The impact of interventions for depression on self-perceptions in young people: A systematic review & meta-analysis

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A B S T R A C T

Negative self-perceptions are implicated in the development and maintenance of depression in young people, but little is known about their receptiveness to change in response to treatment. This paper reports on a pre-registered meta-analysis examining the extent to which treatments for depression in young people aged 11–24 result in changes to self-perceptions. Controlled treatment trials examining outcomes related to self-perceptions were synthesised ($k = 20$, $N = 2041$), finding small reductions in both symptoms of depression ($g = -0.30$; 95 % CI: -0.52, -0.08) and self-perception outcomes ($g = 0.33$; 95 % CI: 0.16, 0.49) for interventions compared with control groups. Meta-regression analyses found no significant association between reductions in depressive symptoms and improvements in self-perception following treatment, suggesting that despite interventions generally improving both outcomes these changes may be unrelated to each other. Our results indicate that young people's self-perceptions are sensitive to change following treatment for depression, however effect sizes are small and treatments could be more effective in targeting and changing negative self-perceptions. Given the importance that young people place on integrating work on their sense of self into treatments for depression, future interventions could aim to support young people with depression to develop a positive sense of self.

1. Introduction

Adolescence and young adulthood are periods of extensive biological, developmental, and social change, and are associated with increased vulnerability to mental health difficulties (Blakemore, 2019). Globally, it is estimated that over one-third of adolescents aged 10–19 years experience elevated symptoms of depression, and 8 % meet the criteria for major depressive disorder (Shorey et al., 2022). Experiencing depression in youth is associated with long-term difficulties affecting education, employment, and relationships (Clayborne et al., 2019). Despite the existence of a range of evidence-based psychological and pharmacological treatments for depression (NICE, 2019), their effectiveness is often sub-optimal. Psychological treatments are considerably less effective in treating children and adolescents compared with adults with less than 60 % achieving treatment response (Cuijpers et al., 2023), and current antidepressant medications have also only been found to have small effects in reducing symptoms of depression in adolescents compared with placebo (Hetrick et al., 2021). There are several possible reasons for why interventions are suboptimal in young people. These include that interventions are sometimes translated from adults with minimal adaptation; that there might be differing mechanisms driving depression in young people; and the limited capacity for adolescents to change their personal circumstances such as their living situation or school (Cuijpers et al., 2020; Ng & Weisz, 2016; Pile et al., 2022). These findings show an urgent need for improved interventions for symptoms of depression in young people. One potential way to improve treatments is to better understand how they work, and the mechanisms that drive change (Holmes et al., 2018). One of the hypothesised mechanisms for the development and maintenance of depression is how young people perceive themselves, i.e. self-perception. This review aims to understand the impact of treatments for depression on self-perception, which could inform the development of more effective treatments.

Negative views of the self are a central feature of the cognitive model of depression (A. T. Beck, 1967). These negative self-perceptions are thought to influence how individuals think, feel, and behave, which subsequently maintains symptoms of depression. Negative self-

perceptions are a common symptom of depression in young people, and young people describe low self-esteem and an altered sense of self as part of their experience of depression (Bear et al., 2021; Manfro et al., 2021; Orchard et al., 2017; Twivy et al., 2023). Within the literature on self, studies explore a range of different facets of self, and terminology is often used interchangeably and with overlap in definition. Three commonly used terms are: self-efficacy – "people's beliefs in their capabilities to produce given attainments" (Bandura, 2005), self-esteem – "a global judgment of the worth or value of the self" (Crocker, 2001), and self-evaluation "the perceptions and beliefs that a person holds about themselves…and the person's judgement of the value of these attributes" (Orchard et al., 2021) which encompasses other frequently used terms such as self-concept, self-image, and view of self. This broad spectrum of terminology relating to self means it is important to understand which concepts researchers aim to assess, and to identify which outcome measures they use to do this. In this review, self-perceptions will be examined according to our working definition: 'A person's views and beliefs about themselves and their personal characteristics, and the value judgements they place on these traits'. We aim to capture a broad range of terms relating to self to synthesise which domains tend to be examined in trials of interventions for depression in young people, and which instruments are used to assess them.

An individual's sense of self is important for their mental health, and positive self-concept has been found to be correlated with having fewer symptoms of depression whilst the inverse is true of negative self-concept (Hards et al., 2020; Ybrandt, 2008). Self-related processes such as self-image, self-worth, and self-esteem have been found to predict symptoms of depression longitudinally, suggesting that they may contribute towards the development of depressive symptoms (Fine et al., 1993; Franko et al., 2005; Sowislo & Orth, 2013). For example, Fine et al. (1993) studied 47 adolescents receiving outpatient therapy for depression and measured symptoms of depression and self-image at baseline, three months, and one year. The researchers found that depression and self-image were highly correlated, and that self-image was more predictive of future depressive symptoms than depressive symptoms were of self-image, suggesting that self-image is a precursor to depression. Psychological models of depression such as the vulnerability model posit that low self-esteem can make individuals more vulnerable to depression (Beck, 1987). One potential mechanism for this is that individuals with low self-esteem have an increased tendency to ruminate, which exacerbates negative self-evaluation and is a predictor of depression itself (Jørgensen et al., 2023; Kuster et al., 2012). How people evaluate themselves changes across their life. Adolescence is a critical period for the development of self-concept, during this time young people become increasingly more aware of how they are perceived by others (Harter, 2012; Sebastian et al., 2008). Research involving young people has found that a focus on self-perceptions is valued within treatments for depression. A recent scoping review with input from lived experience advisors highlighted the role of self-evaluation in adolescent depression, and advisors recommended more focus on self-evaluation in treatments (Orchard et al., 2021). Increased self-confidence and self-acceptance have been identified by young people as goals and valued outcomes for therapeutic intervention, along with 'learning how to be kinder to yourself' (Pile et al., 2022, 2023; Rupani et al., 2014). Some treatments do already target elements of self-perception such as self-esteem and self-criticism to an extent, either directly or indirectly. Examples of this include a trial of the MoodGYM online cognitive behavioural therapy (CBT) intervention for adolescents which included self-esteem training, and an expressive writing intervention aiming to reduce self-judgement in students (Gortner et al., 2006; O'Kearney et al., 2006). In addition, it has been suggested that medications may also have an impact on self-perceptions by altering neurotransmitter systems that may reduce rumination and repetitive negative thinking about the self (Davey & Harrison, 2022).

A first step to understanding whether self-perception could be targeted in interventions for depression is to look at whether existing treatments change self-perceptions. Considering the strong emphasis that young people place on self-perceptions as a treatment focus, closer attention to these outcomes is necessary to understand whether current treatments are already effective in targeting self-perceptions. This review will first establish the extent to which treatments affect symptoms of depression, before exploring whether there are positive improvements in self-perceptions. We will also explore the relationship between post-treatment depression outcomes and self-perceptions to better understand whether change in depressive symptoms can be predicted by change in self-perceptions. Therefore, this systematic review and meta-analysis aims to synthesise all controlled trials measuring self-perception in the context of interventions for symptoms of depression in young people to answer the following research questions:

1) To what extent do interventions for depression in young people (that measure outcomes relating to self) reduce symptoms of depression?
2) To what extent do interventions for depression improve young people's perceptions of themselves?
3) To what extent do interventions for depression in young people improve specific categories of self (self-esteem, self-evaluation, and self-efficacy)?
4) Is there a relationship between post-treatment self and depression outcomes in young people as a result of interventions for depression?

2. Methods

2.1. Registration

The review was pre-registered on PROSPERO (CRD42021292814) and has been conducted in accordance with the PRISMA guidelines for systematic reviews (Page et al., 2021).

2.2. Eligibility criteria

We included only controlled trials examining the impact of any intervention for symptoms of depression in adolescents and young people that reported on any outcomes relating to self-perceptions based on our working definition: 'A person's views and beliefs about themselves and their personal characteristics, and the value judgements they place on these traits'. In this review, we define 'young person' as someone aged between 11 and 24. This extended upper age limit more closely corresponds with recent global definitions of youth (Sawyer et al., 2018; United Nations, 2020; World Health Organization, 2024). Studies included participants experiencing symptoms of depression (including early-intervention populations with sub-clinical symptoms) or who met criteria for clinical depression. Our review included studies with a control group, but randomisation was not required for inclusion. Articles were required to be English language and published in peer-reviewed journals. Full inclusion and exclusion criteria are available in Table 1.

2.3. Search strategy

Four electronic databases (Web of Science, PsycINFO, MEDLINE, and PubMed) were searched on 22nd July 2022 with no date restrictions. The search was rerun on 15th January 2024 and 2nd August 2024 to identify new publications since the first search. The search terms were developed based on preliminary searches of the chosen databases. Where available, results were filtered by peer reviewed, English language, and document type 'journal article' or 'article'.

The following search terms were used: ("cognitions about the self" OR "negative evaluation" OR "positive evaluation" OR "negative self" OR "positive self" OR self-appraisal OR self-assessment OR self-aware* OR self-belief OR self-cognition OR self-concept OR self-construction OR self-criticism OR self-description OR self-efficacy OR self-esteem OR self-evaluation OR self-hat* OR self-identity OR self-image OR self-

Table 1
Inclusion and exclusion criteria.

	Inclusion	Exclusion
Population:		
Age	All participants must be between the ages of 11 to 24. Where only the mean and SD age is reported, the mean age $+/-$ the SD must be between 11 and 24.	Participants under 11 or over 24 years old.
Depression status	Participants will have a primary problem of depression, including sub-clinical and early intervention populations. They will either meet standardised diagnostic criteria for depression (as assessed by diagnostic interview or medical records), or score above a clinical or sub-clinical cut off on a validated measure of depression.	Other depressive disorders, such as seasonal affective disorder, antenatal or post-partum depression.
Co-morbidities		Any studies in which all participants have a physical or mental health co-morbidity (except those that are common in people with depression, e.g. anxiety or insomnia).
Intervention	Any treatment for young people with symptoms of depression, including psychological therapies and pharmacological interventions. This includes treatments that target specific symptoms that are common to young people with depression, e. g. insomnia, anxiety.	Interventions not targeting symptoms of depression or anxiety.
Comparator	Studies must have a control group who do not receive an intervention or who receive a different intervention for comparison. Cross-over trials will be included and only data from the first period prior to cross-over will be used.	Uncontrolled trials with no comparator.
Outcome	Measures of self-perception (and related concepts).	Self-efficacy based on a specific skill or situation.
Publication	Primary research published in a peer-reviewed journal.	Abstract, protocol, conference presentation, meta-analysis, systematic review. Publication in a non-peer reviewed journal.
Language	English-language only.	Any other language.

inhibiting OR self-perception OR "self-referential processing" OR self-representation OR self-schema OR self-worth OR "sense of self" OR "view of self") AND (depressi* OR MDD OR "low mood") AND (treatment OR intervention OR therap* OR psychotherap*).

Reference lists of included studies were also searched to identify any additional papers that were not found in the database search

2.4. Selection of studies

The lead author (RLD) screened all titles and abstracts for inclusion using Covidence review software. A second author (EG) independently double-screened 20 % of title and abstracts. Any disagreements were resolved by discussion between the two reviewers or escalated to a third author (KL). Inter-rater reliability was high, with strong agreement between reviewers (Cohen's $\kappa = 0.80$). Full-text papers were retrieved and screened by RLD, and 20 % were double-screened by EG, following the same process as the previous stage, with good inter-rater reliability (Cohen's $\kappa = 0.80$).

2.5. Data extraction

Once the papers for inclusion had been identified, data was extracted

to Covidence data extraction forms by RLD. Twenty percent of included papers were double-extracted by EG and checked for inconsistencies. Data extracted were: lead author, year of publication, title of paper, country, study design, number of participants, participant characteristics (depression status, gender, age), setting, intervention characteristics, concomitant treatments allowed, terminology used to reflect self, outcome measure used to test self, timepoints of data collection, and post-intervention means and standard deviations of relevant outcomes. Study authors were contacted to request any missing data.

2.6. Risk of bias assessment

Studies were assessed for bias using the Cochrane Collaboration's Risk of Bias tool (Higgins et al., 2011) according to six domains: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias. All studies were rated by the lead author (RLD), and 20 % of these were double assessed independently by EG to check for accuracy. Any discrepancies were discussed between the two reviewers.

2.7. Effect measures

Due to the outcomes of interest being continuous, mean differences were used to compare post-intervention outcomes between the intervention and control groups. Where multiple measures were used to examine the same outcome across different studies, standardised mean difference was used.

2.8. Synthesis methods

Studies which had a non-equivalent comparator (i.e. not an active intervention) and that presented post-intervention data within four weeks of the end of intervention were included in the meta-analysis. Studies that did not meet these criteria were synthesised in narrative form.

Statistical analyses were conducted in R using the 'meta' and 'metafor' packages (R Core Team, 2019; G. Schwarzer, 2007; Viechtbauer, 2010). Meta-analyses were performed separately for depression and self outcomes. Effect sizes for individual studies were calculated for depression and self outcomes based on reported means and standard deviations, and these were then pooled for each of the outcomes of interest. Hedges' g correction was applied to the effect estimates to reduce bias given the small sample sizes (Hedges, 1981). A higher depression score indicated higher levels of depressive symptomology, and therefore negative effect sizes were interpreted as favouring intervention groups. For most self-related outcome scales a higher score indicated a positive evaluation of self, however four scales were required to be reverse scored to ensure an equivalent interpretation of results. One study (Guo et al., 2017) had an implausibly large negative effect size, potentially reflecting a mistake in reporting the standard error in place of the standard deviation, which would artificially inflate the effect size. The study authors were contacted to verify these figures but we did not receive a response. We therefore proceeded under the assumption that the reporting was accurate but conducted a sensitivity analysis in case that assumption was incorrect.

Random effects meta-analyses were then conducted using the following three level multi-level model to identify the efficacy of interventions:

$$\widehat{\theta}_{ij} = \mu + \widehat{\sigma}_{ij}^2 + \widehat{\tau}_j^2 + \varepsilon_{ij}$$

Within this equation, $\widehat{\theta}_{ij}$ is an estimate of effect size i nested within study j, μ is the overall population effect, $\widehat{\sigma}_{ij}^2$ is the within-study variability in effect sizes, and $\widehat{\tau}_j^2$ is the between-study variability in effect sizes. Cluster-robust tests and confidence intervals based on a sandwich-type estimator using restricted maximum likelihood were used for all

models (Cameron & Miller, 2015; Viechtbauer, 2010). Based on this model, a confirmatory analysis was first conducted to test whether the interventions in the included studies were effective in significantly reducing symptoms of depression. We conducted further meta-analyses to test our main research question: Do interventions for symptoms of depression improve young people's perceptions of themselves? Moderation analyses were conducted for both models to test whether the effect sizes varied across trials that used randomised versus non-randomised methods to allocate participants to treatment arms.

Funnel plots were used to visualise effect sizes to identify the likelihood of publication bias being present in the included studies, for both depression and self-perception outcomes. Publication bias was then modelled using a step function selection model, in which $w(p_i)$ denotes the relative likelihood of selection given the *p*-value of a study:

$$w(p_i) = \delta_j \text{ if } \alpha_{\{j-1\}} < p_i < \alpha_i$$

One-tailed moderate and severe publication bias were modelled with few cut points (because of the relatively small number of studies in the meta-analysis), but based on values representative of reality quoted in Vevea and Woods (2005):

$$\alpha = \{.05, .1, .2, .5, 1\}$$

$$\text{One} - \text{tailed moderate} : \delta_j = \{1, .90, .80, .65, .50\}$$

$$\text{One} - \text{tailed severe} : \delta_j = \{1, .75, .60, .40, .10\}$$

These models are based on some subjective parameterisation, and as such the estimates produced by these models are merely indicative of the potential impact of publication bias on our results.

Measures of self-perception were broken down into three categories (self-esteem, self-evaluation, and self-efficacy) to be examined in moderation analyses to determine whether interventions for depression were effective in changing a variety of elements of self or if improvements are only seen for some. Lastly, a meta-regression analysis was conducted to test our final research question and examine the association between post-intervention effects on depression and self-perception outcomes, with the effect size for self-perception as the dependent variable and the effect size for depression as the predictor variable.

The results of each meta-analysis were illustrated using forest plots which displayed the combined effect size for each included study,
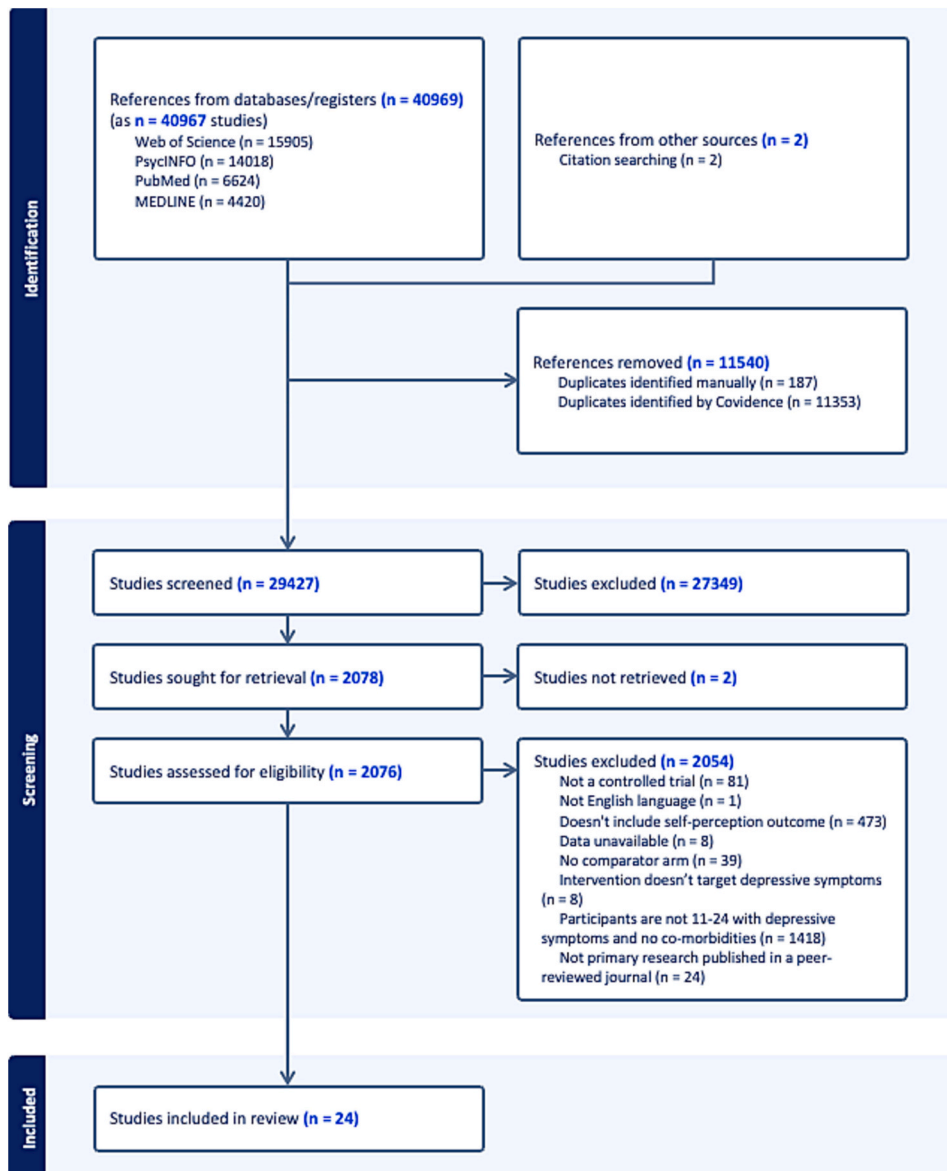

Fig. 1. PRISMA diagram.

colour-coded by the type of comparator to aid interpretation. The amount of support provided to participants in the control group will have an impact on the likelihood that a difference between the intervention and the control group will be found (i.e. a significant difference is more likely to be found when participants in the control group are given no support compared to participants in a control group with active support). Comparators were categorised according to the amount of support provided to participants, into 'none' (e.g. waitlist, monitoring control), 'light' (e.g. educational brochure, cognitive training placebo), and 'active' controls in which investigators would expect that the control would reduce symptoms of depression (e.g. supportive-expressive groups, school counselling). Placebo medication was categorised separately as this intervention would not usually have effects on depression but may have been impacted by participants believing that they were receiving an active intervention.

3. Results

3.1. Selection and inclusion of studies

The PRISMA flowchart presented in Fig. 1 illustrates the study selection process. The search identified 40,969 studies and 11,540 duplicates were removed. We screened 29,437 title and abstracts, and of these 2078 were screened using full texts. Twenty-four studies were identified that met the inclusion criteria for this review.

3.2. Characteristics of included studies

Twenty-four studies were identified, of which 20 studies were included in the meta-analysis (Table 2). Three studies were not included in the meta-analytic synthesis due to the timing of the self-perception outcome assessment not being within 4 weeks of treatment ending, and one study was not included due to having an equivalent active comparator group, meaning that we could not compare an intervention for depression against a control. A narrative synthesis of these studies is presented in section 3.8.

3.2.1. Characteristics of studies included in the meta-analysis

Thirty-one effect sizes were included in the meta-analysis due to six studies having multiple intervention or control groups. We calculated two sets of effect sizes for one study, Rickhi et al. (2015), because their data was presented separately for two age groups (13–18 and 19–24 year olds) with different measures used to examine the outcomes of interest.

The meta-analysis included a total of $N = 2041$ participants (min = 20, max = 439), and included participants from age 11 to 24 years old. Thirteen studies had participants that met the clinical threshold for depression, four studies recruited participants with elevated symptoms of depression that met a lower threshold than clinical cut-off (sub-clinical), and three studies had a mix of participants with clinical and sub-clinical depression. Twenty-six interventions were assessed across studies, with most incorporating CBT ($k = 16$). One of these studies combined two kinds of CBT intervention, and another combined CBT with an antidepressant (fluoxetine). Other types of intervention assessed were: cognitive training ($k = 2$), behavioural activation ($k = 1$), fluoxetine ($k = 1$), group counselling combined with a Qigong sports exercise prescription ($k = 1$), interpersonal therapy ($k = 1$), positive psychotherapy ($k = 1$), rational emotive behaviour therapy ($k = 1$), social skills training ($k = 1$), and a spiritually informed intervention ($k = 1$).

Fourteen interventions were delivered to participants individually, and ten were delivered in a group format. Two interventions had both individual and group components. Most interventions were delivered in a face-to-face format ($k = 17$), but some were delivered online ($k = 7$) or with a combination of these delivery methods ($k = 2$). Interventions were delivered in a range of locations: schools ($k = 13$), mental health clinics ($k = 8$), community ($k = 3$), university ($k = 1$). One intervention was delivered in both school and community settings, depending on

where participants had been recruited from.

Only eight interventions were explicitly stated to be aiming to target the self in publications, although it is likely that several others also targeted elements of self without specifically saying this. For example, CBT interventions often target negative thoughts about the self, but many publications do not go into depth about which modules are included in treatments. Twenty-four comparators were identified, with eleven providing no support to the control group, six giving light support, six active support, and one using placebo medication.

Eleven different outcome measures were used to examine various aspects of self. For self-esteem, the Rosenberg Self-Esteem Scale was used for all included studies ($k = 9$ studies; Rosenberg, 1965). Three measures were used to measure self-efficacy: the Generalized Self-Efficacy Scale ($k = 2$; Schwarzer & Jerusalem, 1985), the Self-Efficacy Questionnaire for Children ($k = 1$; Muris, 2001), and the Positive Psychological Capital Questionnaire (PPQ) self-efficacy subscale ($k = 1$; Zhang et al., 2010). A range of concepts were included under the umbrella of self-evaluation, and seven outcome measures were identified. Three of these measured self-concept: the Piers Harris Children's Self-Concept Scale 2nd edition ($k = 2$; Piers & Herzberg, 2002), Six Factor Self Concept Rating Scale ($k = 1$; Stake, 1994), and the Beck Self-Concept Inventory for Youth ($k = 1$; J. Beck et al., 2001). Other measures examined self-image (the Offer Self-Image Questionnaire; $k = 1$; Offer et al., 1977), negative thoughts about the self (Automatic Thoughts Questionnaire; $k = 2$; Hollon & Kendall, 1980), negative self-evaluation (Reynolds Adolescent Depression Scale-second edition-Korean; $k = 1$; Reynolds, 2002), and view of self (Cognitive Triad Inventory for Children view of self subscale, $k = 1$; Kaslow et al., 1992).

3.3. Risk of bias

Out of 20 studies included in the meta-analysis, five were considered to have a high risk of bias for random sequence generation due to a lack of randomisation (Bossenbroek et al., 2022; Fine et al., 1991; Min & Yao, 2022; Sung, 2012; Wong et al., 2012), and for two studies the risk was unclear (Guo et al., 2017; Rosselló & Bernal, 1999). The same studies were also high risk for allocation concealment (Bossenbroek et al., 2022; Fine et al., 1991; Min & Yao, 2022; Sung, 2012; Wong et al., 2012), and one was unclear (Guo et al., 2017). Twelve studies were determined to be high risk for blinding of participants and personnel and for blinding of outcome assessments (Bossenbroek et al., 2022; Do et al., 2021; Dobson et al., 2010; Fine et al., 1991; Guo et al., 2017; Kitchen et al., 2021; Min & Yao, 2022; Rosselló & Bernal, 1999; Sælid & Nordahl, 2017; Stallard et al., 2011; Topooco et al., 2019; Wong et al., 2012), and six studies were unclear (Brière et al., 2019; Pile et al., 2021; Rickhi et al., 2015; Rohde et al., 2012; Sung, 2012; Treatment for Adolescents with Depression Study (TADS) Team, 2005). Three studies were identified as being high risk for incomplete outcome data (Fine et al., 1991; Rosselló & Bernal, 1999; Wong et al., 2012), and seven studies were unclear (Brière et al., 2019; De Voogd, De Hullu, et al., 2017; De Voogd, Wiers, & Salemink, 2017; Dobson et al., 2010; Min & Yao, 2022; Rohde et al., 2012; Stallard et al., 2011). No studies were high risk for selective reporting, however thirteen had unclear risk (Bossenbroek et al., 2022; Do et al., 2021; Dobson et al., 2010; Fine et al., 1991; Guo et al., 2017; Min & Yao, 2022; Rohde et al., 2012; Rosselló & Bernal, 1999; Sælid & Nordahl, 2017; Stallard et al., 2011; Sung, 2012; Treatment for Adolescents with Depression Study (TADS) Team, 2005; Wong et al., 2012). No sources of other bias were identified (Fig. 2).

3.4. Meta-analysis effects of interventions on depression symptoms

A confirmatory analysis was conducted to test whether included interventions were effective in reducing symptoms of depression compared with control groups. Effect sizes from thirty-eight comparisons (twenty studies) were pooled to give an overall effect size $g = -0.42$ (95 % CI: -0.72, -0.13), and a prediction interval crossing zero (PI

Table 2
Characteristics of all included studies.

Study	Country	Randomisation	Blinding	N	% fem	Age	Depression status	Self term	Self measure	Trial arms	Control category*	Self target
Alavi et al., 2018**	Canada	Non-randomised, participant choice of arm	Unblinded	15	86.7 %	14–17	Clinical	Self-evaluation	BSCI-Y	1) eCBT 2) Live CBT	N/A	No
Bossenbroek et al., 2022	The Netherlands	Cluster randomised	Unblinded	190	100 %	11–16	Sub-clinical	Self-efficacy	SEQ-C	1) School-based depression prevention programme (Op Volle Kracht) 2) CBT-based game (SPARX) 3) Combination of 1 and 2 4) Monitoring control	None	No
Brière et al., 2019	Canada	Randomised	Single-blinded	74	66 %	14–18	Sub-clinical	Self-evaluation	ATQ	1) Blues Programme 2) Educational brochure control	Light	No
De Voogd, De Hullu, et al., 2017	The Netherlands	Randomised	Double-blinded	108	66.7 %	11–19	Mixed	Self-esteem	RSES	1) Visual search training 2) Visual search placebo 3) No training control	None	No
De Voogd, Wiers, & Salemink, 2017	The Netherlands	Randomised	Double-blinded	119	66.7 %	11–19	Mixed	Self-esteem	RSES	1) Positive scenario training 2) Picture-word training 3) Neutral scenario training	Light	No
Do et al., 2021	Republic of Korea	Randomised	Unblinded	50	52 %	12–17	Clinical	Self-esteem	RSES	1) eCBT 2) Waitlist control	None	No
Dobson et al., 2010	Canada	Randomised	Unblinded	46	69.8 %	13–18	Sub-clinical	Self-esteem	RSES	1) Group CBT 2) Support group	Active	No
Fine et al., 1991	Canada	Non-randomised, allocation based on referral date	Unblinded	66	83 %	13–17	Clinical	Self-evaluation	OSIQ	1) Social Skills group 2) Therapeutic support group	Active	Yes (therapeutic support group)
Guo et al., 2017	China	Randomised	Unblinded	76	94.9 %	No age range****	Clinical	Self-efficacy	GSS	1) Positive psychotherapy 2) Treatment as usual	Light	No
Kitchen et al., 2021	UK	Randomised	Unblinded	22	81.8 %	12–17	Clinical	Self-esteem	RSES	1) Behavioural activation 2) Treatment as usual	Active (CAMHS)	No
McCarty et al., 2013**	USA	Randomised	Single-blinded	120	60.9 %	11–15	Sub-clinical	Self-esteem	BASC-2 self-esteem subscale	1) Problem Thoughts and Action school group prevention programme	Active	No

Table 2 (*continued*)

Study	Country	Randomisation	Blinding	N	% fem	Age	Depression status	Self term	Self measure	Trial arms	Control category*	Self target
Min & Yao, 2022	China	Non-randomised	Unblinded	61	54.1 %	No age range (estimate 12–15)*	Mixed	Self-efficacy	PPQ	1) Positive rumination-based Qigong sports prescription 2) Treatment as usual	None	Yes (positive rumination-based Qigong sports prescription)
Moeini et al., 2019**	Iran	Randomised	Unblinded	128	100 %	15–18	Clinical	Self-efficacy	SSES	1) Social cognitive theory-informed online education programme 2) Assessment only	None	Yes
Pile et al., 2021	UK	Randomised	Single-blinded	56	60.8 %	16–18	Clinical	Self-esteem	RSES	1) Imagery-based cognitive behavioural intervention 2) Non-directive supportive therapy	Active	Yes (both)
Rickhi et al., 2015***	Canada	Randomised	Single-blinded	62	71 %	13–24	Clinical	Self-evaluation	PHCSCS-2 (13–18 year old subgroup); SFSCS (19–24 year old subgroup)	1) Spiritually informed online programme (LEAP) 2) Waitlist control	None	Yes (LEAP)
Rohde et al., 2012	USA	Randomised	Single-blinded	346	56 %	14–19	Sub-clinical	Self-esteem; Self-evaluation	RSES; ATQ (personal maladjustment/ desire for change and negative self-concept subscales)	1) CBT group 2) Supportive-expressive group 3) Cognitive-behavioural bibliotherapy 4) Brochure control	2) Active 4) Light	Yes (Cognitive-behavioural bibliotherapy)
Rosselló & Bernal, 1999	Puerto Rico	Randomised	Unblinded	71	54 %	13–18	Clinical	Self-evaluation	PHCSCS	1) Group CBT 2) Group interpersonal psychotherapy 3) Waitlist control	None	Yes (Interpersonal psychotherapy)
Sælid & Nordahl, 2017	Norway	Randomised	Unblinded	42	50 %	16–18	Clinical	Self-esteem	RSES	1) Rational emotive behaviour therapy 2) Supportive therapy placebo 3) No treatment control	Active	Yes (Rational emotive behaviour therapy)
Stallard et al., 2011	UK	Randomised	Unblinded	20	Unavailable	11–16	Clinical	Self-esteem	RSES	1) eCBT 2) Waitlist control	None	No

Table 2 (*continued*)

Study	Country	Randomisation	Blinding	N	% fem	Age	Depression status	Self term	Self measure	Trial arms	Control category*	Self target
Stallard et al., 2013**	UK	Cluster randomised	Single-blinded	1064 (sub-group of high-risk participants)	65.4 %	12–16	Sub-clinical	Self-esteem; Self-evaluation	RSES; CATS personal failure subscale	1) CBT school-based prevention programme 2) Attention control intervention 3) Usual school provision	2) Light 3) Light	Yes
Sung, 2012	Republic of Korea	Non-randomised	Single-blinded	58	100 %	13–14	Clinical	Self-evaluation	RADS-K negative self-evaluation subscale	1) CBT school-based depression intervention programme 2) No treatment control	None	Yes (School-based depression intervention programme)
Treatment for Adolescents with Depression Study (TADS) Team, 2005	USA	Randomised	Double-blinded (Fluoxetine and placebo groups); Unblinded (CBT and CBT + fluoxetine groups)	439	54.4 %	12–17	Clinical	Self-evaluation	CTI view of self subscale	1) CBT + fluoxetine 2) Fluoxetine 3) CBT 4) Placebo medication	Placebo medication	No
Topooco et al., 2019	Sweden	Randomised	Unblinded	70	95.7 %	15–19	Clinical	Self-efficacy	GSES	1) eCBT 2) Waitlist control	None	Yes (eCBT)
Wong et al., 2012	China	Non-randomised	Unblinded	65	Unavailable	14–16	Clinical	Self-esteem	RSES	1) CBT-based school depression prevention programme 2) Waitlist control	None	No

Abbreviations: ATQ - Automatic Thoughts Questionnaire; BASC-2 – Behaviour Assessment Scale for Children second edition; BSCI-Y - Beck Self-Concept Inventory for Youth; CATS – Children's Automatic Thoughts Scale; CTI - Cognitive Triad Inventory for Children; GSES – General Self-Efficacy Scale; GSS – Generalized Self-Efficacy Scale; OSIQ - Offer Self-Image Questionnaire; PHCSCS – Piers Harris Children's Self-Concept Scale; PHCSCS-2 – Piers Harris Children's Self-Concept Scale 2nd Edition; PPQ – Positive Psychological capital Questionnaire; RADS-K - Reynolds Adolescent Depression Scale-second edition-Korean; RSES - Rosenberg Self-Esteem Scale; SEQ-C - Self Efficacy Questionnaire for Children; SFSCS – 6 Factor Self Concept Rating Scale; SSES – Sherer Self-Efficacy Scale.

* Comparators were categorised based on the amount of support control groups received ('none' e.g. waitlist, monitoring control, 'light' e.g. educational brochure, cognitive training placebo, 'active' e.g. supportive-expressive groups, school counselling, and 'placebo').

** Not included in meta-analysis.

*** Rickhi 2015 has been split into two comparisons (a and b), as the results are broken down into two different age groups which use different measures for the outcomes of interest.

**** Guo 2017 - No age range defined but the mean and SD age of participants is within review criteria (M = 20.39, SD = 1.20). Min 2022 – no age range provided. Estimate is based on a junior high school student sample.
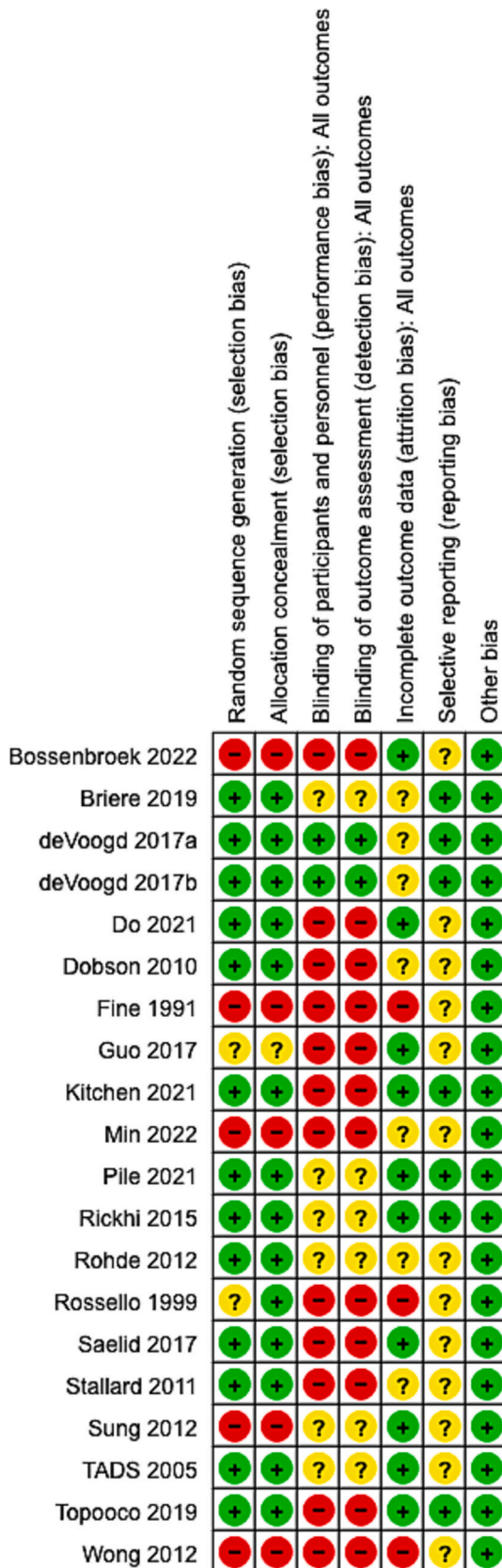
Fig. 2. Risk of bias of included studies.

-1.74, 0.89). These results are plotted in Fig. 3.

Heterogeneity was very high ($Q_E(19) = 102.44$, $p < 0.0001$, $I^2 = 81.5$ %), and therefore influence analyses were conducted to attempt to identify the source of this. Guo et al. (2017) was identified as the largest contributor of heterogeneity to the analysis, and the analysis was re-conducted with this outlier removed. This study had previously been flagged as having a potentially overestimated effect size, possibly due to misreporting of the standard deviation in the original paper. The recalculated pooled effect size was $g = -0.30$ (95 % CI, -0.52, -0.08). Heterogeneity remained high after removal of this outlier ($Q_E(18) = 53.50$, $p < 0.0001$, $I^2 = 66.4$ %).

A random-effects meta-analysis was conducted with all thirty-eight comparisons. The between study variability for all studies was $\hat{\tau}_j^2 = 0.306$ and within study variability was $\hat{\sigma}_{ij}^2 = 0.062$. An analysis of all studies found a significant negative effect, $\hat{\theta} = -0.40$ $[-0.70, -0.10]$, $t(19) = -2.81$, $p = 0.01$, which indicates that receiving an intervention was associated with a reduction in depressive symptoms over control.

When Guo 2017 was excluded, between study variability was reduced $\hat{\tau}_j^2 = 0.123$, and within study variability stayed close to the same value $\hat{\sigma}_{ij}^2 = 0.061$. Excluding Guo from the analysis continued to result in a significant negative effect, $\hat{\theta} = -0.29$ $[-0.51, -0.06]$, $t(18) = -2.71$, $p < 0.05$.

3.4.1. Moderation analysis: randomisation

A moderation analysis was conducted using randomisation as a categorical predictor of effect size to determine whether the method of allocating participants to trial arms had an impact on response to intervention. Guo et al. (2017) was not included in this analysis. The results found that between study variability was $\hat{\tau}_j^2 = 0.09$ and within study variability was $\hat{\sigma}_{ij}^2 = 0.06$. There was significant heterogeneity, $Q_E(35) = 124.87$, $p < 0.0001$. The overall moderation effect was non-significant, $\beta = -0.55$ $[-1.10, 0.01]$, $t(17)$, -2.08, $p = 0.053$, with prediction intervals crossing zero. However, there were only four effect sizes from three studies in the non-randomised group, meaning that the analysis likely lacked power to detect any significant differences. Table 3 shows that the effects were negative and significant in the randomised group, demonstrating a reduction in depressive symptoms, whereas there was a positive, non-significant effect for the non-randomised group, however these conclusions are limited by the small numbers involved in this analysis.
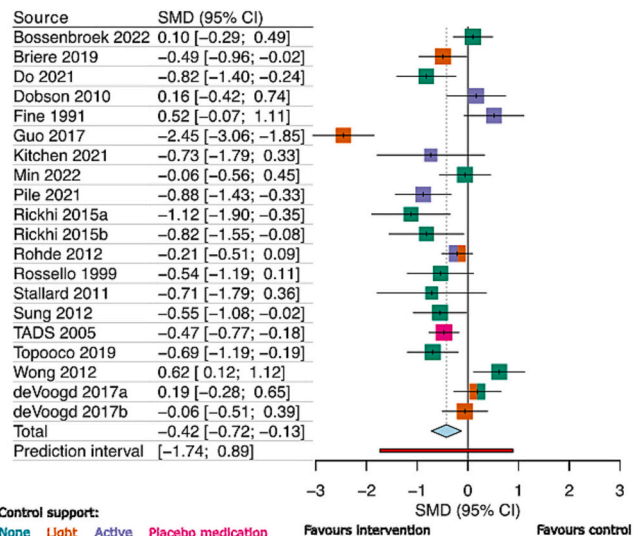
Fig. 3. Pooled effect of interventions on depression outcomes.

Table 3

Individual meta-analyses for arm allocation methods on depression symptoms and self outcomes.

Randomisation	k	$\hat{\tau}_j^2$	$\hat{\sigma}_{ij}^2$	Q	df_Q	p_Q	θ	95 % CI	t	p
Depression outcomes										
Non-randomised	5	0.226	0.000	13.712	4	0.008	0.143	[−0.384, 0.669]	0.531	0.595
Randomised	33	0.268	0.065	158.617	32	0.001	−0.530	[−0.828, −0.231]	−3.480	0.001
Self outcomes										
Non-randomised	3	0.000	0.000	1.726	2	0.422	0.489	[0.175, 0.802]	3.055	0.002
Randomised	31	0.056	0.008	53.707	30	0.005	0.268	[0.105, 0.432]	3.213	0.001

3.4.2. Publication bias model

Funnel plots for depression outcomes were examined, both including and excluding Guo et al. (2017), to determine whether the results were likely impacted by publication bias (Fig. 4). Since an effect in the expected direction is represented by a negative effect size (that is, depression being lower in the intervention group compared to controls), the funnel plots below suggest an absence of small samples studies (i.e. those with large standard errors) that show null effects or effects in the opposite direction to expected. This pattern is indicative of one-tailed selection bias, suggesting that studies showing effects in the predicted direction are disproportionately selected for publication.

A step function selection model was used to determine whether the results of the meta-analysis were likely to be influenced by publication bias (Table 4).

Under a model of moderate one-tailed selection bias, the overall effect would be reduced to $\hat{\theta} = -0.25$ [−0.56, 0.06] and is not significantly different from zero. Under a severe selection bias model, the overall effect would change to a small non-significant effect in the opposite direction with a wide confidence interval $\hat{\theta} = 0.18$ [−0.26, 0.61]. These results suggest that publication bias may be present within the studies included in this meta-analysis.

3.5. Meta-analysis effects of interventions on all self outcomes

To test the impact of interventions for symptoms of depression on self-perceptions, all outcomes relating to self were first combined. Thirty-five comparisons from twenty-one studies were included in this analysis. The pooled effect size for self-perception outcomes was $g = 0.43$ (95 % CI, 0.20, 0.67), with the prediction interval crossing zero (−0.58, 1.45) (Fig. 5).

Heterogeneity was high $Q_E(20) = 71.29$, $p < 0.0001$, $I^2 = 71.9$ %), and subsequent influence analyses identified Min and Yao (2022) as the largest contributor of heterogeneity. The recalculated pooled effect size with Min and Yao (2022) removed was $g = 0.33$ (95 % CI: 0.16, 0.49). Heterogeneity was reduced but remained moderate after removal of this

Table 4

Publication bias model (depression and self-perception outcomes).

Selection model	$\hat{\theta}$	$\hat{\theta}_{adjusted}$	95 % CI	p
Depression outcomes				
Moderate	−0.42	−0.25	[−0.56, 0.06]	0.112
Severe	−0.42	0.18	[−0.26, 0.61]	0.429
Self-perception outcomes				
Moderate	0.43	0.30	[0.05, 0.55]	0.020
Severe	0.43	−0.04	[−0.42, 0.33]	0.819
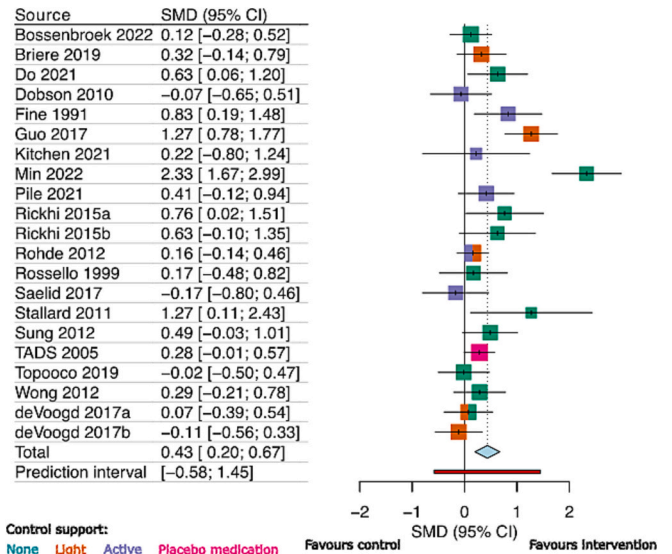
Fig. 5. Pooled effect of interventions on all self outcomes.
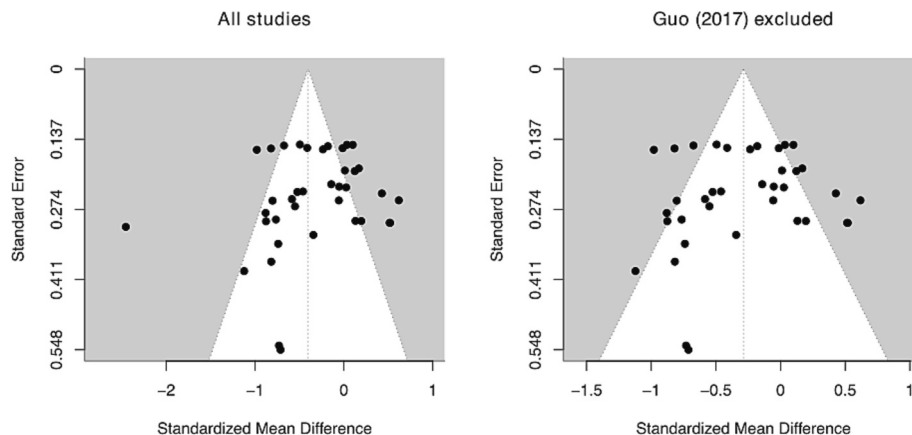
Fig. 4. Depression funnel plot.

outlier ($Q_E(19) = 35.66$, $p < 0.0001$, $I^2 = 46.7$ %).

A meta-analysis was conducted with all thirty-five comparisons to determine the effect of interventions on all self-perception outcomes. Between study variability for all studies was $\widehat{\tau}_j^2 = 0.212$ and within study variability $\widehat{\sigma}_{ij}^2 = 0.006$. The meta-analysis found a significant positive effect on measures of self-perception, $\widehat{\theta} = 0.42$ [0.18, 0.67], $t(20) = 3.57$, $p = 0.001$, suggesting that participants allocated to the intervention group were more likely to have improved self-perception scores post-intervention compared with those allocated to control.

With Min and Yao (2022) excluded, between study variability was $\widehat{\tau}_j^2 = 0.053$ and within study variability was $\widehat{\sigma}_{ij}^2 = 0.007$. A smaller effect size was found in favour of the intervention group improving self-perception outcomes, although with increased significance, $\widehat{\theta} = 0.30$ [0.14, 0.46], $t(19) = 3.91$, $p < 0.001$.

3.5.1. Moderation analysis: randomisation

A moderation model was used to compare effect sizes across studies that used different methods to allocate participants to treatment arms. Min and Yao (2022) was not included in this analysis. Between study variability was $\widehat{\tau}_j^2 = 0.048$ and within study variability was $\widehat{\sigma}_{ij}^2 = 0.008$. There was significant heterogeneity, $Q_E(32) = 55.43$, $p = 0.0062$. The overall moderation effect was non-significant, $\beta = -0.24$ [−0.56, 0.08], $t(18)$, -1.60, $p = 0.13$. There were only three effect sizes contributing to the non-randomised group, and prediction intervals crossed zero. Table 3 demonstrates a significant increase in positive self-evaluation for both groups.

3.5.2. Moderation analysis: categories of self

Self-perception outcomes were separated into three categories (self-esteem, self-evaluation, and self-efficacy) and were pooled to compare effect sizes across these different types of self (Fig. 6).

Four studies, with six comparisons, were included for self-efficacy, finding a pooled effect size of $g = 0.91$ (95 % CI, −0.16, 1.97), although the 95 % confidence intervals were wide and crossed zero. There was significant heterogeneity, $Q_E(3) = 45.01$, $p < 0.01$, $I^2 = 94.54$ %, likely caused by the inclusion of Min and Yao (2022) within this subset of data.

Effect sizes for self-evaluation were pooled based on outcomes from eight studies, with fourteen comparisons. The pooled self-evaluation effect size was $g = 0.35$ (95 % CI, 0.20, 0.51), showing increased post-intervention self-evaluation for intervention groups over control. No significant heterogeneity was found for this subgroup ($Q_E(7) = 5.38$, $p = 0.61$, $I^2 = 0.00$ %).

Lastly, ten studies with fifteen comparisons contributed to the self-esteem subgroup. The pooled self-esteem effect size was $g = 0.15$ (95 % CI: −0.01, 0.31). Heterogeneity was not significant, ($Q_E(9) = 10.75$, $p = 0.29$, $I^2 = 0.01$ %).

A moderation analysis was conducted to determine whether there were differential effects of interventions for depression in young people on different categories of self. Min and Yao (2022) was not included in this analysis. Between study variability was $\widehat{\tau}_j^2 = 0.05$ and within study variability was $\widehat{\sigma}_{ij}^2 = 0.005$. Significant heterogeneity was found, $Q_E(32) = 54.43$, $p = 0.008$. The overall moderation effect was not significant, $\beta = -0.13$ [−0.30, 0.05], $t(18) = -1.55$, $p = 0.14$ and confidence intervals crossed zero.

Individual meta-analyses demonstrate a non-significant effect of interventions on self-efficacy and self-esteem over control (Table 5). However, a significant positive effect was found in favour of intervention over control for self-evaluation, $\widehat{\theta} = 0.29$ [0.19, 0.39], $t(13) = 5.61$, $p < 0.001$.
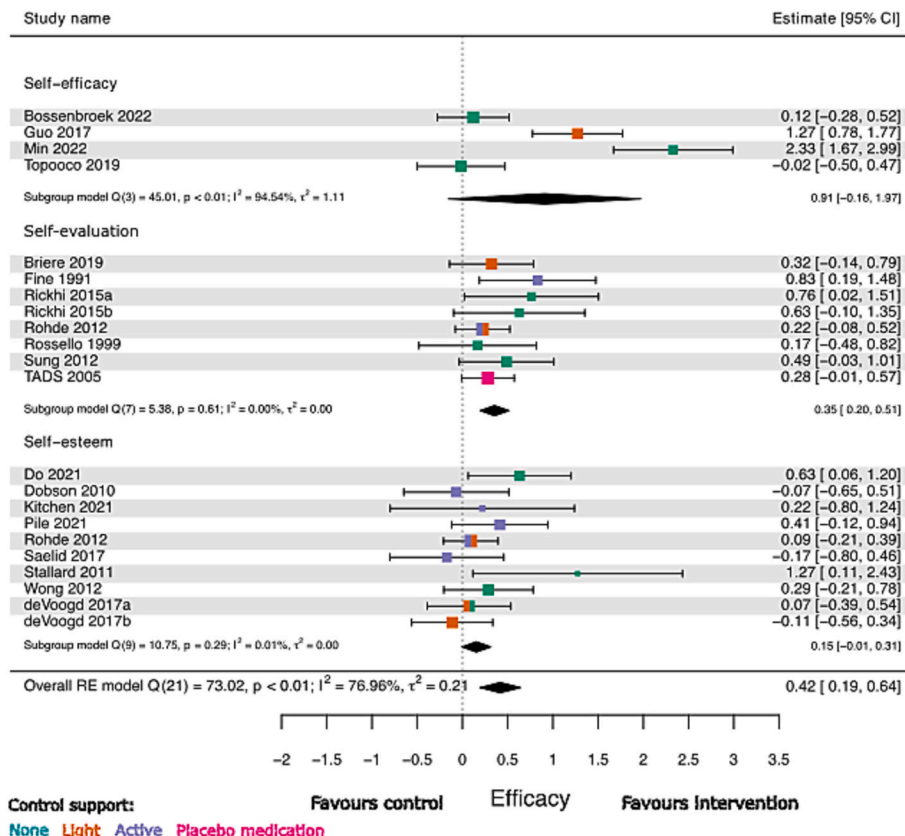
Fig. 6. Pooled effect size by category of self (all studies).

Table 5
Individual meta-analyses for categories of self (excluding Min & Yao, 2022).

Category of self	k	$\widehat{\tau}_j^2$	$\widehat{\sigma}_{ij}^2$	Q	dfQ	pQ	$\widehat{\theta}$	95 % CI	t	p
Self-efficacy	5	0.43	0.00	18.84	4	<0.001	0.45	[−0.34, 1.23]	1.12	0.26
Self-evaluation	14	0.00	0.00	11.66	13	0.555	0.29	[0.19, 0.39]	5.61	0.00
Self-esteem	15	0.00	0.02	22.27	14	0.073	0.12	[−0.02, 0.26]	1.64	0.10

3.5.3. Publication bias model

Funnel plots for all self-perception outcomes were examined, both including and excluding Min and Yao (2022), to examine the potential impact of publication bias on findings (Fig. 7). It is expected that self-perception would be higher in the intervention group compared with control, which is represented by a positive effect size. The funnel plots below depict an absence of studies with large standard errors with null effects or effects in the opposite direction to that which is expected. This pattern suggests one-tailed selection bias, indicating that studies showing expected effects are more likely to be published.

The publication bias model for self-perception shows that under a model of moderate one-tailed selection bias, the overall effect would be reduced to $\widehat{\theta} = 0.30$ [0.05, 0.55], $p = 0.02$, but that this would still be significantly different from zero, demonstrating an improvement in self-perceptions as a result of interventions for depression over control (Table 4). Under a severe selection bias model, the overall effect would change to effectively zero and would not be significant, $\widehat{\theta} = -0.04$ [−0.42, 0.33]. These findings suggest that there may be a potential influence of publication bias in the studies identified for inclusion in this meta-analysis.

3.6. Association between post-intervention effects on self and depression

Finally, a random-effects multi-level meta-regression was conducted to determine whether there was an association between the effect of an intervention on both depression and self-perception. Post-intervention self-perception outcome was the independent variable, with post-intervention depression outcome added to the model as a predictor variable. A significant effect was not found, $Q_M(1) = 2.09$, $\beta = -0.26$ [−0.60, 0.09], $p = 0.15$. This result indicates that there was no significant association between self-perception and depression outcomes post-intervention, however given that this analysis was based on 20 comparisons it is likely to have been underpowered for significance testing.

3.7. Narrative synthesis of studies not included in meta-analysis

Four studies were unable to be Included in the meta-analysis and are synthesised in narrative form instead. One study was not included due to having an equivalent comparator that was an active intervention, rather than a control group that fit within the defined categories (Alavi et al., 2018). The other three studies were not included because they did not collect post-intervention data relating to self-perception outcomes within four weeks of the intervention (McCarty et al., 2013; Moeini et al., 2019; Stallard et al., 2013). These delayed data collection time-points create difficulties with direct comparison as they do not reflect the immediate outcomes of the intervention, so these studies were not included in the meta-analysis. Despite this, it was felt that all four of these studies had relevant data that should be examined within the context of these specific methodological designs, and therefore they are synthesised in narrative form instead.

3.7.1. Characteristics of studies not included in the meta-analysis

Three of the four studies included in the narrative synthesis examined CBT-based interventions: Alavi et al. (2018) compared eCBT with CBT delivered face to face in young people aged 14–17 with clinical levels of depression; McCarty et al. (2013) examined a CBT-based classroom-based prevention programme compared with a brief individual support session in 11–15 year olds; and Stallard et al. (2013) compared a CBT school-based group prevention programme with an attention control intervention and usual school

Personal, Social, Health and Economic Education (PSHE) provision. The intervention studied by Stallard et al. (2013) was a universal school-based programme for students aged 12–16, and we only examined a sub-group of students at high-risk of depression in this review. Moeini et al. (2019) tested an online education programme informed by principles of social cognitive theory for 15–18 year olds with mild-moderate symptoms of depression in comparison with an assessment-only control group. The interventions tested by Moeini et al. (2019) and Stallard et al. (2013) were both reported to target elements of self-perception.

Two of these studies assessed self-esteem using the Behaviour Assessment Scale for Children second edition self-esteem subscale (Thorpe et al., 2003) and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Self-evaluation was examined by two studies using the Beck Self-Concept Inventory for Youth (J. Beck et al., 2001) and the Children's Automatic Thoughts Scale (Schniering & Rapee, 2002). One study measured self-efficacy using the Farsi language version of the Sherer Self-Efficacy Scale (Asgharnejad et al., 2006).
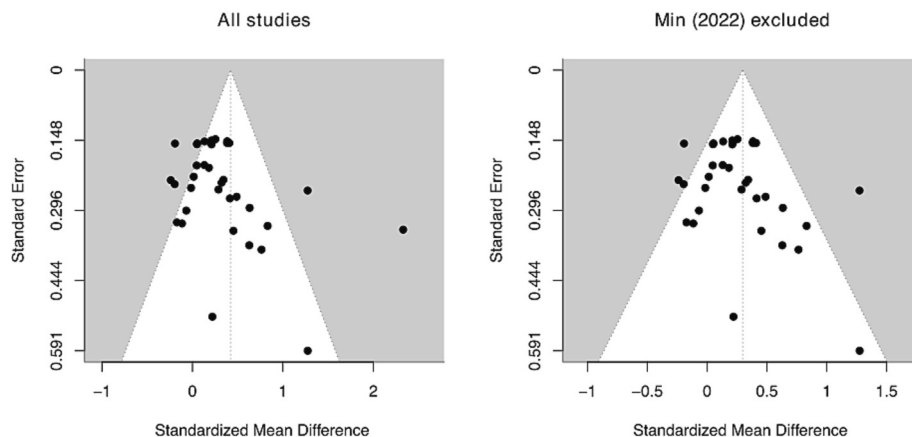
Fig. 7. Self-perception funnel plot.

3.7.2. Narrative synthesis of effects of interventions on depression

Mixed results were found across trials examining the impact of interventions on depressive symptoms. Stallard et al. (2013) found a reduction in symptoms of depression for both the intervention and control group at 6- and 12-month follow-up, suggesting that classroom-based CBT was not effective in reducing depressive symptoms compared with usual provision. Alavi et al. (2018) found that post-treatment depression scores did not differ significantly between participants allocated to receive CBT online compared with face-to-face delivery. Upon further examination, participants receiving eCBT had a significant reduction in symptoms from pre- to post-treatment whereas the live CBT group did not. Moeini et al. (2019) found significant decreases in depression scores at 12 weeks for their intervention group participating in a social cognitive theory-informed online programme over an assessment-only control group, although these differences were no longer significant at 24 weeks. Conversely, McCarty et al. (2013) did find a significant improvement at 12 weeks in symptoms of depression for participants receiving the Problem Thoughts and Action intervention programme over those participating in a brief interpersonal support group.

3.7.3. Narrative synthesis of effects of interventions on self-esteem

McCarty et al. (2013) found that participants in the Problem Thoughts and Action intervention programme had a significantly increased change in self-esteem at 5–7 month follow-up compared with the brief interpersonal support control group ($d = 0.65$, 95 % CI: 0.15, 0.92, $p = 0.003$). Stallard et al. (2013) found no effect of the intervention on self-esteem at 6 months and 12 months.

3.7.4. Narrative synthesis of effects of interventions on self-evaluation

Alavi et al. (2018) found no significant differences in self-concept scores between the e-CBT and face-to-face CBT groups post-treatment. However, whilst pre and post treatment self-concept scores did not differ for the live CBT group, the e-CBT group self-concept scores did rise significantly over time. Conversely, Stallard et al. (2013) found that participants at high risk of depression in the intervention group had increased feelings of personal failure at 12 months compared with usual PSHE, suggesting that this classroom-based CBT intervention may have negative effects on self-evaluation for this group.

3.7.5. Narrative synthesis of effects of interventions on self-efficacy

One study examined the impacts of a web-based programme based on Social Cognitive Theory on self-efficacy compared with an assessment-only control group (Moeini et al., 2019). The authors found no significant difference in self-efficacy change scores at 8 weeks post-intervention (12-week timepoint) between the intervention and control groups ($p = 0.237$).

4. Discussion

This systematic review and meta-analysis explored the effects of interventions for depression on outcomes relating to the self in young people. A total of twenty studies were included in the meta-analysis, with thirty-eight comparisons for depression and thirty-five comparisons for self-perception outcomes. Four studies were also narratively synthesised. The meta-analysis results found that interventions had a small but significant effect in improving both depression and self-perceptions at post-treatment, however there were high levels of heterogeneity and prediction intervals crossed zero, demonstrating uncertainty in our results. These effects were not moderated by whether studies used randomisation to allocate participants to treatment arms for both depression and self outcomes, although due to the small number of non-randomised studies included in this review the power of these subgroup analyses was extremely low and additional data would be necessary to confirm these results (Cuijpers et al., 2021).

When self-perception was broken down into sub-categories, a small-to-medium significant positive effect was found for self-evaluation. There was a non-significant positive effect of interventions on self-esteem and self-efficacy. After further exploration however, it was found that there was no moderating effect of category of self outcome. Given this pattern of results, we do not want to over-interpret this finding. However one explanation as to the positive effect on self-evaluation might be that it is proposed to be a unified construct of multiple versions of self (Harter, 1999), made up of many perceptions and beliefs that are held about the self (Orchard et al., 2021). It has been suggested to be an active cognitive process that individuals engage in regularly which could potentially make it more responsive to change using cognitive techniques than the other categories(Brown et al., 2001; Leary & Terry, 2013). The finding relating to self-esteem is less clear. Whilst low self-esteem is frequently experienced by young people with depression, it is most commonly treated with CBT adapted specifically for self-esteem rather than doing so via traditional treatments for depression (e.g. Niveau et al., 2021). Models of self-esteem have theorised unique and crucial characteristics, such as self-esteem being about the overarching confidence an individual has in their worth, and that there is an influential role of the opinions of other people in determining self-esteem. Therefore, it may be that self-esteem may be more resistant to change if not explicitly targeted in treatment(Harter, 1990; Josephs et al., 2003). However, other meta-analytic research has found that treatments for self-esteem can improve symptoms of depression (e.g. Kolubinski et al., 2018), so the nature of the relationship between these concepts is still unclear. Furthermore, given the small numbers of studies involved in the subgroup analyses, caution must be given to this interpretation.

The meta-regression analysis found that there was no significant association between post-treatment depression and self-perception outcomes for young people, suggesting that whilst these interventions seem to improve both depression and self-perceptions, these may be via separate processes. This finding is in contrast with a recent meta-analysis investigating the effect of psychotherapy treatments for adult depression on self-esteem, which found a strong significant association post-treatment (Bhattacharya et al., 2023). A potential explanation for this could be the wider definition of self used in the present study, encompassing self-evaluation and self-efficacy in addition to self-esteem. Due to the small number of included studies examining self-esteem, we were unable to conduct a separate meta-regression focusing solely on this category of self-perception, making the results less comparable. However, these differences could alternatively be due to the differing efficacy of treatments for depression between adults and young people, which Cuijpers et al. (2020) suggested could be explained by treatments for young people typically being adapted from versions of treatments aimed at adults, despite their needs not being the same. The small effects identified for depression and self-perception also align with previous research investigating the effectiveness of interventions for depression in young people, further supporting the need to develop better interventions for this age group (Cuijpers et al., 2023). Co-designing interventions with young people and other key stakeholders have been suggested as one route to enhance the effectiveness of treatments for young people with depression (Pile et al., 2022). Considering the strong emphasis that young people place on self-perceptions as a treatment focus (Orchard et al., 2021), closer attention to these outcomes is necessary to understand whether treatments are effective in impacting upon this key mechanism of depression.

This meta-analysis has several limitations, including the small number of studies that met the inclusion criteria which limited the statistical power of analyses. Despite a large number of papers being identified in the initial searches, trials do not routinely include measures of self as research outcomes in their publications and so were excluded. Where outcomes relating to self-perceptions are measured, data was often only presented at baseline as a predictor of treatment response rather than as a post-intervention outcome, despite the variable nature of self-perceptions. This may be due to publication bias, which was

assessed for the depression and self meta-analyses. For depression outcomes, both moderate and severe models of publication bias indicated that there may be no significant effect of interventions over control. For self-perception there may still be a significant but reduced positive effect of interventions compared with control for the moderate model of publication bias, and a non-significant effect under a severe model of bias. It should be noted that these models are based on subjective parameters and are therefore only estimates of the potential effects that publication bias may exert on the findings of our meta-analyses. However, this highlights the limitations of our conclusions, given the increased likelihood of studies reporting positive results being published. A further limitation was the high levels of heterogeneity in all analyses, even after the exclusion of outliers and sensitivity analyses were conducted. Two influential studies were identified, and meta-analyses were repeated without these studies to check whether the results were maintained. Guo et al. (2017) was excluded from the depression meta-analysis due to having a large standardised mean difference between the intervention and control group. A potential reason for this strong effect may be that the sample population was quite different to the other included studies. This study recruited undergraduate nursing students. There are several reasons why this population may benefit more, for example they may have been more motivated to engage with an intervention or the techniques/approach may have been more familiar to them from their experience in training. An alternative explanation, as previously mentioned, may be that the effect size was artificially inflated due to misreporting of the standard deviation in the original paper. Min and Yao (2022) was removed from the self-perceptions and self-efficacy analyses due to the large effect on self-efficacy. A possible explanation for this large effect could be the intensity of the intervention. The intervention was a positive rumination training program, coupled with health Qigong training. Participants received one session of each per week for six weeks and completed homework, meaning that the intervention was more intensive than the other interventions included in this analysis. The positive rumination training also strongly targeted participant's sense of self, which may explain the significant improvements in self-efficacy seen in the intervention group above those seen in other studies. The high levels of heterogeneity, along with difficulties in distinguishing what is and is not CBT in the 'other' category, precluded our ability to conduct sub-group analyses to determine differences between different types of intervention. Finally, many sources of bias were identified according to the Cochrane Collaboration's Risk of Bias tool and thirteen included studies had a high risk of bias on at least one domain assessed, impacting the quality of the meta-analysis results.

4.1. Clinical and research implications

It is encouraging that the results of this meta-analysis demonstrate that young people's self-evaluation is sensitive to change as a result of interventions for depression. Clinicians should consider how the young people they work with evaluate themselves and use interventions that promote positive self-evaluation in their clinical work. However, the discrepancy in findings for different categories of 'self' highlight the importance in how researchers and practitioners measure or conceptualise 'self' and the need to be aware of the possibility that only some aspects of self might be changeable via interventions for depression. One interpretation of the results may be that where clients are experiencing difficulties with self-esteem or self-efficacy, interventions that specifically target these may be more appropriate and effective at improving these difficulties, as they may not be improved through interventions targeting wider symptoms of depression. Additionally, further research to differentiate these different conceptualisations of the self and how they might be responsive to treatment is needed.

It is important to note that one study did report negative effects on self-evaluation for participants receiving a classroom-based CBT intervention, and no differences in depression were found compared with

usual PSHE classes (Stallard et al., 2013). One explanation for this could be that the environment influenced the outcomes on self, although more research would be needed to confirm this. School-based interventions for anxiety and depression have reported mixed effects on symptoms of anxiety and depression, and outcomes appear to be dependent on a range of factors, e.g. whether the intervention is delivered by school staff or professionals (Gee et al., 2020). Furthermore, there is increasing recognition that receiving psychological interventions in a group format at school could be distressing for some young people due to the complex group dynamics at school (Foulkes & Stringaris, 2023).

This review identifies small effect sizes in both reducing depression and improving self-perceptions, therefore one future direction is to develop interventions that specifically target self-perceptions in the context of depression in young people. Work with adult populations has demonstrated the potential of targeting the self in interventions (Dinger et al., 2017; Orth & Robins, 2013), but further work is needed to ensure young people have access to therapies targeting self-perceptions and depression as well. The lack of association identified in the present review between depression symptoms and self-perception outcomes is important as it suggests some level of independence, which may require tailored intervention techniques. Co-designing interventions to target key mechanisms in depression, such as self-perception, could be a valuable future direction to both improve and diversify our current treatment offerings for young people.

In addition, most studies included in this review examined CBT-based interventions and it would be useful to consider the impact of a wider range of interventions on self-perceptions. Within this review there were not enough studies available to conduct sub-group analyses based on the type of intervention, and only one of the included studies investigated the effects of anti-depressant medications on self-perceptions. This would have been useful to examine given that anti-depressant medications are commonly prescribed for adolescent depression and are likely to have a different mechanism of action compared with psychotherapeutic treatments. Being able to compare interventions with different targets, doses and methods of delivery would enable us to identify the active ingredients of complex interventions. By understanding the mechanisms that drive changes in self-perception, we can build upon this to enhance existing interventions or create new and more effective treatments for depression. Therefore, researchers studying a wide variety of interventions for depression in young people should aim to incorporate instruments measuring self-perceptions into their outcome measures.

Lastly, given the low quality of many of the studies included in this meta-analysis, future studies should aim to use more robust trial designs with blinding where possible and adequate controls to improve the quality of research on interventions for young people with depression. Trials that identify negative or null findings should be published irrespective of their results to reduce publication bias so that we can improve our understanding of what does and does not work to improve symptoms of depression in young people.

5. Conclusions

Despite the limitations of this review, our results suggest that interventions for depression in young people do have a small positive effect on both depression and self-perceptions, particularly self-evaluation, but not on self-esteem or self-efficacy alone. Further work is necessary to improve the interventions available for young people with depression that incorporate the lived experience and values of young people and promote positive self-perceptions in addition to reducing depressive symptoms.

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CRediT authorship contribution statement

R.L. Dean: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization, Supervision, Project administration. **K.J. Lester:** Conceptualization, Writing – review & editing, Supervision. **E. Grant:** Investigation, Data curation, Writing – review & editing. **A.P. Field:** Methodology, Software, Formal analysis, Resources, Writing – review & editing. **F. Orchard:** Conceptualization, Writing – review & editing, Supervision, Funding acquisition. **V. Pile:** Conceptualization, Writing – review & editing, Supervision.

Declaration of competing interest

All authors declare that they have no conflicts of interest.

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Data availability

Data is available on the Open Science Framework (https://osf.io/zcfy9/).

References

Alavi, N., Stefanoff, M., Hirji, A., & Khalid-Khan, S. (2018). Cognitive Behavioural therapy through PowerPoint: Efficacy in an adolescent clinical population with depression and anxiety. *International Journal Of Pediatrics, 2018*, Article e1396216. https://doi.org/10.1155/2018/1396216

Asgharnejad, T., Ahmadi, D. M., Farzad, V. E., & Khodapanahi, M. K. (2006). Psychometric properties of sherer's general self-efficacy scale. *Psychology, 10*, 269–274.

Bandura, A. (2005). Guide for constructing self-efficacy scales. In T. Urdan, & F. Pajares (Eds.), *Self-efficacy beliefs of adolescents* (p. 307). IAP.

Bear, H. A., Krause, K. R., Edbrooke-Childs, J., & Wolpert, M. (2021). Understanding the illness representations of young people with anxiety and depression: A qualitative study. *Psychology and Psychotherapy: Theory, Research and Practice, 94*(4), 1036–1058. https://doi.org/10.1111/papt.12345

Beck, A. T. (1967). *Depression.* New York.

Beck, A. T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy, 1*, 5–37.

Beck, J., Beck, A., & Jolly, J. (2001). *Manual for the Beck youth inventories of emotional and social impairment.* The Psychological Corporation.

Bhattacharya, S., Kennedy, M., Miguel, C., Tröger, A., Hofmann, S. G., & Cuijpers, P. (2023). Effect of psychotherapy for adult depression on self-esteem: A systematic review and meta-analysis. *Journal of Affective Disorders, 325*, 572–581. https://doi.org/10.1016/j.jad.2023.01.047

Blakemore, S.-J. (2019). Adolescence and mental health. *The Lancet, 393*(10185), 2030–2031. https://doi.org/10.1016/S0140-6736(19)31013-X

Bossenbroek, R., Poppelaars, M., Creemers, D. H. M., Stikkelbroek, Y., & Lichtwarck-Aschoff, A. (2022). Trajectories of symptom change in school-based prevention programs for adolescent girls with subclinical depression. *Journal of Youth and Adolescence, 51*(4), 659–672. https://doi.org/10.1007/s10964-022-01578-5

Brière, F. N., Reigner, A., Yale-Soulière, G., & Turgeon, L. (2019). Effectiveness trial of brief indicated cognitive-behavioral group depression prevention in French-Canadian secondary schools. *School Mental Health, 11*(4), 728–740. https://doi.org/10.1007/s12310-019-09316-2

Brown, J. D., Dutton, K. A., & Cook, K. E. (2001). From the top down: Self-esteem and self-evaluation. *Cognition and Emotion, 15*(5), 615–631. https://doi.org/10.1080/02699930126063

Cameron, A. C., & Miller, D. L. (2015). A Practitioner's guide to cluster-robust inference. *Journal of Human Resources, 50*(2), 317–372. https://doi.org/10.3368/jhr.50.2.317

Clayborne, Z. M., Varin, M., & Colman, I. (2019). Systematic review and meta-analysis: Adolescent depression and long-term psychosocial outcomes. *Journal of the American Academy of Child & Adolescent Psychiatry, 58*(1), 72–79. https://doi.org/10.1016/j.jaac.2018.07.896

Crocker, J. (2001). Self-esteem in adulthood. In N. J. Smelser, & P. B. Baltes (Eds.), *International encyclopedia of the social & behavioral sciences* (pp. 13822–13826). Pergamon. https://doi.org/10.1016/B0-08-043076-7/01724-1.

Cuijpers, P., Griffin, J. W., & Furukawa, T. A. (2021). The lack of statistical power of subgroup analyses in meta-analyses: A cautionary note. *Epidemiology and Psychiatric Sciences, 30*, Article e78. https://doi.org/10.1017/S2045796021000664

Cuijpers, P., Harrer, M., Miguel, C., Ciharova, M., & Karyotaki, E. (2023). Five decades of research on psychological treatments of depression: A historical and meta-analytic overview. *American Psychologist.* https://doi.org/10.1037/amp0001250

Cuijpers, P., Karyotaki, E., Eckshtain, D., Ng, M. Y., Corteselli, K. A., Noma, H., … Weisz, J. R. (2020). Psychotherapy for depression across different age groups: A systematic review and Meta-analysis. *JAMA Psychiatry, 77*(7), 694–702. https://doi.org/10.1001/jamapsychiatry.2020.0164

Davey, C. G., & Harrison, B. J. (2022). The self on its axis: A framework for understanding depression. *Translational Psychiatry, 12*(1). https://doi.org/10.1038/s41398-022-01790-8. Article 1.

De Voogd, E. L., De Hullu, E., Heyes, S. B., Blackwell, S. E., Wiers, R. W., & Salemink, E. (2017). Imagine the bright side of life: A randomized controlled trial of two types of interpretation bias modification procedure targeting adolescent anxiety and depression. *PLoS One, 12*(7), Article e0181147. https://doi.org/10.1371/journal.pone.0181147

De Voogd, E. L., Wiers, R. W., & Salemink, E. (2017). Online visual search attentional bias modification for adolescents with heightened anxiety and depressive symptoms: A randomized controlled trial. *Behaviour Research and Therapy, 92*, 57–67. https://doi.org/10.1016/j.brat.2017.02.006

Dinger, U., Ehrenthal, J. C., Nikendei, C., & Schauenburg, H. (2017). Change in self-esteem predicts depressive symptoms at follow-up after intensive multimodal psychotherapy for major depression. *Clinical Psychology & Psychotherapy, 24*(5), 1040–1046. https://doi.org/10.1002/cpp.2067

Do, R., Lee, S., Kim, J.-S., Cho, M., Shin, H., Jang, M., & Shin, M.-S. (2021). Effectiveness and dissemination of computer-based cognitive behavioral therapy for depressed adolescents: Effective and accessible to whom? *Journal of Affective Disorders, 282*, 885–893. https://doi.org/10.1016/j.jad.2020.12.177

Dobson, K. S., Ahnberg Hopkins, J., Fata, L., Scherrer, M., & Allan, L. C. (2010). The prevention of depression and anxiety in a sample of high-risk adolescents: A randomized controlled trial. *Canadian Journal of School Psychology, 25*(4), 291–310. https://doi.org/10.1177/0829573510386449

Fine, S., Forth, A., Gilbert, M., & Haley, G. (1991). Group therapy for adolescent depressive disorder: A comparison of social skills and therapeutic support. *Journal of the American Academy of Child & Adolescent Psychiatry, 30*(1), 79.

Fine, S., Haley, G., Gilbert, M., & Forth, A. (1993). Self-image as a predictor of outcome in adolescent major depressive disorder. *Journal of Child Psychology and Psychiatry, 34*(8), 1399–1407. https://doi.org/10.1111/j.1469-7610.1993.tb02098.x

Foulkes, L., & Stringaris, A. (2023). Do no harm: Can school mental health interventions cause iatrogenic harm? *BJPsych Bulletin, 47*(5), 267–269. https://doi.org/10.1192/bjb.2023.9

Franko, D. L., Striegel-Moore, R. H., Bean, J., Tamer, R., Kraemer, H. C., Dohm, F.-A., … Daniels, S. R. (2005). Psychosocial and health consequences of adolescent depression in black and white young adult women. *Health Psychology, 24*(6), 586–593. https://doi.org/10.1037/0278-6133.24.6.586

Gee, B., Wilson, J., Clarke, T., Farthing, S., Carroll, B., Jackson, C., … Notley, C. (2020). Review: Delivering mental health support within schools and colleges – A thematic synthesis of barriers and facilitators to implementation of indicated psychological interventions for adolescents. *Child and Adolescent Mental Health, 26*(1), 34–46. https://doi.org/10.1111/camh.12381

Gortner, E.-M., Rude, S. S., & Pennebaker, J. W. (2006). Benefits of expressive writing in lowering rumination and depressive symptoms. *Behavior Therapy, 37*(3), 292–303. https://doi.org/10.1016/j.beth.2006.01.004

Guo, Y.-F., Zhang, X., Plummer, V., Lam, L., Cross, W., & Zhang, J.-P. (2017). Positive psychotherapy for depression and self-efficacy in undergraduate nursing students: A randomized, controlled trial. *International Journal of Mental Health Nursing, 26*(4), 375–383. https://doi.org/10.1111/inm.12255

Hards, E., Ellis, J., Fisk, J., & Reynolds, S. (2020). Negative view of the self and symptoms of depression in adolescents. *Journal of Affective Disorders, 262*, 143–148. https://doi.org/10.1016/j.jad.2019.11.012

Harter, S. (1990). Developmental differences in the nature of self-representations: Implications for the understanding, assessment, and treatment of maladaptive behavior. *Cognitive Therapy and Research, 14*(2), 113–142. https://doi.org/10.1007/BF01176205

Harter, S. (1999). *The construction of the self: A developmental perspective* (pp. xv, 413). Guilford Press.

Harter, S. (2012). Emerging self-processes during childhood and adolescence. In *Handbook of self and identity* (2nd ed., pp. 680–715). The Guilford Press.

Hedges, L. V. (1981). Distribution theory for Glass's estimator of effect size and related estimators. *Journal of Educational Statistics, 6*(2), 107–128. https://doi.org/10.2307/1164588

Hetrick, S. E., McKenzie, J. E., Bailey, A. P., Sharma, V., Moller, C. I., Badcock, P. B., … Meader, N. (2021). New generation antidepressants for depression in children and adolescents: A network meta-analysis. *Cochrane Database of Systematic Reviews, 5*. https://doi.org/10.1002/14651858.CD013674.pub2

Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., … Sterne, J. A. C. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ, 343*, Article d5928. https://doi.org/10.1136/bmj.d5928

Hollon, S. D., & Kendall, P. C. (1980). Cognitive self-statements in depression: Development of an automatic thoughts questionnaire. *Cognitive Therapy and Research, 4*(4), 383–395. https://doi.org/10.1007/BF01178214

Holmes, E. A., Ghaderi, A., Harmer, C. J., Ramchandani, P. G., Cuijpers, P., Morrison, A. P., … Craske, M. G. (2018). The lancet psychiatry commission on psychological treatments research in tomorrow's science. *The Lancet Psychiatry, 5*(3), 237–286. https://doi.org/10.1016/s2215-0366(17)30513-8

Jørgensen, M., Kristensen, S. M., & Breivik, K. (2023). Scar, vulnerability, or both? A longitudinal study of the association between depressive tendencies and global negative self-esteem from early adolescence to young adulthood with gender as a moderating factor. *Personality and Individual Differences, 214*, Article 112349. https://doi.org/10.1016/j.paid.2023.112349

Josephs, R. A., Bosson, J. K., & Jacobs, C. G. (2003). Self-esteem maintenance processes: Why low self-esteem may be resistant to change. *Personality and Social Psychology Bulletin, 29*(7), 920–933. https://doi.org/10.1177/0146167203029007010

Kaslow, N. J., Stark, K. D., Printz, B., Livingston, R., & Tsai, S. L. (1992). Cognitive triad inventory for children: Development and relation to depression and anxiety. *Journal of Clinical Child Psychology, 21*(4), 339–347. https://doi.org/10.1207/s15374424jccp2104_3

Kitchen, C. E. W., Tiffin, P. A., Lewis, S., Gega, L., & Ekers, D. (2021). Innovations in practice: A randomised controlled feasibility trial of Behavioural activation as a treatment for young people with depression. *Child and Adolescent Mental Health, 26*(3), 290–295. https://doi.org/10.1111/camh.12415

Kolubinski, D. C., Frings, D., Nikčević, A. V., Lawrence, J. A., & Spada, M. M. (2018). A systematic review and meta-analysis of CBT interventions based on the Fennell model of low self-esteem. *Psychiatry Research, 267*, 296–305. https://doi.org/10.1016/j.psychres.2018.06.025

Kuster, F., Orth, U., & Meier, L. L. (2012). Rumination mediates the prospective effect of low self-esteem on depression: A five-wave longitudinal study. *Personality and Social Psychology Bulletin, 38*(6), 747–759. https://doi.org/10.1177/0146167212437250

Leary, M. R., & Terry, M. L. (2013). Self-evaluation and self-esteem. In D. Carlston (Ed.), *The Oxford handbook of social cognition* (p. 0). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199730018.013.0026.

Manfro, P. H., Pereira, R. B., Rosa, M., Cogo-Moreira, H., Fisher, H. L., Kohrt, B. A., … Kieling, C. (2021). Adolescent depression beyond DSM definition: A network analysis. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-021-01908-1

McCarty, C. A., Violette, H. D., Duong, M. T., Cruz, R. A., & McCauley, E. (2013). A randomized trial of the positive thoughts and action program for depression among early adolescents. *Journal of Clinical Child & Adolescent Psychology, 42*(4), 554–563. https://doi.org/10.1080/15374416.2013.782817

Min, C., & Yao, J. (2022). Effect of positive rumination-based sports prescription on the mental health of teenagers. *Psychiatria Danubina, 34*(1), 64–70. https://doi.org/10.24869/psyd.2022.64

Moeini, B., Bashirian, S., Soltanian, A. R., Ghaleiha, A., & Taheri, M. (2019). Examining the effectiveness of a web-based intervention for depressive symptoms in female adolescents: Applying social cognitive theory. *Journal of Research in Health Sciences, 19*(3). https://doi.org/10.34172/jrhs194826. Article 3.

Muris, P. (2001). A brief questionnaire for measuring self-efficacy in youths. *Journal of Psychopathology and Behavioral Assessment, 23*(3), 145–149. https://doi.org/10.1023/A:1010961119608

Ng, M. Y., & Weisz, J. R. (2016). Annual research review: Building a science of personalized intervention for youth mental health. *Journal of Child Psychology and Psychiatry, 57*(3), 216–236. https://doi.org/10.1111/jcpp.12470

NICE. (2019). *Depression in children and young people: Identification and management*. National Institute for Health and Care Excellence. https://www.nice.org.uk/guidance/ng134.

Niveau, N., New, B., & Beaudoin, M. (2021). Self-esteem interventions in adults – A systematic review and Meta-analysis. *Journal of Research in Personality, 94*, Article 104131. https://doi.org/10.1016/j.jrp.2021.104131

Offer, D., Howard, K. I., & Ostrov, E. (1977). *The Offer self-image questionnaire for adolescents: A manual*.

O'Kearney, R., Gibson, M., Christensen, H., & Griffiths, K. M. (2006). Effects of a cognitive-behavioural internet program on depression, vulnerability to depression and stigma in adolescent males: A school-based controlled trial. *Cognitive Behaviour Therapy, 35*(1), 43–54. https://doi.org/10.1080/16506070500303456

Orchard, F., Pass, L., Marshall, T., & Reynolds, S. (2017). Clinical characteristics of adolescents referred for treatment of depressive disorders. *Child and Adolescent Mental Health, 22*(2), 61–68. https://doi.org/10.1111/camh.12178

Orchard, F., Westbrook, J., Gee, B., Clarke, T., Allan, S., & Pass, L. (2021). Self-evaluation as an active ingredient in the experience and treatment of adolescent depression; an integrated scoping review with expert advisory input. *BMC Psychiatry, 21*(1), 603. https://doi.org/10.1186/s12888-021-03585-5

Orth, U., & Robins, R. W. (2013). Understanding the link between low self-esteem and depression. *Current Directions in Psychological Science, 22*(6), 455–460. https://doi.org/10.1177/0963721413492763

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*, Article n71. https://doi.org/10.1136/bmj.n71

Piers, E. V., & Herzberg, D. S. (2002). *Piers-Harris 2: Piers-Harris children's self-concept scale* (2nd ed.). Western Psychological Services.

Pile, V., Herring, G., Bullard, A., Loades, M., Chan, S. W. Y., Reynolds, S., & Orchard, F. (2022). A multi-stakeholders perspective on how to improve psychological treatments for depression in young people. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-022-02001-x

Pile, V., Schlepper, L. K., Lau, J. Y. F., & Leamy, M. (2023). An early intervention for adolescent depression targeting emotional mental images: A process evaluation. *European Child & Adolescent Psychiatry, 32*(5), 783–795. https://doi.org/10.1007/s00787-021-01902-7

Pile, V., Smith, P., Leamy, M., Oliver, A., Bennett, E., Blackwell, S. E., … Lau, J. Y. F. (2021). A feasibility randomised controlled trial of a brief early intervention for adolescent depression that targets emotional mental images and memory specificity (IMAGINE). *Behaviour Research and Therapy, 143*, Article 103876. https://doi.org/10.1016/j.brat.2021.103876

R Core Team. (2019). *R: A language and environment for statistical computing. [Computer software]*. R Foundation for Statistical Computing. https://www.r-project.org/.

Reynolds, W. M. (2002). *Reynolds adolescent depression scale – 2nd edition: Professional manual* (Vol. 2). Psychological Assessment Resources. https://www.researchgate.net/profile/William-Reynolds-3/publication/229579050_Reynolds_Adolescent_Depression_Scale/links/60539b15458515e834559b00/Reynolds-Adolescent-Depression-Scale.pdf.

Rickhi, B., Kania-Richmond, A., Moritz, S., Cohen, J., Paccagnan, P., Dennis, C., Liu, M., Malhotra, S., Steele, P., & Toews, J. (2015). Evaluation of a spirituality informed e-mental health tool as an intervention for major depressive disorder in adolescents and young adults—A randomized controlled pilot trial. *BMC Complementary and Alternative Medicine, 15*, 450. https://doi.org/10.1186/s12906-015-0968-x

Rohde, P., Stice, E., & Gau, J. M. (2012). Effects of three depression prevention interventions on risk for depressive disorder onset in the context of depression risk factors. *Prevention Science: The Official Journal of the Society for Prevention Research, 13*(6), 584–593. https://doi.org/10.1007/s11121-012-0284-3

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press. https://www.jstor.org/stable/j.ctt183pjjh.

Rosselló, J., & Bernal, G. (1999). The efficacy of cognitive-behavioral and interpersonal treatments for depression in Puerto Rican adolescents. *Journal of Consulting and Clinical Psychology, 67*(5), 734–745. https://doi.org/10.1037//0022-006x.67.5.734

Rupani, P., Cooper, M., McArthur, K., Pybis, J., Cromarty, K., Hill, A., Levesley, R., Murdoch, J., & Turner, N. (2014). The goals of young people in school-based counselling and their achievement of these goals. *Counselling and Psychotherapy Research, 14*(4), 306–314. https://doi.org/10.1080/14733145.2013.816758

Sælid, G. A., & Nordahl, H. M. (2017). Rational emotive behaviour therapy in high schools to educate in mental health and empower youth health. A randomized controlled study of a brief intervention. *Cognitive Behaviour Therapy, 46*(3), 196–210. https://doi.org/10.1080/16506073.2016.1233453

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *The Lancet Child & Adolescent Health, 2*(3), 223–228. https://doi.org/10.1016/S2352-4642(18)30022-1

Schniering, C. A., & Rapee, R. M. (2002). Development and validation of a measure of children's automatic thoughts: The children's automatic thoughts scale. *Behaviour Research and Therapy, 40*(9), 1091–1109. https://doi.org/10.1016/S0005-7967(02)00022-0

Schwarzer, G. (2007). meta: An R package for meta-analysis. *R News, 7*(3), 40–45.

Schwarzer, R., & Jerusalem, M. (1985). Generalized self-efficacy scale. In (35th ed.,, *35. Measures in health psychology: A user's portfolio. Causal and control beliefs* (p. 37). https://doi.org/10.1037/t00393-000

Sebastian, C., Burnett, S., & Blakemore, S.-J. (2008). Development of the self-concept during adolescence. *Trends in Cognitive Sciences, 12*(11), 441–446. https://doi.org/10.1016/j.tics.2008.07.008

Shorey, S., Ng, E. D., & Wong, C. H. J. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology, 61*(2), 287–305. https://doi.org/10.1111/bjc.12333

Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin, 139*(1), 213–240. https://doi.org/10.1037/a0028931

Stake, J. E. (1994). Development and validation of the six-factor self-concept scale for adults. *Educational and Psychological Measurement, 54*(1), 56–72. https://doi.org/10.1177/0013164494054001006

Stallard, P., Phillips, R., Montgomery, A. A., Spears, M., Anderson, R., Taylor, J., … Sayal, K. (2013). A cluster randomised controlled trial to determine the clinical effectiveness and cost-effectiveness of classroom-based cognitive-behavioural therapy (CBT) in reducing symptoms of depression in high-risk adolescents. *Health Technology Assessment (Winchester), 17*(47). https://doi.org/10.3310/hta17470. vii–xvii, 1–109.

Stallard, P., Richardson, T., Velleman, S., & Attwood, M. (2011). Computerized CBT (think, feel, Do) for depression and anxiety in children and adolescents: Outcomes and feedback from a pilot randomized controlled trial. *Behavioural and Cognitive Psychotherapy, 39*(3), 273–284. https://doi.org/10.1017/S135246581000086X

Sung, K. M. (2012). Effects of a school-based intervention program for middle school adolescent girls with depression: As part of the school health services. *Journal of Korean Academy of Nursing, 42*(7), 984–991. https://doi.org/10.4040/jkan.2012.42.7.984

Thorpe, J., Kamphaus, R. W., & Reynolds, C. R. (2003). The behavior assessment system for children. In *Handbook of psychological and educational assessment of children: Personality, behavior, and context* (2nd ed., pp. 387–405). The Guilford Press.

Topooco, N., Byléhn, S., Dahlström Nysäter, E., Holmlund, J., Lindegaard, J., Johansson, S., … Andersson, G. (2019). Evaluating the efficacy of internet-delivered cognitive behavioral therapy blended with synchronous chat sessions to treat adolescent depression: Randomized controlled trial. *Journal of Medical Internet Research, 21*(11), Article e13393. https://doi.org/10.2196/13393

Treatment for Adolescents with Depression Study (TADS) Team. (2005). The treatment for adolescents with depression study (TADS): Demographic and clinical

characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry, 44* (1), 28–40. https://doi.org/10.1097/01.chi.0000145807.09027.82

Twivy, E., Kirkham, M., & Cooper, M. (2023). The lived experience of adolescent depression: A systematic review and meta-aggregation. *Clinical Psychology & Psychotherapy, n/a*(n/a). https://doi.org/10.1002/cpp.2834

United Nations. (2020). *World youth report 2020: Youth social entrepreneurship and the 2030 agenda*. UN. https://doi.org/10.18356/248b499b-en

Vevea, J. L., & Woods, C. M. (2005). Publication Bias in research synthesis: Sensitivity analysis using a priori weight functions. *Psychological Methods, 10*(4), 428–443. https://doi.org/10.1037/1082-989X.10.4.428

Viechtbauer, W. (2010). Conducting Meta-analyses in R with the metafor package. *Journal of Statistical Software, 36*, 1–48. https://doi.org/10.18637/jss.v036.i03

Wong, P. W. C., Fu, K.-W., Chan, K. Y. K., Chan, W. S. C., Liu, P. M. Y., Law, Y.-W., & Yip, P. S. F. (2012). Effectiveness of a universal school-based programme for preventing depression in Chinese adolescents: A quasi-experimental pilot study. *Journal of Affective Disorders, 142*(1–3), 106–114. https://doi.org/10.1016/j.jad.2012.03.050

World Health Organization. (2024). Adolescent and young adult health. Retrieved 24 February 2023, from https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions.

Ybrandt, H. (2008). The relation between self-concept and social functioning in adolescence. *Journal of Adolescence, 31*(1), 1–16. https://doi.org/10.1016/j.adolescence.2007.03.004

Zhang, K., Zhang, S., & Dong, Y. (2010). Positive psychological capital: Measurement and relationship with mental health. *Studies of Psychology and Behavior, 8*, 58–64.