



# Effectiveness of 234 interventions to improve life satisfaction: A rapid systematic review

Katie Tiley<sup>a,b,c</sup>, Richard Crellin<sup>d</sup>, Tania Domun<sup>a,e</sup>, Frances Harkness<sup>a</sup>,  
Joanna M. Blodgett<sup>a,f,\*</sup> 

<sup>a</sup> Kohlrabi, Manchester, SK4 3HJ, UK

<sup>b</sup> Centre for Mathematical Modelling of Infectious Diseases, London School of Hygiene & Tropical Medicine, London, WC1E 7HT, UK

<sup>c</sup> Department of Infectious Disease Epidemiology, Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, WC1E 7HT, UK

<sup>d</sup> What Works Centre for Wellbeing, London, SW1H 9EA, UK

<sup>e</sup> School of Public Health, Faculty of Medicine, Imperial College London, London, W2 1NY, UK

<sup>f</sup> Institute of Sport Exercise & Health, Division of Surgery & Interventional Science, University College London, London, W1T 7HA, UK

## ARTICLE INFO

### Keywords:

Life satisfaction  
Evaluation  
Intervention  
Rapid review  
Wellbeing

## ABSTRACT

This rapid review evaluates interventions aimed at improving life satisfaction and aids policymakers, researchers, and practitioners by identifying research strengths, gaps, and future directions for life satisfaction research. Intervention inclusion criteria were: use of a control group; delivered in high-income OECD country; randomised control trials or quasi-experimental studies; published between Jan 2011–Oct 2023; English language; uses a validated life satisfaction outcome measure. Of 9520 search results across five academic databases and grey literature sources, a total of 189 studies with 234 intervention arms met criteria for inclusion. The six themes (18 total subthemes) identified were: Emotion-based activities (intrapersonal and interpersonal,  $n = 154$ ); Didactic emotional development ( $n = 30$ ); Health promotion ( $n = 31$ ); Social media ( $n = 4$ ); Music ( $n = 3$ ); and Multi-component interventions ( $n = 12$ ). Meta-analyses were possible in six subthemes and examined overall standardised mean differences (SMD) in life satisfaction from pre-to post-intervention between the intervention and control group. The review primarily identified intrapersonal (related to self) emotional activities as generally associated with small improvements in life satisfaction: mindfulness (SMD: 0.28 (95% Confidence Interval: 0.13, 0.42)), gratitude (0.19 (0.11, 0.27)) and therapy (0.33 (0.12, 0.53)). Additionally, meta-analysis revealed a moderate effect of emotional skills development training (SMD 0.50 (0.12, 0.88)) and a small effect of exercise (SMD: 0.33 (0.04, 0.62)) on life satisfaction. Subthemes with mixed evidence (i.e., some interventions were effective while others were not) included: positivity and prosocial activities, emotional regulation and resilience training, health promotion education, ‘other’ intrapersonal emotion-based activities which could not otherwise be categorised, and multi-component interventions. The findings of this rapid review offer comprehensive insight into effective interventions for improving life satisfaction as well as areas for further research.

## 1. Introduction

Life satisfaction, a fundamental component of subjective wellbeing, is increasingly recognised as a crucial indicator of overall quality of life and societal welfare (OECD, 2019). Defined as “a person’s cognitive and affective evaluations of his or her life” (Diener et al., 2002), life satisfaction encompasses a holistic view that reflects one’s perceptions, opinions, and evaluations of their circumstances. Within the United Kingdom, life satisfaction has garnered particular attention, with the

Office for National Statistics (ONS) incorporating it into the Measuring National Well-being Programme, reflecting a broader societal shift towards prioritising holistic measures of wellbeing beyond traditional economic or health indicators (Tinkler and Hicks, 2011). Higher life satisfaction is associated with a lower risk of mortality, fewer chronic conditions, better health behaviours, and overall improved self-reported health (Goel et al., 2018; Rosella et al., 2019). Moreover, studies indicate lower life satisfaction is associated with lower work productivity and increased healthcare utilisation and costs (Goel et al., 2018),

\* Corresponding author. Institute of Sport Exercise & Health, Division of Surgery & Interventional Science, University College London, London, W1T 7HA, UK.  
E-mail address: [joanna.blodgett@ucl.ac.uk](mailto:joanna.blodgett@ucl.ac.uk) (J.M. Blodgett).

<https://doi.org/10.1016/j.socscimed.2024.117662>

Received 8 July 2024; Received in revised form 20 December 2024; Accepted 22 December 2024

Available online 24 December 2024

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therefore, policymakers have been driving research investigating interventions which improve individual life satisfaction to potentially reduce wider public health and economic burdens.

The existing literature on life satisfaction has a long history of developing valid and comprehensive measures of life satisfaction (Costa et al., 2022; Diener et al., 1985; Gademann et al., 2010; Pavot et al., 1998), and more recently focusing on investigating determinants of life satisfaction (Erdogan et al., 2012; Proctor et al., 2009) and how one's life satisfaction shapes their future outcomes (Goel et al., 2018; Rosella et al., 2019). For the purpose of this review, life satisfaction interventions are defined as "a planned and systematically implemented activity taking place in current social structures, which aims at changing knowledge, attitude or behavior of a person, an organization, or a population" (Loss, 2008) and constitute a growing field. Previous systematic reviews of life satisfaction interventions are uncommon; however, two recent reviews have each focused on a single theme, demonstrating positive associations between life review interventions and reminiscence therapy in older adults (Zhong et al., 2023) and gratitude interventions (Kerry et al., 2023) with improving life satisfaction. Despite high heterogeneity, there was evidence that longer life review and reminiscence interventions had greater effectiveness, with a plateau effect after eight sessions due to potential fatigue hypothesised to be a result of their sample (>60+ years) (Zhong et al., 2023). Most studies in the review of the influence of gratitude (Kerry et al., 2023) utilised a cross-sectional design (n = 26), with only a small subset of included studies focused on interventions (n = 18); quasi-experimental studies and randomised controlled trials offer more robust frameworks for assessing intervention efficacy by comparing pre- and post-intervention outcomes. Furthermore, the authors report that the narrow inclusion criteria of these reviews limit the generalisability of their findings. While numerous systematic reviews have highlighted the effectiveness of positive psychology interventions in enhancing other wellbeing measures (Lim and Tierney, 2023; Sakuraya et al., 2020; van Agteren et al., 2021a,b), including mental health measures, their specific impact on life satisfaction has not been examined. Despite its public health significance, the broad effectiveness of existing interventions in improving life satisfaction is not well understood.

To our knowledge, this is the first review to assess the effectiveness of interventions in improving life satisfaction regardless of intervention type, delivery mode, or sample population. Through a systematic search of available evidence in high-income OECD countries, this review seeks to identify what works to improve individual life satisfaction across all ages. By synthesising existing literature and identifying gaps in knowledge, this review aims to map the evidence base of interventions aiming to improve life satisfaction and provide valuable insights for policymakers, researchers, and practitioners alike. Specifically, this study answers the research question: what is the effectiveness of interventions aimed at improving life satisfaction in healthy adults across the life course?

## 2. Methods

This rapid review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA) (Moher et al., 2009) and guidance from the Cochrane Collaboration (Garrity et al., 2021). The study protocol was registered with PROSPERO (CRD42023475384).

### 2.1. Eligibility criteria

Studies from peer-reviewed journals and grey literature sources were eligible for inclusion if they met the following PICO (Population, Intervention, Control, and Outcome) criteria described in Table 1. Eligible populations included children and adults, with no age restrictions, which did not have a clinical diagnosis. Any intervention study with a control group was eligible if improving life satisfaction was

**Table 1**  
Inclusion criteria for the review.

<b>Population</b>	General population (no age restrictions)
<b>Intervention</b>	Improving life satisfaction defined as a stated primary aim of intervention or one of three or fewer secondary aims
<b>Control</b>	Must include a control group (i.e., 'no intervention') and a historical time-based comparator (pre-post assessment of life satisfaction)
<b>Outcome</b>	Life satisfaction measured with a valid quantitative measure (e.g. Satisfaction with Life Scale, ONS wellbeing scale, other single-item question)
<b>Study Design</b>	Randomised controlled trials or quasi-experimental studies
<b>Language</b>	English
<b>Timeframe</b>	January 1st, 2011 to date of search: October 2023
<b>Geographical Scope</b>	High-income Organisation for Economic Co-Operation and Development (OECD) countries
<b>Other Criteria</b>	Must provide sufficient detail to appraise the quality of the included study (e.g. conference abstracts and presentation slides were excluded)

one of the primary intervention aims, and life satisfaction was assessed both pre- and post-intervention using a validated quantitative measure. Hierarchical reasons for exclusion are listed below.

### 2.2. Search strategy

In October 2023, eligible studies were identified by searching five academic databases and seven grey literature searches (restricted from 2011 to present). Academic databases included: OVID MEDLINE, OVID PsycINFO, Web of Science (Social Sciences Citation Index collection), Social Policy & Practice, and British Education Index. Grey literature sources included: Google Scholar, Google Advanced Search, Social Science Research Network, King's Fund Library, the Health Foundation, Mental Health Foundation and Gov.uk. Grey literature searches were sorted by relevance and the first 500 records in each database reviewed. The search used free-text and MeSH (or APA mapping) terms as well as truncation and wildcards as appropriate in each database; the search strategy had two primary arms: 'life satisfaction' and 'intervention' (see Appendix A for details).

### 2.3. Study selection

The search process comprised two phases. Initially, results from five academic databases were combined, deduplicated, and managed using Endnote v20 and Rayyan (Ouzzani et al., 2016). Subsequently, the review team piloted the title-abstract screening by independently evaluating 50 title-abstracts against the inclusion and exclusion criteria and discussing any decision differences. Two reviewers independently screened 20% of all title-abstracts of records, resolving conflicts through discussion with a third reviewer, and the remaining 80% was screened by a single reviewer. The initial 20% screening constitutes a pilot screening stage to assess reviewer agreement as recommended by the Cochrane Rapid Review guidance (Garrity et al., 2024).

The same approach was employed for full-text screening: the review team piloted 15 full-text records, two reviewers independently screened 20% of the full-text articles, and conflicts were resolved through discussion with a third reviewer. A single reviewer then screened the remaining 80% of full-text articles, with a second reviewer confirming all full-text decisions to ensure that no evidence was missed or inadvertently included (Higgins et al., 2019). During full-text screening, exclusion decisions were recorded following a hierarchical list of reasons:

- i. Non-English language;
- ii. Inappropriate record type (e.g. conference article, media article) or wrong study design;
- iii. Did not measure life satisfaction with a validated or standardised measure;

- iv. No control group;
- v. Life satisfaction not measured pre- and post-intervention;
- vi. Intervention delivered in a non-high-income OECD country;
- vii. Clinical sample;
- viii. Covid-19-related (e.g. intervention only relevant to Covid-19 context such as lockdown);
- ix. Intervention did not directly aim to improve life satisfaction.

In cases where a single intervention is discussed in two studies (i.e., study samples are shared to some degree), the study with the largest sample is chosen for data extraction, however, if the sample sizes are the same the most recently published study is chosen for data extraction. The above steps were repeated for the grey literature search.

#### 2.4. Data extraction

A single reviewer independently extracted data from all included studies, while a second reviewer confirmed the extracted data against the original record for a minimum of 20% of included studies. Any discrepancies were resolved by a third reviewer. The following data were extracted: publication year, evidence type, study sample (age, location, description including specific sex, ethnicity or health characteristics), study design (randomisation, method of allocation), intervention (description including frequency, length and context of intervention and duration of follow-up, preliminary mapping of theme), life satisfaction data (scale used and the sample size, mean, standard deviation pre- and post-intervention for intervention and control groups), and critical appraisal checklist. Data presented in graphs and not available in tables was extracted using WebPlotDigitizer (Rohatgi, 2021). If a publication details more than one study (e.g., for comparison) then data is extracted for each of the detailed studies to the extent that it is provided in the included publication.

#### 2.5. Critical appraisal

Two critical appraisal checklists, each developed by the Joanna Briggs Institute (JBI), were utilised depending on study design: the JBI Randomised Control Trial (RCT) Critical Appraisal Checklist (Barker et al., 2023), which assesses 13 elements across five themes, and the JBI Quasi-experimental Critical Appraisal Checklist (Joanna Briggs Institute, 2020), which assesses nine elements. Checklist scores for each element are binary and scores could range from 0 to 13, or 0–9, respectively; conflicts were resolved by a third reviewer.

#### 2.6. Synthesis

Initial narrative synthesis was used to describe key characteristics of the included evidence (e.g. age range, country, scale used, etc.). Inductive coding was then used to identify key themes and subthemes that organised results synthesis. Synthesis was conducted at the intervention level, as multiple intervention arms were sometimes explored in a single study.

The most commonly reported data were pre- and post-intervention life satisfaction scores for the intervention and control/comparison group. Therefore, we conducted random-effects meta-analyses using Hedge's *g* (Higgins et al., 2019), which provides the standardised mean differences (SMD) of pre-post changes between the intervention and control groups, allowing data comparison regardless of life satisfaction scale used. The SMD is calculated by finding the difference of differences, i.e., calculating the difference between pre- and post-intervention means ( $\mu$ ) and the difference between pre- and post-control group means, and finally the difference between these two mean differences is divided by a pooled standard deviation (SD) from all four measures.

Hedge's *g* includes an adjustment factor for small sample sizes with 0.20, 0.50 and 0.80 correspond to small, medium, and large effect sizes, respectively (Brydges, 2019). A 95% Confidence Interval (CI) was

calculated alongside each SMD. Analyses were conducted using the *meta* and *metaphor* Packages in R (Balduzzi et al., 2019; Viechtbauer, 2010). We utilised recommended approaches from the Cochrane Collaboration for dealing with missing data in meta-analyses (e.g., SD imputation, medians, ranges, interquartile ranges, etc.) (Higgins et al., 2019; Weir et al., 2018). Some studies measured life satisfaction at multiple time-points post-intervention; to maximise comparability and to manage scope, the first available measure (typically immediately post-intervention) was extracted for synthesis.

Based on intervention description and content, preliminary inductive coding of each intervention by theme and sub-theme was conducted by three members of the review team according to the primary component of the intervention, i.e., the type of activity asked of participants, since inductive coding for thematic analysis has been established as particularly useful for synthesising diverse evidence (Mays et al., 2005). Where it was not possible to code an intervention under a single theme due to multiple activities or components, it was themed as 'Multi-component Interventions'. Subthemes and themes were then modified and restructured based on expert input. Specifically, this consisted of a workshop with three members of the review team and five members of an independent wellbeing research organisation, with varying expertise in wellbeing policy, research, and practice. Themes and subthemes were then presented for input at an expert advisory group meeting, with iterative modifications to themes made throughout the process.

Frequently, two intervention arms were presented against a single control group, therefore to avoid double counting participants in meta-analyses (Higgins et al., 2019), intervention arm estimates were either, i) combined to create a single effect size against the control group (where intervention arms fell under a single theme) or, ii) the 'shared' control group was split into two equal samples, with means and SDs remaining the same (where intervention arms differed substantially).

Due to substantial within-theme heterogeneity, meta-analyses were only conducted for themes which had comparability in intervention descriptions between studies and sufficient studies (minimum 4; Brydges, 2019). Decisions on comparability were made through discussion with experts, per mapping decisions above. Where meta-analyses were conducted, statistical heterogeneity was measured using the  $I^2$  statistic in which  $>75\%$  indicates considerable heterogeneity (Higgins et al., 2019). Where meta-analyses were not conducted for a given subtheme and sufficient pre-post data was provided, individual SMD scores were calculated for each intervention to enable consistency in quantitative synthesis. Finally, description of significant findings (favouring intervention, favouring control, or null) were provided for studies which did not provide sufficient data to derive SMDs.

### 3. Results

#### 3.1. Search results

After deduplication of academic database results, 7818 records underwent initial screening, with 499 advancing to full-text screening and 187 meeting inclusion criteria (PRISMA diagram in Fig. 1). In the grey literature search, 1712 records were found, 20 underwent full-text screening, and 2 met inclusion criteria. Thus, 189 records were included, with two records each containing two separate studies within the record/paper (Carrillo et al., 2021; Sanders et al., 2019), while two pairs of studies covered data from duplicate samples (C. Armenta, 2018; C. N. Armenta et al., 2022; O'Connell et al., 2017, 2018). Hierarchical exclusion reasons are described in Fig. 1.

#### 3.2. Overview of included records

##### 3.2.1. Characteristics of included studies

The majority of studies ( $n = 162$ ; 85.7%) were peer-reviewed publications, spanning 6 continents and 27 countries (Europe,  $n = 87$ , 46%; North America,  $n = 73$ , 38.6%). Participants' mean age was 36.3 (SD:

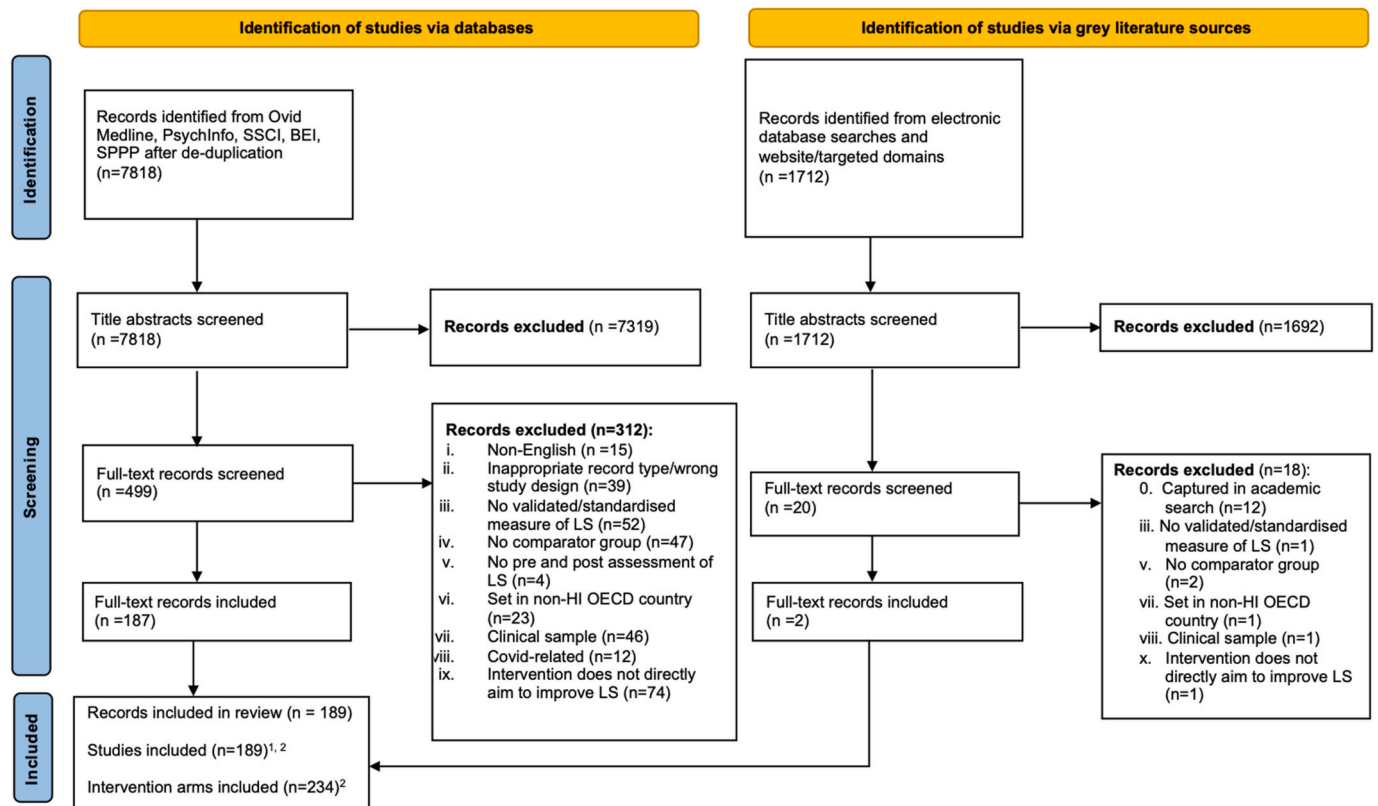


Fig. 1. PRISMA diagram outlining records identified in search, screened, and included in final review

<sup>1</sup> Two records contained two studies (Carrillo et al., 2021; Sanders et al., 2019) and two pairs of records described data from the same intervention (i.e., used a duplicate sample; O'Connell et al., 2017, 2018)

<sup>2</sup> Thirty-three records had multiple intervention arms, giving a total of 234 arms included in synthesis.

20.4,  $n = 158$ ). Random assignment was used in less than two-thirds of studies (52.4% individual, 11.6% cluster randomisation). The Satisfaction With Life Scale (SWLS) was commonly used ( $n = 113$ , 60%), along with the Student's Life Satisfaction Scale (SLSS) ( $n = 19$ , 10.1%). Summary characteristics of studies is provided in Table 2 and summary characteristics of interventions is provided in Table 3. All included studies are listed in Appendix B.

### 3.2.2. Mapping and overview of intervention themes

Across 189 studies, there were a total of 234 intervention arms ( $n = 23$ ,  $n = 8$ , and  $n = 2$  studies with two, three, and four intervention arms, respectively). Most interventions were delivered to individuals ( $n = 121$ ; 51.7%) rather than to groups of participants, and delivered in various locations, such as home ( $n = 42$ ; 18.4%), online ( $n = 40$ ; 17.5%), and school ( $n = 39$ ; 17.1%). Baseline sample sizes ranged from 3 to 1813 participants, with 21–50 participants being the most common ( $n = 95$ ; 44.4%).

Thematic mapping of the 234 interventions identified six primary themes:

- I. Emotion-based activities ( $n = 154$ ; 65.8%);
- II. Didactic emotional development ( $n = 30$ ; 12.8%);
- III. Health promotion ( $n = 31$ ; 13.1%);
- IV. Social media ( $n = 4$ ; 1.7%);
- V. Music ( $n = 3$ ; 1.3%);
- VI. Multi-component interventions ( $n = 12$ ; 5.1%).

Emotion-based activities was the largest theme with eight subthemes related to intrapersonal aspects and two related to interpersonal aspects, visualised in Fig. 2. Detailed definitions of the 18 subthemes and comprehensive study details are provided in Appendix C. Complete

details on each study and intervention are available in the study look-up table in Appendix D.

### 3.3. Theme 1 emotional activities

Nine subthemes were included under the emotional activities theme. Meta-analyses were possible for four of these themes: mindfulness, gratitude, therapy, and meditation. The remaining five subthemes were: visualisation, positivity, reflection, social and prosocial, and 'other' (activities that did not fit under any of the seven core subthemes).

#### 3.3.1. Mindfulness

The most common intervention type was mindfulness ( $n$  studies = 35;  $n$  intervention arms = 40). These interventions lasted 1–12 weeks, often combining educational components and individual daily mindfulness practice sessions; two-thirds were group-based, six targeting young people and two for older adults. Of the 40 interventions, 37 were included in the meta-analysis (total  $n = 3184$ ); summary of findings for interventions not included in meta-analyses are shown in Appendix E. Overall, mindfulness interventions showed a small positive effect on life satisfaction (SMD: 0.28 (0.13, 0.42); Fig. 3), but with moderately high statistical heterogeneity ( $I^2$ : 76%).

Interventions with larger effect sizes typically lasted 6+ weeks, involved structured group sessions or individual programmes, and included at-home practice. Chiodelli et al. (2022) and Hoover et al. (2022), delivering mindfulness programmes for students regularly enrolled in university courses and physician assistant students, respectively, had control groups for each intervention arm and showed a moderate effect for in-person delivery but no effect for virtual delivery. Many studies had large confidence intervals and some results favoured the control arm, with study authors hypothesising this was due to

**Table 2**  
Summary characteristics of studies (n = 189).

CHARACTERISTIC	N (%)
<b>Evidence type</b>	
Peer-reviewed publication	162 (85.7)
Thesis	25 (13.2)
Evaluation report	2 (1.1)
<b>Country</b>	
Europe	87 (46.0)
North America	73 (38.6)
Australia & New Zealand	12 (6.3)
Africa	9 (4.8)
Asia	4 (2.1)
South America	2 (1.1)
Cross-continental <sup>a</sup>	2 (1.1)
<b>Age group (n=142 studies; 47 did not report age range)</b>	
Under 18yo	30 (21.1)
19–49yo	9 (6.3)
Over 50yo	29 (20.4)
Life span <sup>b</sup>	74 (52.1)
<b>Randomisation</b>	
Individual randomisation	99 (52.4)
Wait-list control group	44 (23.3)
No randomisation	24 (12.7)
Cluster randomisation	22 (11.6)
<b>Life Satisfaction measure (n=189 studies)</b>	
Satisfaction With Life Scale (SWLS)	113 (59.8)
Modified and validated measure	40 (21.2)
Student's Life Satisfaction Scale	19 (10.1)
Other	6 (3.2)
ONS single-item measure	4 (2.1)
Ad-hoc single-item measure	4 (2.1)
Multidimensional Student's Life Satisfaction Scale	3 (1.6)

<sup>a</sup> The sample of two records includes participants from different continents: UK and USA (Champion et al., 2018), and USA and South Korea (Shin et al., 2020).

<sup>b</sup> Age ranges which do not fit the other categories, ranging across the life span between 17 and 90 years old.

**Table 3**  
Summary characteristics of interventions (n = 234).

CHARACTERISTIC	N (%)
<b>Intervention delivery format</b>	
Individual	122 (52.1)
Group	85 (36.3)
Individual and group	27 (11.5)
<b>Intervention delivery location<sup>a</sup></b>	
Home	42 (18.4)
Online	40 (17.5)
School	39 (17.1)
University	27 (11.8)
Other <sup>b</sup>	25 (11)
Health centre	19 (8.3)
Community centre	15 (6.6)
Nursing home	10 (4.4)
Multiple locations	7 (3.1)
Outdoors	4 (1.8)
<b>Number of participants in intervention arm at baseline<sup>c</sup></b>	
1-20	21 (9.8)
21-50	95 (44.4)
51-100	55 (25.7)
101-200	25 (11.7)
201-500	11 (5.1)
501-1000	4 (1.9)
1000+	3 (1.4)

<sup>a</sup> Six interventions did not report delivery location.

<sup>b</sup> 'Other' delivery locations include intervention-specific spaces such as meditation retreat, workplace, ski centre, local yoga studio and local theatre.

<sup>c</sup> Twenty interventions did not report number of participants at baseline.

conflicts or resentments in the intervention group: a positive psychology programme for Australian high school students (Burckhardt et al., 2015) and a group psychoeducational mindfulness education programme for

elderly women in the USA (McCarthy et al., 2018).

### 3.3.2. Gratitude

The gratitude-based interventions subtheme (n studies = 31; n intervention arms = 36) featured short activities such as 5- to 10-min reflections or writing exercises, lasting 1–12 weeks. Of 36 interventions, 24 were included in the meta-analysis (total n = 2307); summary of findings for interventions not included in meta-analyses are shown in Appendix F. Gratitude interventions showed a small positive impact on life satisfaction (SMD: 0.19 (0.11, 0.27); Fig. 4), with very low statistical heterogeneity ( $I^2$ : 4%). The 'Zurich Strengths Program' in Switzerland had the largest effect (SMD: 0.52 (0.10, 0.95)), focusing on gratitude-related activities linked to curiosity, humour, and hope in adults aged 17 to 76 (Proyer et al., 2013). Atad and Russo-Netzer (2022), studying an intervention in which university students hand-delivered gratitude letters, had a significant effect size and the largest sample size but lower study quality (JBI RCT score of 9/13; see section 3.9). For parents of children aged between 2 and 5 in the USA, daily gratitude practice for a month showed potential for greater life satisfaction improvements (SMD: 0.70 (95% CI: 0.08, 1.48)) than weekly practice (Ahmed, 2017), although sample sizes were small (Appendix F).

### 3.3.3. Therapy

The therapy subtheme (n studies = 14; n intervention arms = 14) consisted of: Acceptance and Commitment Therapy (ACT; n = 5), Cognitive Behavioural Therapy (CBT; n = 4), Existential Behavioural Therapy (EBT; n = 3), counselling (n = 1), and Family Group Conferences (n = 1). Eight interventions were included in the meta-analysis (total n = 1361); summary of findings for interventions not included in meta-analyses are shown in Appendix G. Therapy interventions showed a small to moderate positive effect on life satisfaction (SMD: 0.33 (0.12, 0.53), Fig. 5); statistical heterogeneity was low ( $I^2$  = 46%).

The most common therapy intervention were whole-cohort school-based programmes (n = 4), comprising two CBT interventions (aimed at 3rd-5th graders in the USA (Fillmore, 2019) and 9th-10th graders in Spain (García-Escalera et al., 2020)), and one online ACT intervention (in students aged 14 to 15 in Finland (Hämäläinen et al., 2023)) which did not significantly improve life satisfaction, and a 4-week group-based ACT programme for school students aged 17 to 19 in Spain which had the largest effect size (SMD: 0.86 (0.43, 1.28); Fig. 5) (Macías et al., 2022). While the exclusion criteria removed interventions with clinical samples, some studies specifically targeted individuals who may be experiencing difficult circumstances including informal caregivers of palliative patients (n = 3), adults receiving long-term social assistance (n = 1), children in foster-care (n = 1) and working adults with 'burnout scores'  $\geq 75$ th percentile (n = 1). Aside from the school-based ACT intervention, the other interventions which significantly improved life satisfaction were: Family Group Conferences (involving an extended family network coming together with a trained facilitator to discuss concerns for an at-risk person) with an average programme duration of 14 weeks (total duration 24 h) for long-term social assistance recipients aged 18 to 63 (SMD: 0.55 (0.21, 0.89); Fig. 5) (Malmberg-Heimonen, 2011); and six group sessions of EBT (total duration 22 h) for informal caregivers of palliative patients in Germany aged 23 to 88 (SMD: 0.41 (0.05, 0.76); Fig. 5) (Fegg et al., 2013).

### 3.3.4. Meditation

The meditation subtheme (n studies = 7; n intervention arms = 8) distinguishes meditation-specific interventions from general mindfulness. An intervention in the USA with 10-min sessions post-weekly university classes and daily at-home practice had the largest effect size (SMD: 1.05 (0.60, 1.49)) (Shinde et al., 2021). Seven interventions (total n = 473) showed no overall impact on life satisfaction (SMD: 0.33 (-0.10, 0.76); Fig. 6), with moderate to high statistical heterogeneity ( $I^2$ : 63%).

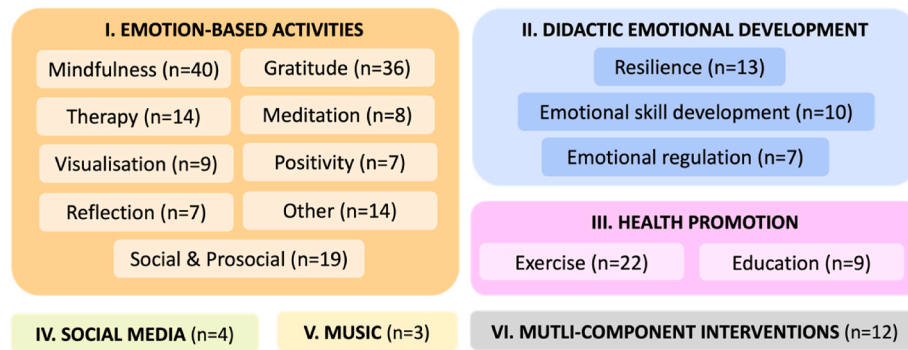


Fig. 2. Mapping overview of key themes and subthemes included in the intervention review.

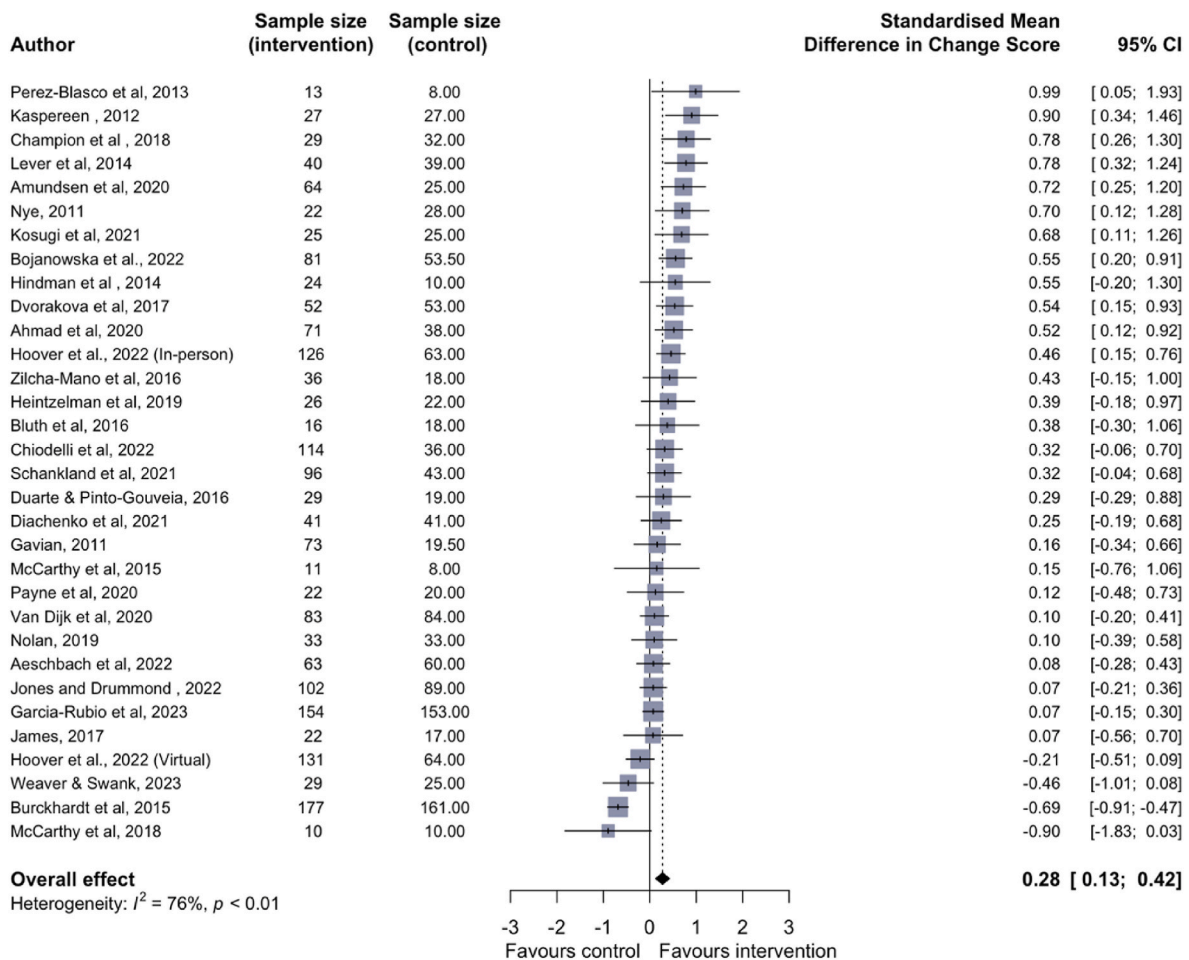


Fig. 3. Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for *mindfulness* interventions (total n = 3184). No change from pre-intervention to post-intervention was found for interventions which did not report sufficient data to be included in meta-analysis (n = 3; Appendix E, also see study look-up table Appendix D).

3.3.5. Subthemes without meta-analyses

The remaining five subthemes were: visualisation (n studies = 5; n intervention arms = 9), positivity (n studies = 7; n intervention arms = 7), reflection (n studies = 6; n intervention arms = 7), social and prosocial (n studies = 4; n intervention arms = 5), and ‘other’ (n studies = 11; n intervention arms = 14). Visualisation interventions involved participants imagining their best selves either in writing or mentally. Positivity intervention methods varied, including daily diaries, happiness lists, and group book clubs. Reflection interventions prompted participants were prompted to reflect on their life experiences using interviews, writing, and theatre. Interventions categorised as ‘Social’

spanned two programmes highlighting the life satisfaction benefits of social groups, one for older individuals going into retirement and another for university students, an intervention in which retirees who have not previously volunteered took on 6 months of volunteering (no restriction on the activity chosen by the individual), and an intervention in which university students spend time playing with a ‘therapy’ dog. On the other hand, prosocial interventions included performing altruistic acts of kindness or generosity and a forgiveness-focused primary school programme. The ‘Other’ subtheme comprises diverse intrapersonal emotion-based activities that did not fit under any of the seven core subthemes, some examples include trying something outside of the

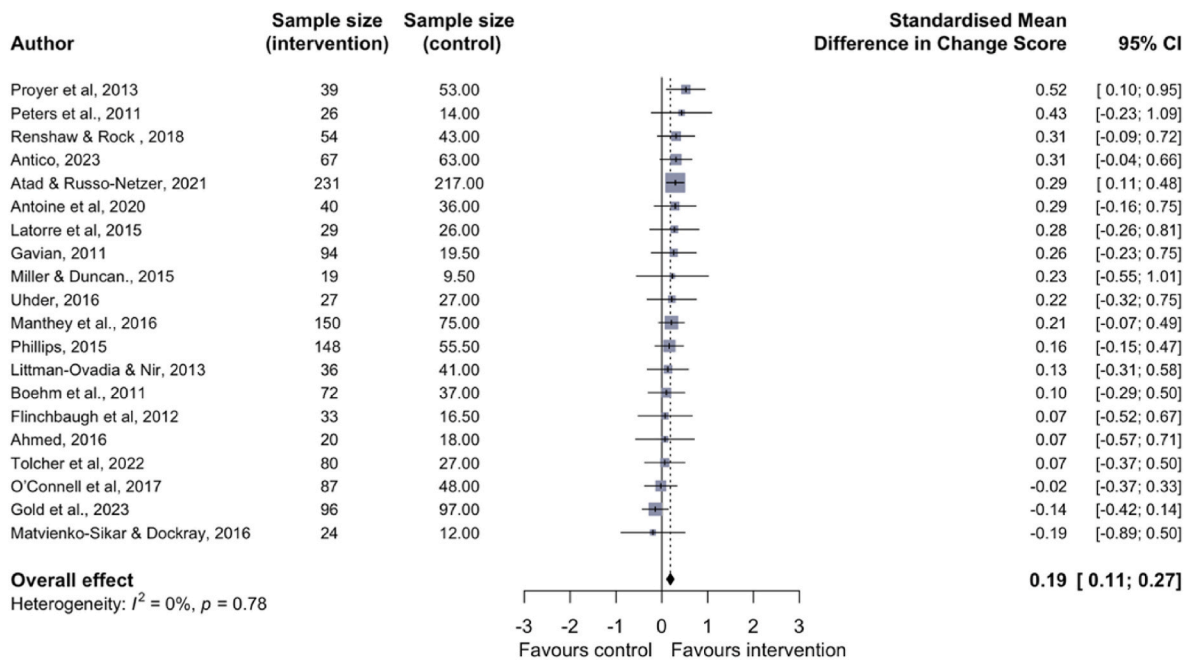


Fig. 4. Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for **gratitude** interventions (total n = 2307). Of the interventions which did not report sufficient data to be included in meta-analysis (n = 12), most found no change from pre-intervention to post-intervention and four favoured the intervention (Appendix F, also see study look-up table Appendix D).

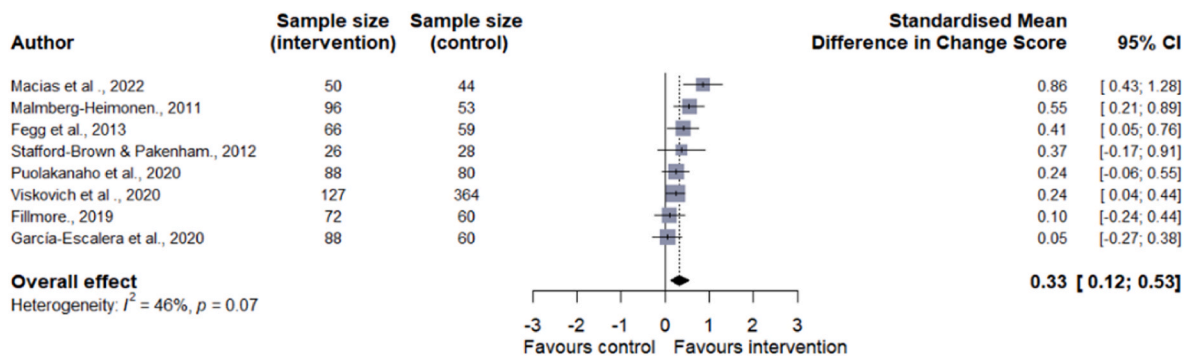


Fig. 5. Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for **therapy** interventions (total n = 1361). Of the interventions which did not report sufficient data to be included in meta-analysis (n = 6), most found no change from pre-intervention to post-intervention and one favoured the intervention (Appendix G, also see study look-up table Appendix D).

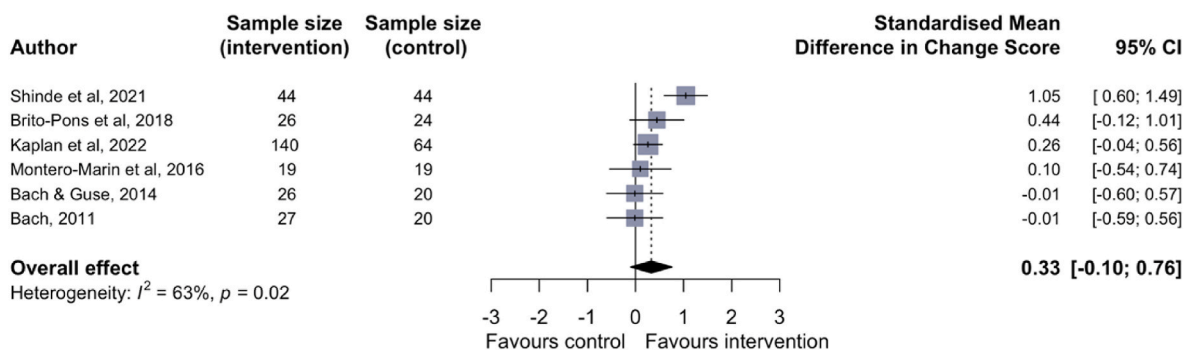


Fig. 6. Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for **meditation** interventions (total n = 473). All interventions in this subtheme are included in meta-analysis (also see study look-up table Appendix D).

participants comfort zone (no restrictions on the activity chosen by the individual), practicing humility, or watching short inspiring media once a day. The findings from these subthemes are summarised in Appendix H.

### 3.4. Theme 2 didactic emotional development

Didactic emotional development interventions involve structured learning and education, typically led by a teacher but in some cases self-guided, around three core subthemes: resilience, emotional skill development (meta-analysis possible) and emotional regulation. High heterogeneity prevented meta-analyses from being performed in the subthemes resilience (n studies = 12; n intervention arms = 13) and emotional regulation (n studies = 7; n intervention arms = 7), the findings of which are summarised in Appendix H.

#### 3.4.1. Emotional skill development

All interventions in this subtheme (n studies = 10; n intervention arms = 10) were included in meta-analysis, showing a moderate positive effect on life satisfaction (SMD 0.50 (0.12, 0.88); Fig. 7). The largest effect came from 12 2-h emotional development workshops for hospital employees in Chile (Veloso-Besio et al., 2019). A moderate effect was seen in a 10-week group programme for enhancing emotional intelligence in older adults in Spain (Delhom et al., 2020). Shoshani and Steinmetz (2014) reported a small to moderate effect in a 30-week programme for primary-school children in Israel, with a large sample size (n = 1038). All significantly impactful interventions were group-based; there was high statistical heterogeneity ( $I^2 = 86\%$ ).

### 3.5. Theme 3 health promotion

Health-based interventions were clustered under two subthemes: exercise (meta-analysis possible) and health promotion education (n studies = 9; n intervention arms = 9) for which findings are summarised in Appendix H.

#### 3.5.1. Exercise

The exercise subtheme (n studies = 19; n intervention arms = 22) primarily targeted adults, half focusing on older adults. Sessions lasted 15–90 min, occurring 1–7 times weekly for up to 6 months, often group based. Activities ranged from gentle yoga to Nordic skiing. Sixteen interventions could be included in the meta-analysis, showing a small to moderate positive effect on life satisfaction (SMD: 0.33 (0.04, 0.62); Fig. 8); summary of findings for interventions not included in meta-analyses are shown in Appendix N. Notably, older adults in South Korea in twice-weekly Qigong sessions (Sok et al., 2021) had the largest effect size. A ‘negative’ intervention in active young adults aged between 18 and 35 – forced sedentarism - drastically reduced life satisfaction (SMD: 9.33 (–11.61, –7.06); Appendix I) but rebounded upon resuming regular activity (Edwards and Loprinzi, 2017).

### 3.6. Non-meta-analysis themes

The ‘Social media’ theme (n studies = 3; n intervention arms = 4) examined the impact of reducing social media use, for any smartphone use and, in one intervention, specifically for the app Instagram. The ‘Music’ theme (n studies = 3; n intervention arms = 3) spanned two singing programmes and a broader music programme. Finally, the last theme comprised ‘Multi-component interventions’ (n studies = 11; n intervention arms = 12), which defied categorisation due to their multi-component nature. The findings from these themes are summarised in Appendix H.

### 3.7. Critical appraisal

Both RCT (n = 166) and quasi-experimental (n = 22) studies suggested high quality on the appraisal checklist. RCTs scored between 7 and 13 on the checklist (median = 11), with the three blinding items being the primary shortfall. Most studies (n = 149, 89.8%) lacked blinding among intervention deliverers, and about two-thirds (n = 120, 72.3%) did not blind participants to treatment. Assessors were blind in only 57 studies (34.3%). Retention criteria were not met in 11 studies (6.6%), often due to poorly described dropouts. Quasi-experimental studies scored 8 or 9 (median = 8), with 13 failing on follow-up completeness (59.1%), mainly due to insufficient descriptions.

## 4. Discussion

Reviewfindings suggest that engaging in emotional activities (i.e., emotional skill development, mindfulness, gratitude, therapy) or health promoting activities (i.e., exercise, health education) can have beneficial effects for improving individual life satisfaction, showing small to moderate effect sizes. Cultivating these skills over time is anticipated to facilitate positive emotional wellbeing, enabling individuals to manage emotions and provide perspective on life. Nearly two thirds of the evidence fell under emotion-based activities, and heterogeneity was determined to be low enough in six subthemes to perform meta-analyses: mindfulness, gratitude, therapy, meditation, emotional skill development, and exercise, which may partly account for our ability to draw conclusions regarding these subthemes. Conversely, heterogeneity across intervention type, design and delivery was high and sample size was often low (~50% of studies had n < 50 in the intervention arm); these factors limit our ability to understand specific ingredients of successful interventions and to have indubitable confidence in identifying single intervention types that work the best. Given the scoping nature of the review, it provides a comprehensive understanding of the current landscape of life satisfaction research, highlighting areas of strength,

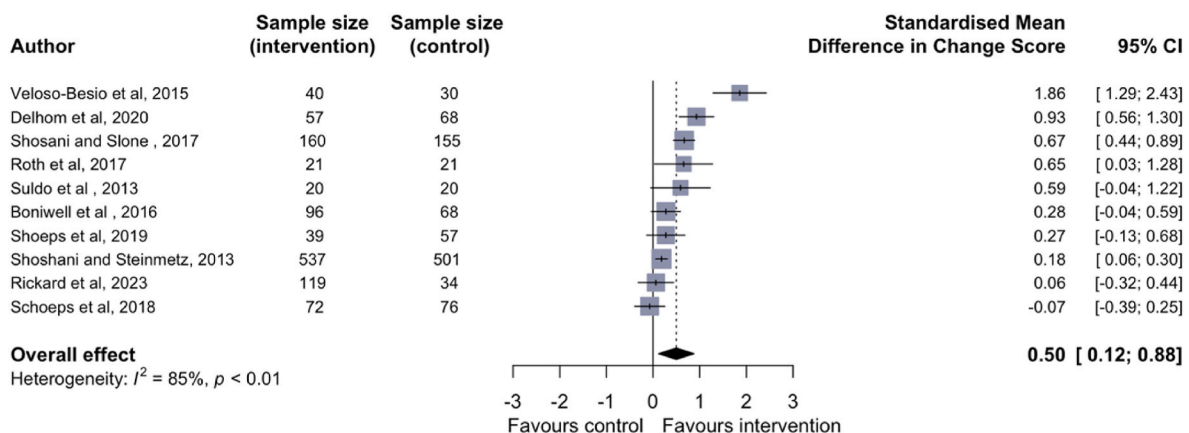
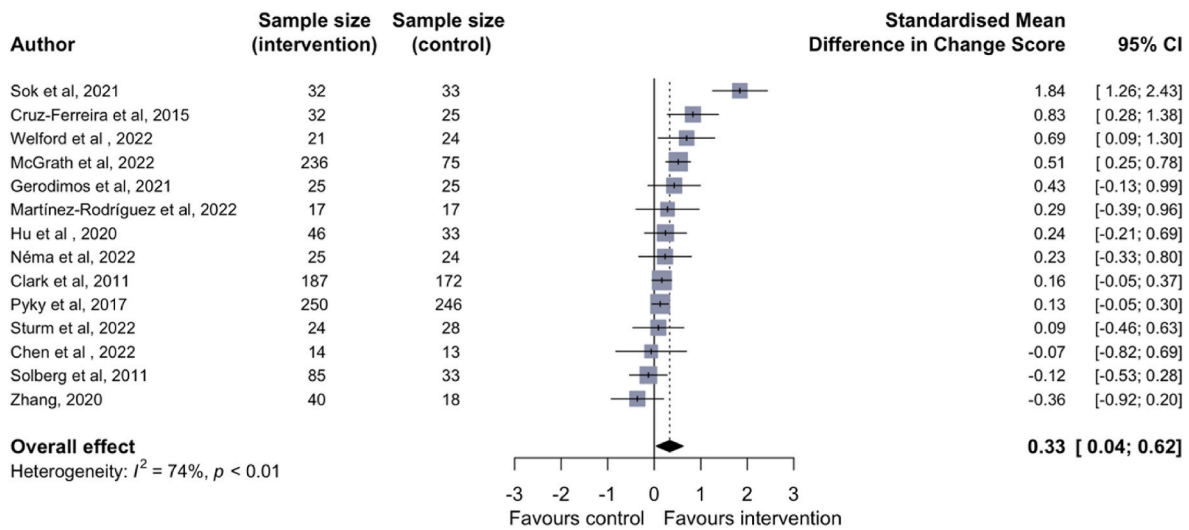


Fig. 7. Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for emotional skill development interventions (total n = 2191). All interventions in this subtheme are included in meta-analysis (also see study look-up table Appendix D).





**Fig. 8.** Forest plot demonstrating standardised mean difference in pre-post intervention life satisfaction scores between control and intervention arms for *exercise* interventions (total n = 1800). Of the interventions which did not report sufficient data to be included in meta-analysis (n = 5), three found no change from pre-intervention to post-intervention, one favoured the intervention (Appendix I, also see study look-up table Appendix D), and one intervention favoured the control (Edwards and Loprinzi, 2017; discussed in text).

gaps in knowledge, and avenues for future exploration.

#### 4.1. Review trends

Several trends emerged across all themes. We observed that more intensive interventions (i.e., longer duration with greater contact time), delivered in group-settings, and targeted at a specific age group (i.e., school-based, or older residential home programmes) may be more successful at improving life satisfaction, although further exploration by subtheme and formal subgroup analysis is needed. For example, group-based activities across diverse intervention types appeared more successful for improving life satisfaction than educational interventions on the benefits of social groups. Furthermore, interventions focused on building resilience and emotional skill development were overwhelmingly targeted at school-aged children and accordingly several effective interventions were long-term school-based programmes. The greatest improvement in life satisfaction in this review was reported for a multi-component wellbeing programme for older adults living in a senior residence (Chamorro-Garrido et al., 2021). The topic of sessions ranged from the benefits of practicing autobiographical memory, forgiveness, gratitude, and cultivating a sense of humour, and several sessions involved group discussion. The evidence suggests increased success in school-aged children and older adults is likely mediated by intervention intensity; many themes in which these trends were observed included longer-lasting programmes with more contact time and the opportunity for group interaction.

This review finds that emotional skill development, exercise, therapy, mindfulness, and gratitude appear to be the most promising for improvements in life satisfaction. This review addresses a paucity in the literature of reviews centred on life satisfaction interventions rather than, for example, determinants or future impacts of life satisfaction. Our findings are consistent with Kerry et al. (2023), a review focused exclusively on gratitude interventions, which also reported these interventions are positively associated with improvements in life satisfaction. Many themes had insufficient evidence to evaluate adequately, for example, social media interventions (n = 4) only involve abstinence or reduction of social media use rather than different types of social media use, such as using image-based vs long-form social media. While the seven interventions included in the reflection subtheme did not report significant improvements in life satisfaction and we report there was insufficient evidence, a review by Zhong et al. (2023) reported that

reminiscence therapy in older adults is positively associated with improvements in life satisfaction, supporting our conclusion that sub-themes with insufficient evidence require further investigation. Through having no inclusion restriction on intervention type, this review offers a broader overview of the literature than previously published, identifying underrepresented areas in life satisfaction research and enabling policymakers to make more informed decisions.

#### 4.2. Implications for research, policy, and practice

The large number of interventions to improve life satisfaction identified in the review provides a rich data set for researchers, policymakers, and practitioners when considering how best to improve the life satisfaction of individuals, communities, and society at large. These findings provide evidence that interventions focused on individuals and delivered at higher intensity can have a significant impact on life satisfaction. However, further research with larger sample sizes with repeated follow-up data is needed to establish if changes are sustained; understanding intervention longevity in life satisfaction is crucial for policymakers appraising which types of policy interventions demonstrate best value for money. Furthermore, despite relatively high critical appraisal scores due to the checklist used, there were core limitations of many studies including small sample sizes and minimal reporting of individual intervention details. Therefore, the findings of this review highlight key gaps in the evidence base and through the rigorous meta-analyses, provide an indication of what types of interventions may improve life satisfaction. The findings suggest that policymakers in public health could make important contributions to improved life satisfaction through therapeutic and exercise-based interventions. Policymakers in education should consider the efficacy of both didactic emotional skills courses and class/cohort-based emotional interventions aimed at improving life satisfaction. A research priority should be the identification of the different components or ‘mechanisms’ in successful interventions that are contributing to improvements in life satisfaction. Exploring design features such as groupwork compared to 1:1 delivery, the facilitation skills and training linked to the best outcomes, and the optimal intensity and duration of interventions to deliver the largest improvements in life satisfaction, would be instructive for those looking to design new interventions in areas and for populations where there is currently little or no evidence of effective interventions.

In this review, school-aged children, students, and older people are

over-represented, while working age adults and groups more vulnerable to low life satisfaction (such as children in foster care, unemployed individuals, and individuals living in poverty) are underrepresented, providing little insight into how to improve their life satisfaction. In this regard, a major challenge for policymakers in the future is the identification of interventions that address some key factors which longitudinal research has identified is closely associated with low life satisfaction, specifically, unemployment, family breakdown, and poor health.

#### 4.3. Strengths and limitations

This review followed rigorous, registered, and independent protocols and was conducted at a rapid pace over a short period of time. Key strengths included the high diversity of intervention types, meta-analysis for key subthemes, capturing evidence on children and adults across the life course, and the high quality of studies due to the mandatory review criteria of including a control group, pre-post measures, and a validated outcome measure.

The rapid review protocol presents several limitations. Single screening and streamlined data extraction may lead to missed studies and limited exploration of subgroups. Interventions were predominantly individual-centric due to control group and pre-post measure requirements, resulting in high heterogeneity and limiting our ability to draw effective conclusions. In some subthemes, such as resilience and emotional regulation, interventions were generally more intensive, i.e., involved more contact time over a longer duration, which may drive high heterogeneity. Moreover, small sample sizes were common, with few studies including over 500 participants. For example, approximately half of the studies had an intervention arm sample size of 50 or fewer. Publication bias is also a concern, as only three interventions reported negative effects. While this review focuses on effective interventions for life satisfaction, reliance on significance thresholds in frequentist statistics can be limiting; non-significant findings in certain intervention designs or subthemes highlight areas needing further investigation in life satisfaction research.

Despite stringent inclusion criteria, a wide range of interventions were observed, highlighting areas for methodological enhancement. For instance, many studies lacked analysis on drop-out rates and provided insufficient data for meta-analyses. Studies which did not report pre-post measures (which therefore could not be included in meta-analyses) typically also did not report significant results, suggesting a need for comprehensive reporting regardless of outcome and potentially an overestimation of meta-analysis effect sizes. Furthermore, we hypothesise our pre-post measures inclusion criteria has excluded studies exploring the effect of several other key determinants of life satisfaction. For example, exploration of observational studies has provided evidence to suggest that socioeconomic, social, and environmental factors play a strong role in both trajectories and current levels of life satisfaction (Araki, 2024; Behera et al., 2024; Chang et al., 2020). It is challenging for intervention studies to target several of these factors, in particular financial situations and nature/environmental settings, and therefore, there remain several key determinants of life satisfaction that have not been identified in this intervention review.

Trends favoured group-based, in-person, and longer-duration interventions, yet understanding the key components of success remains limited due to heterogeneity and poor reporting of aspects of design and delivery. While studies included in the meta-analyses had lower heterogeneity, they still show diversity in features, such as delivery approach and duration, however, subgroup analysis of study design was not possible considering most studies were RCTs ( $n = 166$ ) rather quasi-experimental studies ( $n = 22$ ) and had limitations in aspects such as participant blinding, with 90% ( $n = 149$ ) of included studies not meeting the associated checklist criteria. Despite expert guidance and multiple review team members coding intervention into themes, there remains heterogeneity both between and within themes. Therefore, further research is warranted, including trialling individual intervention

components separately (which do not already have sufficient evidence) and improving reporting on who is delivering interventions (i.e., skills/training/role) and sample recruitment strategy and success rate. Only one study explored an economic evaluation; incorporating wellbeing economics into reporting and analysis could aid policy translation.

#### 4.4. Conclusion

This rapid review has identified a range of interventions aimed at improving life satisfaction that have been trialled in experimental conditions in high income OECD countries and published since 2011. The most common type of intervention identified were emotion-based activities such as mindfulness, therapy, and gratitude. Other types of interventions included activities based on didactic emotional development, health promotion, social media use, music, and multi-component interventions that blended several diverse approaches. The evidence suggests that emotional skill development, exercise, therapy, mindfulness, and gratitude appear to be the most promising for improvements in life satisfaction. Further work is needed to explore how effect sizes translate directly to life satisfaction and broader wellbeing research, for example, interventions with small effect sizes may demonstrate excellent cost effectiveness. Thus, there is a need for intervention studies in future to have larger sample sizes and use a realist approach to better establish what works for whom. Future reviews should explore specific components of the design of interventions to identify mechanisms linked to improvements in life satisfaction. For example, this might include the efficacy of group work, online delivery, facilitator style and skills, intensity, and longevity of intervention. Future trials may consider focusing on interventions specifically aimed at individuals with low life satisfaction or at groups currently underserved in the literature, such as working age adults and vulnerable groups. Policymakers should continue to utilise updated rapid reviews to ensure they are using a timely and comprehensive evidence base to inform decision-making.

#### CRediT authorship contribution statement

**Katie Tiley:** Writing – review & editing, Writing – original draft, Visualization, Validation, Project administration, Investigation, Formal analysis. **Richard Crellin:** Writing – review & editing, Writing – original draft, Project administration. **Tania Domun:** Writing – review & editing, Writing – original draft, Investigation. **Frances Harkness:** Writing – review & editing, Funding acquisition, Conceptualization. **Joanna M. Blodgett:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

#### Funding

Funding for the study was provided by the Department for Transport, Department for Media, Culture and Sport, and Cabinet Office of the United Kingdom. The funders had no role in design of the review, data screening, extraction or analysis, the decision to publish, or the preparation of the manuscript.

#### Acknowledgments

The authors are grateful for the ongoing collaboration, support, and advice from Nancy Hey, Joanne Smithson, Ingrid Abreu-Sherer, and Robyn Bignall-Donnelly at the What Works Centre for Wellbeing and members of the Advisory Consultation Group and Quality Assurance Group: Sara MacLennan, Margaux Spriet, Eleanor Rees, Mark Fabian, Esteban Ortiz-Ospina, Jon Franklin, Margherita Musella, Andrew Rzepa, Dan Corry, Kelsey O' Connor, Jessica Mahoney, Andrew Oswald, Matt Harris, Chris Barrington-Leigh, Paul Montgomery and Ruth Garside. We further acknowledge Min Ji Kim, Yuncong Liu, Iris Zieler and Christa

Colley-Illueca for contributions with data access, extraction and/or synthesis and the authors of all studies who provided additional requested data.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2024.117662>.

## Data availability

No data was used for the research described in the article.

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