40, 41).

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Drs. Leichsenring and Steinert conceived the idea for the study, designed the study, and wrote the study protocol, which was revised and approved by all coauthors. Drs. Leichsenring and Steinert performed literature searches. All authors calculated effect sizes, assessed study quality, and performed allegiance ratings. Dr. Steinert managed data analysis from Comprehensive Meta-Analysis and wrote the first version of the manuscript, which was later revised for intellectual content by all authors. The final manuscript was read and approved by all authors.

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