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Exploring the efficacy of psychological treatments for depression: a multiverse meta-analysis protocol

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ABSTRACT

Introduction In the past four decades, over 700 randomised controlled trials (RCTs) and 80 meta-analyses have examined the efficacy of psychological treatments for depression. Overwhelming evidence suggests that all types of psychological treatments are effective. Yet, many aspects are still unexplored. Meta-analysts could perform hundreds of potential meta-analyses with the current literature, and a comprehensive bird's-eye view of all published studies is missing. This protocol outlines how a multiverse meta-analysis can evaluate the entire body of the literature on psychological treatments of depression in a single analysis. Thereby, gaps of evidence and areas of robustness are highlighted.

Methods and analysis We will conduct systematic literature searches in bibliographical databases (PubMed, Embase, PsycINFO and Cochrane Register of Controlled Trials) up until 1 January 2021. We will include all RCTs comparing a psychological treatment with a control condition. We will include studies published in English, German, Spanish or Dutch, and exclude trials on maintenance and relapse prevention as well as dissertations. Two independent researchers will check all records. All self-reported and clinician-rated instruments measuring depression are included. We will extract information on recruitment settings, target groups, age groups, comorbidity, intervention formats, psychotherapy types, number of sessions, control conditions and country. Two independent researchers will assess risk of bias using the Cochrane Risk of Bias assessment tool. As part of the multiverse meta-analysis, unweighted, fixed effect and random effects models will be calculated.

Ethics and dissemination As we will not collect any primary data, an ethical approval of this protocol is not required. We will publish the results in a peer-review journal and present them at international conferences. We will follow open science practices and provide our code and data.

Strengths and limitations of this study

- We will investigate the efficacy of psychological interventions for depression on a broad range of subgroups (ie, age groups, treatment formats, types of treatments, type of control group) with a multiverse meta-analysis—rather than having to conduct each of these meta-analyses in individual studies, this approach can investigate all of them in one single analysis.
- We will investigate how flexibility in data analysis might affect the emerging meta-analytical results and, in doing so, will be able to identify gaps in the literature and highlight areas of robust and reliable evidence.
- Thereby, this study can help to resolve conflicting meta-analyses and provide a bird's-eye perspective on the entire field of psychological depression research.
- Uncovering strong evidence for the efficacy of these psychological interventions for depression can help guide decision-making for the allocation of scarce healthcare resources and funding away from redundant research.
- Multiverse meta-analyses cannot end debates about which meta-analysis should be run or is the correct one but rather facilitate those debates by creating a space of all reasonable meta-analyses and visualising why these meta-analyses produced diverging results.

INTRODUCTION

Depression is the most researched mental disorder worldwide as it is highly prevalent, costly and associated with many adverse outcomes such as reduced role functioning and quality of life as well as increased comorbidity and mortality.[1–4] As of 10 July 2019, 81 meta-analyses have examined the efficacy of various psychological treatments on depression to identify which therapies are effective for which groups.[5] Evidence from over 700 included randomised control trials suggests the efficacy of all common psychological treatments for depression,[6 7] that is cognitive behavioral therapy,[8] behavioural activation therapy,[9] interpersonal psychotherapy,[10] problem-solving therapy,[11] psychodynamic therapy,[12 13] third-wave psychotherapies[14] and non-directive counselling,[15] with no significant differences in efficacy between these treatments.[2] These therapies are also effective in most target groups (older adults, college students, patients with general medical disorders), yet tend to be less effective in some—such as patients with comorbid

substance use disorders or chronic depression. Furthermore, these treatments are effective when delivered in individual, group and guided self-help format.

Due to the exponential growth of research on psychotherapy for adult depression, it is important to summarise, integrate and visualise the knowledge from these meta-analyses and primary studies on differences between therapies, target groups, treatment formats and control conditions. Although these meta-analyses exist, a bird's-eye view of the field is still missing. For this reason, we will apply the approach of a multiverse meta-analysis that allows to investigate all reasonable meta-analyses that could be conducted based on the available primary studies. Such a multiverse meta-analysis provides three important benefits over other research synthesis methods:

First, even though conventional meta-analyses also provide an overview of the published literature on a given research question, they do not consider different paths that could have been taken in selecting the data or the data could be analysed. Making sure that the conclusions of a meta-analysis are not disproportionately influenced by data analytical decisions, a multiverse meta-analysis can provide the entire picture and underpin the robustness of the findings—or lack thereof—by conducting all possible and reasonable meta-analyses at once.

Second, it allows us to (1) provide a research integration similar to umbrella reviews and (2) investigate the influence flexibility in data analysis could have on published meta-analyses.

Importantly, in contrast to umbrella reviews, which aim to narratively and visually synthesise multiple published meta-analyses, a multiverse analysis also includes not yet conducted meta-analyses. Conducting and including these possible, reasonable meta-analyses within the multiverse meta-analysis provides a complete picture that is less dependent on flexibility in study selection and available primary studies. For example, recent umbrella reviews evaluated the evidence for the effectiveness of physical activity on depression,[16 17] the efficacy of psychosocial interventions for mental health disorders,[18] the effectiveness of psychotherapy in general[19] and biomarkers associated with mental health disorders.[20] A multiverse meta-analysis could also provide such integration of multiple meta-analyses but contain more information about diverging evidence by providing a robustness check of all potential meta-analyses.

Third, at times, multiple meta-analyses with overlapping research questions reach different conclusions due to differences in inclusion and exclusion criteria, data analytical decisions, differences in publication bias assessment and risk of bias assessment in general.[21 22] It is therefore crucial to evaluate the influence such choices might have on the final result of each meta-analysis. Was the method, restriction of diagnostic criteria or other exclusion criteria decisive, or is the same result reached via multiple analytical strategies? A multiverse meta-analysis can provide the needed clarity to answer these questions by extending the idea of sensitivity analyses. All meta-analyses that can be considered as reasonable based on the included determinants can be calculated in a single analysis and the results can be visualised simultaneously.

To provide such a bird's-eye perspective on the entirety of depression research, we will conduct our multiverse meta-analysis using the MetaPsy database.[7 23] The MetaPsy database is uniquely suited to help answer these outlined questions as it contains all randomised control trials evaluating the treatment efficacy for depression. Thus, the planned study will allow an examination of the robustness of all published randomised control trials on the efficacy of psychological treatments for depression by investigating all possible and reasonable meta-analyses in a single study—the multiverse of psychological treatments for depression. This will provide an exhaustive overview to guide future research as knowledge gaps are identified, and policy-makers can use this overview to inform evidence-based decision-making. Examining this multiverse of psychological depression research can help resolve conflicting meta-analyses and contested evidence, mitigate the associated adverse effects of these phenomena on research progress, and provide a bird's-eye perspective of the entire field.[24]

Table 1 PICOs framework for explicit research question of this study

PICOs criteria	Determinants
Patient	Participants suffering from any depressive disorder, diagnosed either as major depression, subclinical depression, mood disorder, chronic depression or by a cut-off score.
Intervention	Any type of psychological intervention, such as cognitive behavioural therapy, problem-solving therapy, third-wave cognitive therapies, behavioural activation therapy, non-directive supportive therapy, psychodynamic therapy, interpersonal therapy, life review therapy or other types of therapy.
Comparison	Any type of control condition: care as usual, waiting list or other types of control conditions.
Outcome	All self-reported and clinician-rated instruments measuring depression.
Study design	Randomised controlled trials.

PICOs, Patient, intervention, comparison, outcome, study design.

Aim and objective

We aim to estimate the influence of different types of psychological treatments, control conditions, and participant groups have on the effect size estimates across all published randomised studies (see table 1 for all determinants of the PICO framework).

METHODS AND ANALYSIS

Multiverse meta-analysis

A multiverse meta-analysis contains all reasonable meta-analyses on a research question that could be conducted—reasonable meaning that they have a

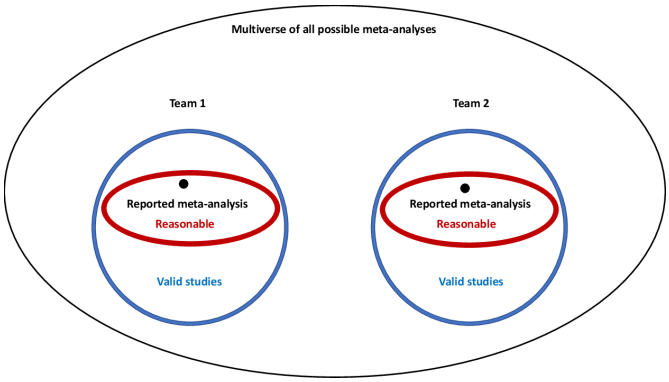

Figure 1 Sets of possible specifications as perceived by two research teams conducting meta-analyses.

theoretical foundation. Generally, the multiverse contains all combinations of reasonable specifications. For instance, different research teams would consider it to be reasonable to investigate psychological treatments for depression with different age groups, different types of therapies or control conditions. It would also be possible to investigate the efficacy of psychological treatments on depression for variables not guided by theory, for instance different first names, favourite French movies, or hair length, yet most experts would not consider these specifications to be valid or reasonable.

Figure 1 illustrates this difference between possible and reasonable specifications for multiverse meta-analyses. A large, possibly infinite, multiverse of meta-analyses could be conducted on a single research question (black circle). Different research teams consider only a subset of these to be valid (the blue circles) based on their inclusion and exclusion criteria. These questions can be investigated with different appropriate methods, resulting in a set of specifications that are considered reasonable (the red circles). Diverging meta-analyses (black dots) can emerge because different research teams draw different circles. Therefore, multiverse meta-analyses cannot end debates about what specifications are reasonable or which meta-analyses should be run but rather facilitate those debates by creating a space of all reasonable meta-analyses and visualising why these meta-analyses produced diverging results.[24] Even if two teams have non-overlapping sets of reasonable specifications, multiverse meta-analysis can help them understand why they may have reached different conclusions: Do these different conclusions arise due to differences in red circles (difference in which sets of specifications are deemed reasonable), or due to different black dots (differences in selectively reported meta-analyses).

To conduct such a multiverse meta-analysis, Voracek *et al*[24] suggest blending two approaches initially developed for the analysis of primary studies—the specification curve and the multiverse analysis approach.

Specification curve analysis is comprised of four steps: (1) identifying all reasonable specifications for analysis, that is, deciding which data to analyse and how (see figure 1), (2) statistically analysing all of them, (3) visualisation of the emerging results and (4) inferential statistical procedures to test if the overall results deviate from the null hypothesis.[25] Steegen *et al*[26] proposed a similar procedure called 'multiverse analysis'. Both multiverse analysis and specification curve analysis are almost identical in first and second steps, but they deviate in the proposed graphical displays for the third step, and multiverse analysis avoids the inferential statistics of the fourth step.

Based on these considerations, our resulting multiverse meta-analysis will consist of three steps: (1) creating a list of all reasonable specifications, (2) conducting inferential statistical tests (a parametric bootstrap procedure) and (3) visualising the multiverse meta-analysis (descriptive and inferential statistical specification curve plots).

Step 1: creating a list of all reasonable specifications

We will consider seven Which factors (which data to meta-analyse) and one How factor (how to meta-analyse the data), as follows.

Which factors: which data to analyse?

The decisions of which groups to compare in a meta-analysis are manifold; we decided to specify the following seven relevant study features:

- *Target group.* Researchers may decide to compare specific populations only. Included are the categories: (1) adults (adults in general with no specific demographic characteristic), (2) general medical group, (3) perinatal depression, (4) student population, (5) older adults, (6) other groups or (7) all target groups.
- *Format.* Researchers might compare interventions for different types of therapy delivery: (1) group, (2) individual, (3) guided self-help, (4) couples, (5) telephone, (6) other formats or (7) all formats.
- *Diagnosis.* We compare interventions that based their inclusion of participants on different types of diagnoses. These specifications include the following diagnoses: (1) major depression according to criteria by the Diagnostic and Statistical Manual of Mental Disorders (DSM), DSM-V, DSM-IV, DSM-III- R, DSM-III, Research Diagnostic Criteria (RDC) for major depression, or Feighner criteria for depressive disorder. We will also include diagnoses of (2) mood disorder or other diagnosed disorders (eg, dysthymia; depression Not Otherwise Specified; minor depression according to RDC). (3) Chronic depression, i.e., participants meet criteria for chronic or treatment-resistant depression, according to any definition given by the authors of the study. We also include diagnoses defined as (4) scoring above a clinically relevant cut-off score or (5) diagnosed subclinical depression, that is, participants score above a cut-off on a self-rating scale, but do not meet criteria for a depressive disorder according to a diagnostic interview (such as the Composite International Diagnostic Interview or Structured Clinical Interview for DSM).

- *Type*. Researchers might compare interventions for different types of therapies: (1) cognitive behavioral therapy, (2) problem-solving therapy, (3) third-wave cognitive therapies, (4) behavioural activation therapy, (5) non-directive supportive therapy, (6) psychodynamic therapy, (7) interpersonal therapy, (8) life review therapy, (9) other types of therapy or (10) all types of therapy.
- *Control conditions*. Researchers might compare interventions for different types of control conditions. These specifications include: (1) care as usual, (2) waiting list, (3) other types of control conditions or (4) all types of control conditions.
- *Country*. Researchers might compare studies conducted in different regions: (1) EU, (2) the USA, (3) the UK, (4) Canada, (5) East Asia, (6) Australia, (7) other countries or (8) all countries.
- *Risk of bias*. Researchers might compare studies with different degrees of risk of bias assessed with the risk of bias assessment tool.[27] Based on the assessment of allocation concealment, blinding of assessors, intention-to-treat analyses and sequence generation, we will create a dichotomous variable indicating whether the study is graded as (1) low risk of bias (if each aspect is rated as low risk) or (2) some concern (if any or all aspects are rated as high risk). We will also include a specification including (3) all studies, regardless of bias assessment.

How factors: how to analyse the data?

The How factor we analyse concerns the choice of the meta-analytic model—random effects model (REM), the fixed-effect model, three-level model or unweighted model (UWM). We will calculate standardised mean differences (Hedges *g*) based on post-treatment outcomes. We consider two REM variants, which differ in the way the between-study variance is estimated: (1) the DerSimonian-Laird estimator, which is the default estimator in the popular Comprehensive Meta-Analysis software[28] and the restricted maximum likelihood estimator (REML), which is the default in the popular metafor R package.[29] Multilevel models (3-LVL) are particularly well equipped to account for effect size dependency when multiple effect sizes are reported per study, and are therefore also included in our multiverse meta-analysis. Additionally, we follow the recommendation by Voracek *et al*[24] to calculate an unweighted meta-analytic model (UWM). Even though this is unusual for meta-analysis, we consider this approach necessary because of the similarities with the 'cognitive algebra' that is common in narrative, unsystematic reviews where empirical evidence is not weighted according to its information value (sample size). To include an effect size estimate accounting for the potential presence of publication bias, we include the *p*-uniform* estimate.[30] Together, the How factor makes up for five different ways to meta-analyse the same data. Theoretically, these Which and How factor combinations could produce up to 6×8 × 7×6 × 10×4 × 8×6 × 3×5 = 58 060 800 ways to meta-analyse different data subsets.

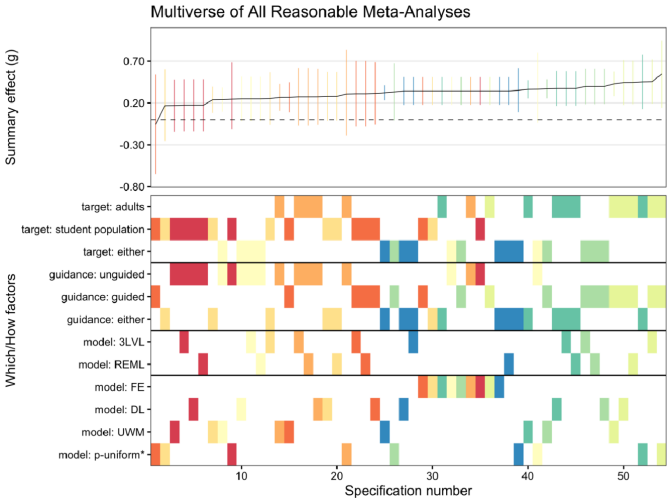

Figure 2 Descriptive meta-analytic specification plots with simulated data. DL, DerSimonian-Laird estimator; FE, fixed effect; REML, restricted maximum likelihood estimator; UWM, unweighted mode; 3-LVL, three-level model.

Step 2: specification curve analysis

We conduct an inferential statistical test with a parametric bootstrap approach to evaluate the descriptive meta-analytic specification curve plot against the null hypothesis of no psychological treatment effect on depression. We regard all study features for each sample from the literature as fixed but simulate random values as new effect sizes under the assumption that the null hypothesis is true. Means are randomly drawn from a normal distribution centred around zero, and the SD are set to the observed SD. Then, descriptive specification curve analysis is applied and repeated 1000 times.[24] The resulting 1000 bootstrapped specification curves are used to identify the lower and upper limits—the 2.5% and 97.5% quantiles. Exceeding these limits would indicate a deviation from the under-the-null scenario of no effect (g=0). We do not have any prior assumptions of direction, magnitude or significance of the deviations from an effect under-the-null scenario.

Step 3: visualisations of specification curve analysis

The first visualisation will depict descriptive meta-analytic specification plots that display the specification curve meta-analyses (for an example with simulated data, see figure 2). In particular, these plots visualise factor-level combinations of How and Which factors constituting a given specification, the number of included samples in a specification, and the resulting meta-analytic summary effects (g) for each specification, along with 95% CIs.

The top panel in figure 2 shows the meta-analytic summary effects (g) for each specification with 95% CIs. The summary effects are sorted by their magnitude. Connecting the different summary effects results in the solid line, which is the specification curve. A horizontal

dotted line of no effect is shown at g=0. The vertical columns in the bottom panel represent factor combinations of How factors (in this example, different age groups and different types of guided or unguided therapy) and Which factors (different appropriate methods: fixed effect model, REM, REML estimator, 3-level meta-analysis) that constitute a given specification. Each vertical column is color coded, signifying the number of samples included in a specification (hot spectral colours for smaller numbers of included samples vs cool spectral colours code for larger number of included samples).

The second visualisation will display inferential meta-analytic specification plots that show the specification curve of the magnitude-sorted meta-analytic summary effects for all specifications. Included will be the corresponding pointwise 97.5% and 2.5% quantiles of 1000 specification curves, simulated under the null hypothesis for a given specification number using a parametric bootstrap procedure. Exceeding these limits would provide evidence against the null hypothesis (g=0).

In the third visualisation we follow the suggestion by Voracek *et al*[24] to additionally apply combinatorial meta-analysis which calculates the statistic of interest for all possible subsets of studies in the meta-analysis—for 2^{k-1} subsets when there are k studies. Although combinatorial meta-analysis is an exhaustive way to identify influential studies in a meta-analysis, it becomes computationally infeasible with an increasing number of primary studies. In the case of the dataset from the previous year, this would amount to at least $2^{363}=1.88 \times e^{109}$ meta-analyses—exceeding the computational feasibility of such a project. For this reason, Voracek *et al*[24] suggest only drawing a smaller, random subset due to feasibility and data visualisation considerations. We will visualise this reduced set of studies with a graphical display of study heterogeneity plot,[31] which is particularly suited to visualise the cross-study effect heterogeneity of each subset in the combinatorial meta-analytic multiverse. As combinatorial meta-analysis is a brute-force method that automatically tests all possible study subsets in a single analysis, it will include by default many specifications that would not be regarded as reasonable. In that respect, the multiverse meta-analysis can be viewed as a theoretically and conceptually guided variant of combinatorial meta-analysis. A further important difference is that combinatorial meta-analysis analyses all study subsets with the same meta-analytic technique.[24] In contrast, the multiverse meta-analytic approach allows several methods (eg, fixed-effect, random effects and multilevel modelling). We will choose a random sample of 100 000 subsets for the combinatorial meta-analysis and use a stratified sampling approach based on the subsets' sizes. Thus, we can ensure the representativeness of the subset for the full set of combinations.

Data sources

We will update our existing database containing all randomised controlled trials (RCTs) on the efficacy of psychological treatments on depression by systematic literature searches in bibliographical databases (PubMed, Embase, PsycINFO and Cochrane Register of Controlled Trials; see online supplemental file 1) for Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Protocols checklist[32] and online supplemental file 2) for search strings). The update of the database will include studies published between 1 January 2020 and 1 January 2021.

Data extraction

After title and abstract screening, two independent researchers (PC and EK) will conduct full-text screening of all records. All eligible studies will be saved in an EndNote library and exported to R for further analyses. A PRISMA Flow Diagram will detail the entire literature search process. We will independently extract information on recruitment settings, target groups, comorbidity, intervention formats, psychotherapy types, number of sessions, control conditions and country (see online supplemental material 3 for our data extraction form). Inconsistencies will be extracted again by a different researcher.

Risk of bias assessment

Two independent researchers will assess risk of bias using the Cochrane Risk of Bias assessment tool.[27]

Inclusion criteria

We will include all RCTs comparing a psychological treatment with a control condition. We will include studies published in English, German, Spanish or Dutch, and exclude trials on maintenance and relapse prevention as well as dissertations. Two independent researchers (PC and EK) will check all records. Eligible are all self-reported and clinician-rated instruments measuring depression. Therapies can be delivered by any person trained to deliver the therapy ranging from psychologist, psychiatrist, nurse, social worker to lay health counsellors and paraprofessionals (ie, lay people trained to deliver psychotherapy).

Exclusion criteria

Studies were excluded if (1) the study did not explicitly state it was randomised; (2) depression was not an inclusion criterion; (3) the studies investigated patients in treatment intending to prevent relapse or maintain outcomes over time; (4) the studies investigated children and adolescents; (5) the study was a dissertation; (6) the specific effects of psychological treatment could not be discerned; (7) the psychological treatment was not aimed at depression (eg, depression scores were assessed for insomnia treatment); (8) insufficient data were reported to calculate effect sizes (even if another meta-analysis reported an effect size for a specific RCT, we will not include that effect size if the RCT does not provide enough information to calculate a standardised mean difference) and if (9) studies were reported in another language than German, Dutch, English or Spanish.

Patient and public involvement

Patients or the public were not involved in the design or development of this manuscript.

ETHICS AND DISSEMINATION

Because we will not collect any primary data, the study does not require additional formal ethical assessment and informed consent. We will present the results from this study at relevant conferences and publish the results in a peer-reviewed journal. All statistical manipulations (the How factors) and study inclusion criteria (the Which factors) are addressed in detail in the present protocol and will be addressed in the final analysis as well. All components necessary for reproducible data analysis (open data, open materials, and open code) will be made accessible and will comply with the findable, accessible, interoperable and reusable guiding principles for scientific data.[33]

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Contributors CYP conceived of the presented idea. PC and EK prepared the data curation. CYP wrote the initial draft, which was reviewed and edited by PC and EK. PC and EK supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Information reported on page #
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not an update
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	-
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	15
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Not an amendment
Support:			
Sources	5a	Indicate sources of financial or other support for the review	15
Sponsor	5b	Provide name for the review funder and/or sponsor	Self-funded
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Self-funded
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	4-5
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Table 1
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Table 1 and pages 12-13
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	12
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it	Search strings in supplemental

		could be repeated	material search
Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	12
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	12
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	12
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	12
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Table 1, page 8-9, 12
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	9, 13
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	9-10
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	10-12
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	10-12
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Not planned.
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	9,13
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	7-8, 10-11

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

Search strings for four bibliographical databases.

PubMed

Psychotherapy [MH] OR psychotherap*[All Fields] OR cbt[All Fields] OR "behavior therapies"[All Fields] OR "behavior therapy"[All Fields] OR "behavior therapeutic"[All Fields] OR "behavior therapeutical"[All Fields] OR "behavior therapeutics"[All Fields] OR "behavior therapeutist"[all Fields] OR "behavior therapeutists"[All Fields] OR "behavior treatment"[All Fields] OR "behavior treatments"[All Fields] OR "behaviors therapies"[All Fields] OR "behaviors therapy"[All Fields] OR "behaviors therapeutics"[All Fields] OR "behaviors therapeutic"[All Fields] OR "behaviors therapeutical"[All Fields] OR "behaviors therapeutist"[All Fields] OR "behaviors therapeutists"[All Fields] OR "behaviors treatment"[All Fields] OR "behaviors treatments"[All Fields] OR "behavioral therapies"[All Fields] OR "behavioral therapy"[All Fields] OR "behavioral therapeutics"[All Fields] OR "behavioral therapeutic"[All Fields] OR "behavioral therapeutical"[All Fields] OR "behavioral therapeutist"[All Fields] OR "behavioral therapeutists"[All Fields] OR "behavioral treatment"[All Fields] OR "behavioral treatments"[All Fields] OR "behaviour therapies"[All Fields] OR "behaviour therapy"[All Fields] OR "behaviour therapeutic"[All Fields] OR "behaviour therapeutical"[All Fields] OR "behaviour therapeutics"[All Fields] OR "behaviour therapeutist"[all Fields] OR "behaviour therapeutists"[All Fields] OR "behaviour treatment"[All Fields] OR "behaviour treatments"[All Fields] OR "behaviours therapies"[All Fields] OR "behaviours therapy"[All Fields] OR "behaviours therapeutics"[All Fields] OR "behaviours therapeutic"[All Fields] OR "behaviours therapeutical"[All Fields] OR "behaviours therapeutist"[All Fields] OR "behaviours therapeutists"[All Fields] OR "behaviours treatment"[All Fields] OR "behaviours treatments"[All Fields] OR "behavioural therapies"[All Fields] OR "behavioural therapy"[All Fields] OR "behavioural therapeutics"[All Fields] OR "behavioural therapeutic"[All Fields] OR "behavioural therapeutical"[All Fields] OR "behavioural therapeutist"[All Fields] OR "behavioural therapeutists"[All Fields] OR "behavioural treatment"[All Fields] OR "behavioural treatments"[All Fields] OR "cognition therapies"[All Fields] OR "cognition therapie"[All Fields] OR "cognition therapy"[All Fields] OR "cognition therapeutical"[All Fields] OR "cognition therapeutic"[All Fields] OR "cognition therapeutics"[All Fields] OR "cognition therapeutist"[All Fields] OR "cognition therapeutists"[All Fields] OR "cognition treatment"[All Fields] OR "cognition treatments"[All Fields] OR psychodynamic[All Fields] OR Psychoanalysis[MH] OR psychoanalysis[All Fields] OR psychoanalytic*[All Fields] OR counselling[All Fields] OR counseling[All Fields] OR Counseling[MH] OR "problem-solving"[All Fields] OR mindfulness[All Fields] OR (acceptance[All Fields] AND commitment[All Fields]) OR "assertiveness training"[All Fields] OR "behavior activation"[All Fields] OR "behaviors activation"[All Fields] OR "behavioral activation"[All Fields] OR "cognitive therapies"[All Fields] OR "cognitive therapy"[All Fields] OR "cognitive therapeutic"[All Fields] OR "cognitive therapeutics"[All Fields] OR "cognitive therapeutical"[All Fields] OR "cognitive therapeutist"[All Fields] OR "cognitive therapeutists"[All Fields] OR "cognitive treatment"[All Fields] OR "cognitive treatments"[All Fields] OR "cognitive restructuring"[All Fields] OR (("compassion-focused"[All Fields] OR "compassion-focussed"[All Fields]) AND (therapy[SH] OR therapies[All Fields] OR therapy[All Fields] OR therape*[All Fields] OR therapis*[All Fields]OR Therapeutics [OR treatment*[All Fields])) OR ((therapy[SH] OR therapies[All Fields]
OR therapy [All Fields] OR therape*[All Fields] OR therapis*[All Fields] OR Therapeutics[MH] OR treatment*[All Fields]) AND constructivist*[All Fields]) OR "metacognitive therapies"[All

Fields] OR "metacognitive therapy"[All Fields] OR "metacognitive therapeutic"[All Fields] OR "metacognitive therapeutics"[All Fields] OR "metacognitive therapeutical"[All Fields] OR "metacognitive therapeutist"[All Fields] OR "metacognitive therapeutists"[All Fields] OR "metacognitive treatment"[All Fields] OR "metacognitive treatments"[All Fields] OR "meta-cognitive therapies"[All Fields] OR "meta-cognitive therapy"[All Fields] OR "meta-cognitive therapeutic"[All Fields] OR "meta-cognitive therapeutics"[All Fields] OR "meta-cognitive therapeutical"[All Fields] OR "meta-cognitive therapeutist"[All Fields] OR "meta-cognitive therapeutists"[All Fields] OR "meta-cognitive treatment"[All Fields] OR "meta-cognitive treatments"[All Fields] OR "solution-focused therapies"[All Fields] OR "solution-focused therapy"[All Fields] OR "solution-focused therapeutic"[All Fields] OR "solution-focused therapeutics"[All Fields] OR "solution-focused therapeutical"[All Fields] OR "solution focused therapies"[All Fields] OR "solution focused therapy"[All Fields] OR "solution focused therapeutic"[All Fields] OR "solution focused therapeutics"[All Fields] OR "solution focused therapeutical"[All Fields]OR "solution-focussed therapies"[All Fields] OR "solution-focussed therapy"[All Fields] OR "solution-focussed therapeutic"[All Fields] OR "solution-focussed therapeutics"[All Fields] OR "solution-focussed therapeutical"[All Fields]OR "solution focussed therapies"[All Fields] OR "solution focussed therapy"[All Fields] OR "solution focussed therapeutic"[All Fields] OR "solution focussed therapeutics"[All Fields] OR "solution focussed therapeutical"[All Fields] OR "self-control therapies"[All Fields] OR "self-control therapy"[All Fields] OR "self-control therapeutics"[All Fields] OR "self-control therapeutical"[All Fields] OR "self-control therapeutic"[All Fields] OR "self- control training"[All Fields] OR "self-control trainings"[All Fields] OR "self control therapies"[All Fields] OR "self control therapy"[All Fields] OR "self control therapeutics"[All Fields] OR "self control therapeutical"[All Fields] OR "self control therapeutic"[All Fields] OR "self control training"[All Fields] OR "self control trainings"[All Fields]
AND
(Depressive Disorder[MH] OR Depression[MH]OR dysthymi*[All Fields] OR "affective disorder"[All Fields]OR "affective disorders"[All Fields] OR "mood disorder"[All Fields] OR "mood disorders"[All Fields] OR depression*[All Fields] OR depressive*[All Fields] OR "dysthymic disorder"[MeSH Terms])
Limits: RCTs

Embase

#1
'psychotherapy'/exp OR 'psychotherapy' OR 'psychotherapies' OR 'psychotherapeutics' OR 'psychotherapeutical' OR 'cognitive therapy'/exp OR 'cognitive behavior therapy'/exp OR 'behavior therapy'/exp OR ´cbt´ OR ´cognitive behavioural therapy´ OR ´cognitive behavioural therapies´ OR cognitive behavioral therapy´ OR 'cognitive behavioral therapies' OR 'behavior therapy' OR 'behavior therapies' OR 'behaviour therapy' OR 'behaviour therapies' OR 'cognition therapy' OR 'cognitive therapies' OR 'cognitive therapy' OR 'cognitive therapeutic' OR 'cognitive therapeutics' OR 'cognitive therapeutical' OR 'cognitive therapeutist' OR 'cognitive therapeutists' OR 'cognitive treatment' OR 'cognitive treatments' OR 'cognitive restructuring' OR 'cognition therapies' OR 'cognition therapie' OR 'cognition therapeutical' OR 'cognition therapeutic' OR 'cognition therapeutics' OR 'cognition therapeutist' OR 'cognition therapeutists' OR 'cognition treatment' OR 'cognition treatments' OR 'behavior therapeutic' OR 'behavior therapeutical' OR 'behavior therapeutics' OR 'behavior

therapeutist' OR 'behavior therapeutists' OR 'behavior treatment' OR 'behavior treatments' OR 'behaviors therapies' OR 'behaviors therapy' OR 'behaviors therapeutics' OR 'behaviors therapeutic' OR 'behaviors therapeutical' OR 'behaviors therapeutist' OR 'behaviors therapeutists' OR 'behaviors treatment' OR 'behaviors treatments' OR 'behavioral therapies' OR 'behavioral therapy' OR 'behavioral therapeutics' OR 'behavioral therapeutic' OR 'behavioral therapeutical' OR 'behavioral therapeutist' OR 'behavioral therapeutists' OR 'behavioral treatment' OR 'behavioral treatments' OR 'behaviour therapeutic' OR 'behaviour therapeutical' OR 'behaviour therapeutics' OR 'behaviour therapeutist' OR 'behaviour therapeutists' OR 'behaviour treatment' OR 'behaviour treatments' OR 'behaviours therapies' OR 'behaviours therapy' OR 'behaviours therapeutics' OR 'behaviours therapeutic' OR 'behaviours therapeutical' OR 'behaviours therapeutist' OR 'behaviours therapeutists' OR 'behaviours treatment' OR 'behaviours treatments' OR 'behavioural therapies' OR 'behavioural therapy' OR 'behavioural therapeutics' OR 'behavioural therapeutic' OR 'behavioural therapeutical' OR 'behavioural therapeutist' OR 'behavioural therapeutists' OR 'behavioural treatment' OR 'behavioural treatments' OR 'behavior activation' OR 'behaviors activation' OR 'behavioral activation' OR 'behaviour activation' OR 'behaviours activation' OR 'behavioural activation' OR 'psychoanalytic therapy'/exp OR 'psychodynamic' OR 'psychodynamical' OR 'psychoanalysis' OR 'psychoanalytical' OR 'counselling'/exp OR 'counseling'/exp OR 'counselling' OR 'counseling' OR 'problem-solving' OR 'problem solving' OR 'supportive therapy' OR 'metacognitive therapy' OR 'metacognitive therapies' OR 'metacognitive therapeutic' OR 'metacognitive therapeutics' OR 'metacognitive therapeutical' OR 'metacognitive therapeutist' OR 'metacognitive therapeutists' OR 'metacognitive treatment' OR 'metacognitive treatments' OR 'meta-cognitive therapy' OR 'meta-cognitive therapies' OR 'meta-cognitive therapeutic' OR 'meta-cognitive therapeutics' OR 'meta-cognitive therapeutical' OR 'meta-cognitive therapeutist' OR 'meta-cognitive therapeutists' OR 'meta-cognitive treatment' OR 'meta-cognitive treatments' OR 'solution-focused therapies' OR 'solution focused therapies' OR 'solution-focussed therapies' OR 'solution focused therapies' OR 'solution- focused therapy' OR 'solution focused therapy' OR 'solution-focussed therapy' OR 'solution focused therapy' OR 'solution-focused therapeutic' OR 'solution focused therapeutic' OR 'solution-focussed therapeutic' OR 'solution focussed therapeutic' OR 'solution-focused therapeutics' OR 'solution focused therapeutics' OR 'solution-focussed therapeutics' OR 'solution focused therapeutics' OR 'solution-focused therapeutical' OR 'solution focused therapeutical' OR 'solution-focussed therapeutical' OR 'solution focused therapeutical' OR 'self-control therapies' OR 'self control therapies' OR 'self-control therapy' OR 'self control therapy' OR 'self-control therapeutics' OR 'self control therapeutics' OR 'self-control therapeutical' OR 'self control therapeutical' OR 'self-control therapeutic' OR 'self control therapeutic' OR 'self-control training' OR 'self control training' OR 'self control trainings' OR 'self-control trainings' OR 'mindfulness' OR 'acceptance commitment' OR 'acceptance and commitment' OR 'assertiveness training'

#2

'compassion-focused' OR 'compassion-focussed' OR 'compassion focused' OR 'compassion focussed' OR 'constructivist' OR 'constructivists'

#3

'therapies' OR 'therapy' OR 'therapeutics' OR 'therapist' OR 'treatment' OR 'treatments'

#4

Combine: #2 AND #3

#5: #1 OR #4

#6
'depressive disorder'/exp OR 'depression'/exp OR 'depressive' OR 'major depression'/exp OR 'major depressive disorder'/exp OR 'depression' OR 'depressions' OR 'depressive' OR 'dysthymic disorder'/exp OR 'dysthymic disorder' OR 'dysthymia'/exp OR 'dysthymic' OR 'mood disorder'/exp OR 'affective disorder'/exp OR 'affective disorder' OR 'affective disorders' OR 'mood disorder' OR 'mood disorders'
Combine: #5 AND #6
Limits: RCTs

PsycINFO
(DE "Psychotherapy" OR "Psychotherapy" OR "psychotherapies" OR "psychotherapeutic" OR "psychotherapeutical" OR "psychotherapeutics" OR DE "Behavior Therapy" OR DE "Cognitive Behavior Therapy" OR "CBT" OR "behavior therapies" OR "behavior therapy" OR "behavior therapeutic" OR "behavior therapeutical" OR "behavior therapeutics" OR "behavior therapeutist" OR "behavior therapeutists" OR "behavior treatment" OR "behavior treatments" OR "behaviors therapies" OR "behaviors therapy" OR "behaviors therapeutics" OR "behaviors therapeutic" OR "behaviors therapeutical" OR "behaviors therapeutist" OR "behaviors therapeutists" OR "behaviors treatment" OR "behaviors treatments" OR "behavioral therapies" OR "behavioral therapy" OR "behavioral therapeutics" OR "behavioral therapeutic" OR "behavioral therapeutical" OR "behavioral therapeutist" OR "behavioral therapeutists" OR "behavioral treatment" OR "behavioral treatments" OR "behaviour therapies" OR "behaviour therapy" OR "behaviour therapeutic" OR "behaviour therapeutical" OR "behaviour therapeutics" OR "behaviour therapeutist" OR "behaviour therapeutists" OR "behaviour treatment" OR "behaviour treatments" OR "behaviours therapies" OR "behaviours therapy" OR "behaviours therapeutics" OR "behaviours therapeutic" OR "behaviours therapeutical" OR "behaviours therapeutist" OR "behaviours therapeutists" OR "behaviours treatment" OR "behaviours treatments" OR "behavioural therapies" OR "behavioural therapy" OR "behavioural therapeutics" OR "behavioural therapeutic" OR "behavioural therapeutical" OR "behavioural therapeutist" OR "behavioural therapeutists" OR "behavioural treatment" OR "behavioural treatments" OR "cognition therapies" OR "cognition therapie" OR "cognition therapy" OR "cognition therapeutical" OR "cognition therapeutic" OR "cognition therapeutics" OR "cognition therapeutist" OR "cognition therapeutists" OR "cognition treatment" OR "cognition treatments" OR "cognitive therapies" OR "cognitive therapy" OR "cognitive therapeutic" OR "cognitive therapeutics" OR "cognitive therapeutical" OR "cognitive therapeutist" OR "cognitive therapeutists" OR "cognitive treatment" OR "cognitive treatments" OR "cognitive restructuring" OR DE "Emotion Focused Therapy" OR DE "Psychoanalysis" OR "psychoanalysis" OR "psychoanalytic" OR "psychoanalytical "OR DE "Psychodynamic Psychotherapy" OR "psychodynamic" OR DE "Psychotherapeutic Counseling" OR "counselling" OR "counseling" OR "problem-solving" OR "problem solving" OR "mindfulness" OR ("acceptance" AND "commitment") OR "assertiveness training" OR "behavior activation" OR "behaviors activation" OR "behavioral activation" OR "behaviour activation" OR "behaviours activation" OR "behavioural activation" OR "metacognitive therapies" OR "metacognitive therapy" OR "metacognitive therapeutic" OR "metacognitive therapeutics" OR "metacognitive therapeutical" OR "metacognitive therapeutist" OR "metacognitive therapeutists" OR "metacognitive treatment" OR "metacognitive treatments" OR "meta-cognitive therapies" OR "meta-cognitive therapy" OR "meta-

cognitive therapeutic" OR "meta-cognitive therapeutics" OR "meta-cognitive therapeutical" OR "meta-cognitive therapeutist" OR "meta-cognitive therapeutists" OR "meta-cognitive treatment" OR "meta-cognitive treatments" OR DE "Solution Focused Therapy" OR "solution- focused therapies" OR "solution-focused therapy" OR "solution-focused therapeutic" OR "solution-focused therapeutics" OR "solution-focused therapeutical" OR "solution-focussed therapies" OR "solution-focussed therapy" OR "solution-focussed therapeutic" OR "solution-focussed therapeutics" OR "solution-focussed therapeutical" OR "solution focused therapies" OR "solution focused therapy" OR "solution focused therapeutic" OR "solution focused therapeutics" OR "solution focused therapeutical" OR "solution focussed therapies" OR "solution focussed therapy" OR "solution focussed therapeutic" OR "solution focussed therapeutics" OR "solution focussed therapeutical" OR "self- control therapies" OR "self-control therapy" OR "self-control therapeutics" OR "self-control therapeutical" OR "self- control therapeutic" OR "self-control training" OR "self-control trainings" OR "self control therapies" OR "self control therapy" OR "self control therapeutics" OR "self control therapeutical" OR "self control therapeutic" OR "self control training" OR "self control trainings" OR (("compassion-focused" OR "compassion-focussed" OR "compassion focused" OR "compassion focussed") AND ("therapies" OR "therapy" OR "therapie" OR "therapist" OR "therapists" OR "therapeut" OR "treatment" OR "treatments")) OR ("constructivist" AND ("therapies" OR "therapy" OR "therapie" OR "therapist" OR "therapists" OR "therapeut" OR "treatment" OR "treatments")))
AND
(DE "Depression (Emotion)" "depressive disorder" OR "depression" OR "depressions" OR "depressive" OR DE "Major Depression" OR "major depression" OR "major depressive disorder" OR DE "Dysthymic Disorder" OR "Dysthymia" OR " dysthymic disorder" OR DE "Affective Disorders" OR "Affective Disorder" OR "affective disorders" OR "Mood Disorder" OR "Mood disorders")
Limits: Methodology is ME=(treatment outcome/clinical trial): papers (December 2014)

Cochrane
#1 MeSH descriptor: [Depressive Disorder] explode all trees : 6, 777
#2 ''depress*'' (Word variations have been searched) : 51, 768
#3 #1or#2 :51,783
#4 ''major depressive disorder'' (Word variations have been searched) : 5, 435
#5 #3or#4 :51,783
#6 MeSH descriptor: [Dysthymic Disorder] explode all trees : 129
#7 ''dysthymi*'' (Word variations have been searched) : 649
#8 #6or#7 :649
#9 #5or#8 :51,800
#10 ''mood disorder'' (Word variations have been searched) :4, 034
#11 ''affective disorder'' (Word variations have been searched) : 2, 882
#12 #10or#11:6,055
#13 #9or#12:53,227
#14 MeSH descriptor: [Psychotherapy] explode all trees : 13, 568
#15 ''psychotherap*'' (Word variations have been searched) : 7, 758
#16 ''CBT'' (Word variations have been searched) : 2, 029
#17 ''Cognitive Behav* therap* (Word variations have been searched) : 8, 893
#18 #14or#15or#16or#17 :20,795

#19 'psychodynamic'' (Word variations have been searched) : 469
#20 MeSH descriptor: [Psychoanalysis] explode all trees : 13
#21 ''psychoanaly*'' (Word variations have been searched) : 345
#22 MeSH descriptor: [Counseling] explode all trees : 2, 783
#23 ''counseling*'' (Word variations have been searched) : 6, 913
#24 ''problem solving'' (Word variations have been searched) : 2, 867
#25 #18or#19or#20or#21or#22or#23or#24 :28,149
#26 ''acceptance commitment'' (Word variations have been searched) : 168
#27 ''assertiveness training'' (Word variations have been searched) :231
#28 ''behavior activation'' (Word variations have been searched) : 663
#29 ''mindfulness'' (Word variations have been searched) : 466
#30 ''metacognitive therap*'' (Word variations have been searched) :56
#31 ''solution focused therap*'' (Word variations have been searched) :858
#32 ''self control training'' (Word variations have been searched): 5850
#33 #25or#26or#27or#28or#29or#30or#31or#32 :32,748
#34 ''Randomized Controlled Trial'':ti,ab,kw (Word variations have been searched) : 120, 901
#35 #13 and #33 and #34 in Trials: 4,614

Supplemental Material 3: Data extraction form & Codebook

category	variable	details	type	allowed_values
1. ID	id_study	unique study identifier (author, year)	character	
2. Effect sizes	outcome_type	smd = standardized meand difference = Hedges g; dich = dichotomous; change = change scores based on m, sd, n variable, t-values, p-values	factor	smd, dich, change, tval, pval
2. Effect sizes	outcome_measure	standardized instrument used	character	
2. Effect sizes	sr_clinician	self-report measure or clinician-rated	factor	sr, cr
2. Effect sizes	time	time of assessment (baseline, post, fu1, fu2, … fu8)	factor	baseline, post, fu1, fu2, fu3, fu4, fu
2. Effect sizes	time_weeks	time in weeks since randomization	character	
2. Effect sizes	m	mean	numeric	
2. Effect sizes	sd	standard deviation	numeric	
2. Effect sizes	n	sample size	numeric	
2. Effect sizes	dich	broad categories of dich outcomes (response, remission based on a cut-off, remission based on diagnosis, reliable change)	character	
2. Effect sizes	dich_type	specific type of dich outcomes as defined in the study (response, remission, other)	character	response, remission, other
2. Effect sizes	n_improved	for dichotomous outcomes	numeric	
2. Effect sizes	n_randomized	n randomized	numeric	
2. Effect sizes	change	measure used to calculate change	character	
2. Effect sizes	change_m	change mean from baseline	numeric	
2. Effect sizes	change_sd	change sd from baseline	numeric	
2. Effect sizes	change_n	change n	numeric	
2. Effect sizes	other_statistic	other reported statistics	character	
3. Moderators	year	year of publication	numeric	
3. Moderators	comorbid_mental	if all the participants are recruited based on meeting criteria for a comorbid mental health disorder (e.g. anxiety and depression) 0 = no, 1 = yes	factor	0, 1
3. Moderators	format	1= individual; 2= group; 3= guided self-help; 4= telephone; 5= couple therapy; 6= other (mixed formats)	factor	1, 2, 3, 4, 5, 6
3. Moderators	n_sessions	average number of sessions received	numeric	
3. Moderators	country	1= usa; 2= uk; 3= eu; 4= canada; 5= australia; 6= east asia; 7= other	factor	1, 2, 3, 4, 5, 6, 7
3. Moderators	age_group	1= children; 2= adolescents; 3= young adults; 4= adults, 5= older adults (≥55 years); 6= older old adults (≥75 years)	factor	1, 2, 3, 4, 5, 6
3. Moderators	mean_age	average age	numeric	
3. Moderators	percent_women	% of women at baseline	numeric	
3. Moderators	recruitment	1= community; 2= clinical; 3= other	factor	1, 2, 3
3. Moderators	diagnosis	1= major depression; 2= mood disorder; 3= cut-off score; 4= subclinical depression; 5= chronic depression	factor	1, 2, 3, 4, 5
3. Moderators	target_group	1= adults, 2= older adults, 3= student population, 4= women with perinatal depression; 5= comorbid somatic disorder; 6= other	factor	1, 2, 3, 4, 5, 6
3. Moderators	ac	allocation concealment (0= high risk; 1= low risk)	factor	0, 1
3. Moderators	ba	blinding of assessors (0= high risk; 1= low risk; sr= self-report)	factor	0, 1
3. Moderators	itt	intention-to-treat analyses (0= high risk; 1= low risk)	factor	0, 1
3. Moderators	sg	sequence generation (0= high risk; 1= low risk)	factor	0, 1
3. Moderators	sor	selective outcome reporting (0= high risk; 1= low risk; nr/rr= not registered or retrospectively registered)	factor	0, 1
3. Moderators	rob_overall	overall risk of bias score. ranging from 0 (high risk) to 5 (low risk)	factor	0, 1, 2, 3, 4, 5
4. Meta Data	notes	additional notes	character	NA
4. Meta Data	full_ref	full reference information	character	NA
4. Meta Data	doi	doi number of publication	character	NA
4. Meta Data	abstract	abstract of publication	character	NA
4. Meta Data	title	title of study	character	NA
4. Meta Data	url	URL of publication	character	NA
4. Meta Data	journal	journal of publication	character	NA
4. Meta Data	registration	link to registration	character	NA
4. Meta Data	protocol	link to protocol	character	NA
4. Meta Data	registry	link to registry	character	NA
4. Meta Data	ipd_available	whether individual participant data is available at the vu	factor	0, 1

Description of variables of included studies, version 5/5/2019

	Values	Description
PARTICIPANTS		
Recruitment	1. Community	If (a part of) the participants are recruited through announcements in newspapers, radio, tv, social media, flyers, etc., and participate as volunteers in the study, the study is rated as "community recruitment". Basically, people have to take action themselves for participating in the study. This type of recruitment can be conducted in the general population, but also in more selected populations, such as university students, or patient groups.
	2. Clinical	Participants are exclusively recruited from patients samples with mental disorders for which they have sought treatment. They can be recruited from primary care or outpatient centers. Participants actively seek help for depression. Recruitment of other, general medical patient groups do not fall into this category.
	3. Other	Other recruitment methods (which are not community or clinical recruitment), such as systematic screening, recruitment from known patients in general medical settings, etc. If the recruitment method is not described in the paper (which happens occasionally) that is also rated as "other"
Diagnosis	1. Major depression	MDD according to DSM-V criteria, DSM-IV criteria, DSM-III-R criteria, DSM-III criteria, Research Diagnostic Criteria (RDC) for major depression, of Feighner criteria for depressive disorder.
	2. Mood disorder	MDD, or other diagnosed disorders (e.g., dysthymia; depression NOS; minor depression according to Research Diagnostic Criteria, etc.).
	3. Cut-off score	Participants score above a cut-off score on a self-rating depression questionnaire, such as the PHQ-9 or the CES-D. This also includes studies where participants score in a specific range of the questionnaire (so there is a lower and an upper limit). If some participants meet diagnostic criteria for a mood disorder, and others only score above a cut-off, then this is also rated as (3)
	4. Subclinical depression	Participants score above a cut-off on a self-rating scale, but do not meet criteria for a depressive disorder according to a diagnostic interview (such as the MINI, CIDI or SCID). Studies are also rated in this category if participants meet criteria for minor depression according to the DSM-IV.
	5. Chronic depression	Participants meet criteria for chronic or treatment-resistant depression, according to any definition given by the authors of the study.
Target group [a)]	1. Adults	The study is aimed at adults in general with no specific demographic characteristic.
	2. Older adults	The study is aimed at older adults according to any lower age limit above 50 years. Older adults with general medical disorders (these studies would also fit into category 5) are classified as "older adults".
	3. Student population	The study is aimed at student populations from universities and colleges.
	4. Women with PPD	The study is aimed at women with perinatal depression. Mothers with young children were also included in this category, as well as pregnant women.

	5. General medical	The study is aimed at people with depression and any general medical disorder. Physical disability was also included in this category.
	6. Other	Studies aimed at any other specific target group, not included in the other categories, were included in this category.
	7. Children and adolescents	
	8. Adolescents	
	9. young people	
Age group	1. Children	the mean age is lower than 13
	2. Adolescents	the mean age is between 13 and 18
	3. Young adults	studies in college students and studies with a mean age between 18 and 24
	4. Adults	all studies in adults (with or without an upper limit)
	5. Older adults	all studies indicating that they work with older adults and with a mean age of 55 or higher.
	6. Older old adults	all studies with a mean age of 75 or higher
Comorbid mental disorder	Yes (1) or No (0)	This includes any comorbid mental or substance use disorder, including insomnia
INTERVENTIONS		
Type of psychotherapy	*See Table 2*	
Format	1. Individual	The standard format is individual therapy in which the patients has therapy sessions with one therapist. If the format is not reported in the paper, it is assumed that the therapy is using an individual format.
	2. Group	Patients are treated in groups by one or more therapists. We do not use an lower or upper limit for the size of the groups, but virtually all groups have 4 to 15 members.
	3. Guided self-help	The patients works through a standardized treatment at home, with support (e.g., email, telephone) from a therapist. The treatment can be written down in a book, on the internet or any other medium.
	4. Telephone	The treatment is conducted through telephone, skype, or any other distant connection.
	5. Couple therapy	The treatment is conducted by the therapist, the patient and the partner of the patient.
	6. Other	Some interventions use mixed formats (partly individual and partly in groups; or partly as guided self-help and partly individual). These are rated as “other”.
N Sessions	*Continuous variable*	The number of sessions is the number of planned sessions, but when the realized number of sessions is given this is preferred. Only full numbers are given (no decimals).
Pharmacotherapy	1. TCA	Tricyclic antidepressants.
	2. SSRI	Selective serotonin reuptake inhibitor.
	3. SNRI	Selective serotonin and norepinephrine reuptake inhibitors.
	4. Other	Any other antidepressant were placed in this category. Other drugs that do not have an antidepressant effect, such as tranquilizers are not considered pharmacotherapy.
Control conditions	1. Waiting list	In this control group, respondents receive the intervention after termination of the intervention in the experimental group.
	2. Care-as-usual	In this control group, respondents have access to regular routine care. In trials were no intervention is provided in the control group it is assumed that respondents have access to routine care.
	3. Other	These are other control conditions, such as pill placebo and psychological placebo (please note that supportive therapy or counseling cannot be considered psychological placebo even if the authors indicate this).
OTHER		

Country	1. USA	United States of America
	2. UK	United Kingdom
	3. EU	Any country in Europe.
	4. Canada	
	5. Australia	Australia and New Zealand.
	6. East Asia	China (plus Hong Kong and Macau), Japan, North Korea, South Korea, Taiwan, Mongolia.
	7. Other	Any other country. This also includes studies in which participants from multiple countries (from 1 to 6) are included
Year of publication	*Continuous variable*	

Definitions of Psychological Treatments of Depression

Type of therapy	Description/definition
Cognitive Behavior Therapy (CBT)	In CBT the therapists focus on the impact that a patient's present dysfunctional thoughts have on current behavior and future functioning. CBT is aimed at evaluating, challenging and modifying a patient's dysfunctional beliefs (cognitive restructuring). In this form of treatment the therapist mostly emphasizes homework assignments and outside-of-session activities. Therapists exert an active influence over therapeutic interactions and topics of discussion, use a psycho educational approach, and teach patients new ways of coping with stressful situations. The most used subtypes are CBT according to Beck's manual (Beck et al., 1979) and the "Coping with Depression" course (Lewinsohn et al., 1984).
Behavioral activation therapy (BAT)	We considered an intervention to be behavioral activation when the registration of pleasant activities and the increase of positive interactions between a person and his or her environment were the core elements of the treatment. Social skills training could be a part of the intervention. There are several subtypes of behavioral activation (Mazzucchelli et al. 2009).
Problem-solving therapy (PST)	We defined PST as a psychological intervention in which the following elements had to be included: definition of personal problems, generation of multiple solutions to each problem, selection of the best solution, the working out of a systematic plan for this solution, and evaluation as to whether the solution has resolved the problem. Subtypes of PST are described elsewhere (Cuijpers et al., 2018).
Interpersonal psychotherapy (IPT)	IPT is a brief and highly structured manual based psychotherapy that addresses interpersonal issues in depression, to the exclusion of all other foci of clinical attention. IPT has no specific theoretical origin although its theoretical basis can be seen as coming from the work of Sullivan, Meyer and Bowlby. The current form of the treatment was developed by the late Gerald Klerman and Myrna Weissman in the 1980s (Klerman et al., 1984). There is a brief version of IPT, called Interpersonal counseling.
Third wave cognitive behavioral therapies	Third wave therapies are a heterogeneous group of therapies that introduce several new techniques to cognitive behavior therapies. They have in common that they abandon or only cautiously use content-oriented cognitive interventions, and the use of skills deficit models to delineate the core maintaining mechanisms of the addressed disorders (Kahl, Winter, & Schweiger, 2012). Well-known therapies that we clustered in this category include Acceptance and Commitment Therapy, Mindfulness-based CBT, and meta-cognitive therapy.
Psychodynamic Therapy	The primary objective in (short-term) psychodynamic therapy is to enhance the patient's understanding, awareness and insight about repetitive conflicts (intra psychic and intrapersonal). An assumption in psychodynamic therapy is that a patient's childhood experiences, past unresolved conflicts, and historical relationships significantly affect a person's present life situation. In this form of treatment, the therapist concentrates on the patient's past, unresolved conflicts, historical relationships and the impact these have on a patient's present functioning. Furthermore, in psychodynamic therapy the therapists explore a patient's wishes, dreams, and fantasies. The time limitations and the focal explorations of the patient's life and emotions distinguish psychodynamic therapy from psychoanalytic psychotherapy.
Non-directive supportive therapy	We defined non-directive therapy as any unstructured therapy without specific psychological techniques other than those common to all approaches such as helping people to ventilate their experiences and emotions and offering empathy. It is not aimed at solutions, or acquiring new skills. It assumes that relief from personal problems may be achieved through discussion with others. These non-directive therapies are commonly described in the literature as either counseling or supportive therapy.
Life review therapy	Reminiscence is a naturally occurring process of recalling the past, that is hypothesized to resolve conflicts from the past and make up the balance of one's life (Bohlmeijer, Smit, & Cuijpers, 2003; Butler, 1963). Since the beginning of the 1970s, reminiscence has been used by therapists as a specific treatment of depression in older adults. In these "life review" therapies the patients work through the memories of all phases in their life with the aim of re-evaluation of their life, resolving conflicts or assessing adaptive coping-responses. We defined life review therapies as all therapies that are aimed at the systematic evaluation of the lives of participants.