



Review article

Problem Solving as an Active Ingredient in Indicated Prevention and Treatment of Youth Depression and Anxiety: An Integrative Review



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Article history: Received October 11, 2021; Accepted May 5, 2022

Keywords: Problem solving; Anxiety; Depression; Transdiagnostic; Young people; Children; Adolescents

 A B S T R A C T

Problem solving is a common focus of psychological interventions for young people. However, existing evidence syntheses are relatively limited in their scope and conclusions. Taking a transdiagnostic approach and incorporating diverse sources of evidence, we examined the role of problem solving as an active ingredient for the indicated prevention and treatment of depression and anxiety in 14–24-year-olds. Three information sources were integrated using framework synthesis: (1) a systematic review of randomized controlled trials of problem solving; (2) a meta-synthesis of qualitative evidence on the therapeutic experience of problem solving; and (3) consultations with a Youth Advisory Group. Intervention protocols that included problem solving and no more than one other specific component appeared to be effective for depression but not anxiety. Larger multicomponent interventions with a problem-solving element achieved moderate effect sizes for both conditions. There was no clear evidence that effectiveness varied by population characteristics, intervention formats, or contextual factors. Qualitative evidence and youth consultations highlighted positive views about the practicality, simplicity, and flexibility of problem solving. Converging sources also suggested changes in problem orientation as a key transdiagnostic process contributing to positive outcomes. Problem solving is a widely applicable therapeutic approach that can help young people with emotional problems to resolve specific stressors and lead to a more hopeful mindset about managing future challenges. Implications for practice are discussed.

IMPLICATIONS AND CONTRIBUTION

This review is a systematic synthesis of quantitative, qualitative, and lived-experience evidence on problem-solving interventions for youth depression and anxiety. These diverse sources support the use of problem solving to enhance outcomes in conjunction with other active ingredients for young people with depression, anxiety, or both.

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Conflicts of interest: The authors have no conflicts of interest to declare.

Disclaimer: The funder (Wellcome Trust) had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. V. P. is the recipient of a prior Wellcome Trust funding award (106919/Z/15/Z) that involved the development and evaluation of an adolescent mental health program with a problem-solving component. D.M. and B.C. are co-investigators on

the same grant. None of these authors derive royalties from the program in question.

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Mental health problems, especially depression and anxiety, are the main cause of health-related disability in young people, accounting for 45% of the global burden of disease in youth aged up to 25 years [1]. The life stage from 14–24 years is a particularly vulnerable period when self-regulatory mechanisms are still developing and social risk factors are abundant [2]. Psychosocial interventions can buffer risks for and reduce depression and anxiety when offered early in the life course [3,4]. However, young people are less likely to receive appropriate care than other groups due to both demand and supply side barriers [5–7]. Moreover, even the most effective interventions for common youth mental health problems fail to achieve a meaningful improvement for 30%–50% of participants in controlled trials [8]. This modest benchmark underscores the need for further work not only on the implementation of evidence-based psychosocial interventions but also on their theoretical design and mechanisms of action.

The current review addresses key questions about outcomes, mechanisms, and acceptability of problem-solving interventions for young people aged 14–24 years who are experiencing, or at risk of, depression and anxiety. Problem solving depends on a set of inter-related cognitive behavioural processes whereby individuals perceive and apply adaptive solutions for coping with problems in daily life. This developmental capacity has been highlighted as a key determinant of adjustment during a period of significant social challenges arising from school and career decisions, peer pressure, and autonomous exploration [9]. Research using experience sampling methods has shown that problem solving is one of the most commonly used strategies for emotion regulation within adolescents' daily lives, whereas deficits in problem solving are implicated in the etiology and persistence of both depression and anxiety [10].

The theoretical rationale for problem-solving interventions cuts across these diagnostic categories and follows from Lazarus and Folkman's [11] "stress-coping" model, which posits that an imbalance between internal/external demands and the perceived resources to deal with these challenges leads to negative emotional responses. Problem-solving interventions aim to rebalance this system by (1) changing an individual's beliefs, appraisals, and expectations from a negative "problem orientation" (i.e., seeing problems as threats which they cannot solve) to a more positive stance (i.e., becoming more hopeful about the ability to cope with problems); and (2) enhancing "problem-solving style" by teaching adaptive skills to define and resolve problems effectively [12]. The latter typically involves learning a structured series of steps to identify a suitable target problem, generate and weigh up the pros and cons of potential solutions, and then apply a chosen solution in a real-life situation.

A major strength of problem solving is its versatility across a range of psychosocial problems and their mental health sequelae. It is a widely used component in indicated prevention and treatment programs for both depression and anxiety, as well as occurring in an array of behavioral health programs that address youth sexual health, violence prevention, and substance use [13–15]. Although problem solving can be delivered as a stand-alone intervention, it is more commonly delivered in combination with other intervention components. Further variation is seen in terms of format (e.g., self-directed or therapist-guided), in the extent to which problem orientation is addressed directly (e.g., by identifying and challenging unhelpful beliefs about self-efficacy/controllability of problems as opposed

to relying on experiential learning), and in the number of steps that are used to define and resolve problems.

Despite its widespread use, existing evidence syntheses of problem solving are relatively limited in their scope and conclusions. A systematic review and network meta-analysis of depression treatment trials [16] involving children and adolescents examined the effectiveness of problem-solving therapy (PST), in which problem solving was the focal element, in relation to three other treatment families. The latter comprised cognitive therapy where negative cognitions were the primary target; cognitive behavioural therapy (CBT), encompassing multicomponent treatments that targeted both cognitive and behavioral mechanisms; and interpersonal therapy (IPT) protocols with components focused on interpersonal functioning. The authors found that PST was effective at post-treatment compared to controls and had higher acceptability with fewer discontinuations than CBT or cognitive therapy. However, CBT and IPT were relatively more effective in the long term. These results were limited by the relatively small sample number of PST studies (three trials) and the broad age range (6–18 years) covered by the review. Moreover, the relatively common use of problem solving within the multicomponent treatments (e.g., social problem solving in IPT) was not systematically described or investigated as a potential effect moderator. Even less systematic evidence is available on PST for youth anxiety, although adult studies suggest PST can improve the secondary outcome of anxiety in samples with primary depression [17,18].

The evidence base is also limited by the relative scarcity of studies from low- and middle-income countries. However, it is notable that problem solving has emerged as one of the most widely used elements in effective multicomponent interventions for common adult mental health problems in low-resource settings [19–24].

The abovementioned challenges and opportunities have motivated the current review. We aimed to synthesize global evidence and integrate insights about problem-solving interventions from three information sources: (1) a systematic review and meta-analysis of quantitative outcomes from randomized controlled trials (RCTs); (2) a systematic review and metasynthesis of qualitative research; and (3) consultations involving young people with lived experience of depression and anxiety. The specific review questions were: in what ways, in which contexts, and for whom does problem solving appear to work, and why, for the indicated prevention and treatment of anxiety and depression in 14–24-year-olds? These questions were informed by wider efforts in the field of youth mental health science to generate evidence on a core set of conceptually coherent active ingredients that can drive clinical effects on depression and anxiety in diverse youth populations and contexts [25].

Methods

Search strategy, data collection, and analysis

Quantitative evidence. The SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) tool [26] was used to standardize the search strategies for quantitative and qualitative evidence (Appendix A, Table A1). We searched for RCTs using the PracticeWise database (PWEBS; www.practicewise.com), which is the world's largest repository of mental health intervention trials involving children and young people. PWEBS is a unique resource that applies a rigorous method for distilling

Table 1
Study details for randomized controlled trials

Study	Intervention description (from original paper)	Study N	Sample selection	Comparison group	Primary outcome(s)	Secondary outcome(s)	Intervention type	Mean age, years (range)	Country	Location	Modality	Provider	Number of sessions
Problem-solving therapies													
Depression studies													
Eskin et al. (2008)	Problem-Solving Therapy	46	Depression (depression diagnosis)	Waitlist	Win (depression)		Treatment	19.0 (14–23)	MIC (Turkey)	Clinic	Individual, face-to-face	Specialist	6
Kramer et al. (2014)	Web-Based Solution-Focused Brief Therapy	263	Depression (elevated depression symptoms)	Waitlist	Win (depression)		Indicated prevention	19.4 (12–22)	HIC (The Netherlands)	Home	Individual (remotely by synchronous webchat)	Specialist	5
Anxiety studies													
Masia-Warner et al. (2016)	Skills for Living	138	Anxiety (social anxiety diagnosis)	Active	Loss (anxiety)		Treatment	15.4 (14–16)	HIC (The Netherlands)	School	Group, face-to-face	Specialist	12
Transdiagnostic studies													
Michelson et al. (2020b)	Premium for Adolescents (PRIDE) “Step 1” Problem-Solving Intervention	251	Transdiagnostic (elevated mental health symptoms with associated distress/impairment)	Active	(i) Nonvalid tie (mental health symptoms); (ii) Win (problem severity)	Nonvalid tie (functioning)	Indicated prevention	15.6 (12–20)	MIC (India)	School	Individual, face-to-face	Non-specialist	4–5
Hoek et al. (2012)	Internet-Based Problem Solving Therapy	45	Transdiagnostic (mild-moderate anxiety or depression symptoms)	Waitlist	(i) Loss (depression); (ii) Loss (anxiety)		Indicated prevention	15.8 (12–19)	HIC (The Netherlands)	Home	Guided self-help (remotely by e-mail)	Specialist	5
Multicomponent interventions													
Depression studies													
Brent et al. (1997) (Study 1)	Cognitive Behavior Therapy	72	Depression (depression diagnosis)	Active	Win (depression)	Win (functioning)	Treatment	15.7 (13–17)	HIC (United States)	Not specified	Individual, face-to-face	Specialist	12–15
Brent et al. (1997) (Study 2)	Systematic Behavior Therapy	70	Depression (depression diagnosis)	Active	Loss (depression)	Win (functioning)	Treatment	15.4 (13–17)	HIC (United States)	Not specified	Family, face-to-face	Specialist	12–15
Goodyer et al. (2017)	Brief Psychosocial Intervention	470	Depression (depression diagnosis)	Active	Loss (depression)		Treatment	15.6 (13–17)	HIC (United Kingdom)	Clinic	Individual, face-to-face + family, face-to-face	Specialist	12
Hallford and Mellor (2016)	Cognitive-Reminiscence Therapy	26	Depression (moderate depressive symptoms)	Active	Nonvalid tie (depression)		Treatment	20.8 (18–25)	HIC (Australia)	Clinic	Individual, face-to-face	Specialist	6
Israel and Diamond (2013)	Attachment-Based Family Therapy	20	Depression (elevated depression symptoms)	Active	Win (depression)		Treatment	15.6 (13–17)	HIC (Norway)	Clinic	Individual, face-to-face	Specialist	12–16
Kobak et al. (2015)	Technology-Enhanced CBT	76	Depression (depression diagnosis)	Active	Loss (depression)		Treatment	15.4 (12–17)	HIC (United States)	Clinic	Individual, blended (1:1 therapy with digital tablet-delivered content)	Specialist	12
Layne et al. (2008) (Study 1)	Classroom-Based Psychoeducation and Skills plus Trauma and Grief Component Therapy	82	Depression (depressive symptoms)	Active	Win (depression)		Indicated prevention	15.9 (13–18)	MIC (Bosnia)	School	Group, face-to-face	Specialist	Classroom sessions not stated, 17 group sessions
Layne et al. (2008) (Study 2)	Classroom-Based Psychoeducation and Skills	60	Depression (depressive symptoms)	Active	Loss (depression)		Indicated prevention	16 (13–18)	MIC (Bosnia)	School	Group, face-to-face	Specialist	Not stated
McCauley et al. (2016)	Behavioral Activation	60	Depression (depression diagnosis or elevated depression symptoms)	Active	Loss (depression)		Treatment	15.2 (12–17)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	14
Merry et al. (2012)	Computerized Cognitive Behavioral Therapy (SPARX, Smart, Positive, Active, Realistic, X-factor thoughts)	187	Depression (mild-moderate depression symptoms)	Active	Loss (depression)	Loss (anxiety)	Indicated prevention	15.6 (12–19)	HIC (New Zealand)	Home	Unguided self-help (by computer)	None	7
Mufson et al. (2004)	Interpersonal Psychotherapy for Adolescents (IPTA)	64	Depression (depression or dysthymia diagnosis)	Active	Win (depression)	Win (functioning)	Treatment	15.3 (12–18)	HIC (United States)	School	Individual, face-to-face	Specialist	12
Rohde et al. (2004)	Adolescent Coping with Depression (CWD-A)	97	Depression (depression and conduct disorder diagnoses)	Active	Win (depression)	Win (functioning)	Treatment	15.1 (13–17)	HIC (United States)	Clinic	Group, face-to-face	Specialist	16
Rosello et al. (2008)	Interpersonal Psychotherapy	112	Depression (depression diagnosis or clinical assessment of significant impairment)	Active	Loss (depression)		Treatment	14.5 (12–18)	HIC (United States)	Clinic	Individual, face-to-face + group, face-to-face	Specialist	12
Sanford et al. (2006)	Usual Treatment and Family Psychoeducation	41	Depression (depression diagnosis)	Active	Loss (depression)		Treatment	15.6 (13–17)	HIC (Canada)	Clinic	Family, face-to-face	Specialist	12
Shirk et al. (2014)	Modified Cognitive Behavioral Therapy (m-CBT)	43	Depression (depression diagnosis and history of interpersonal trauma)	Active	Loss (depression)		Treatment	15.3 (13–17)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	12
Seigenthaler et al. (2014)	Primary and Secondary Control Enhancement Therapy –Physical Illness	217	Depression (depression and irritable bowel disorder diagnoses)	Active	Valid tie (depression)		Treatment	14.3 (9–17)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	12

Table 1
Continued

Study ^a	Intervention description (from original paper)	Study N	Sample selection	Comparison group	Primary outcome(s)	Secondary outcome(s)	Intervention type	Mean age, years (range)	Country	Location	Modality	Provider	Number of sessions
Szigethy et al. (2007)	Primary and Secondary Control Enhancement Therapy – Physical Illness	41	Depression (irritable bowel disorder and subthreshold depression symptoms)	Active	Win (depression)	Win (functioning)	Treatment	15.0 (11–17)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	9–11
Van Voorhees et al. (2009) (Study 1)	Motivational Interview plus Internet Program	84	Depression (subthreshold depression)	Active	Valid tie (depression)		Indicated prevention	17.4 (14–20)	HIC (United States)	Home	Motivational interviewing followed by unguided self-help (web-based)	Specialist	14
Van Voorhees et al. (2009) (Study 2)	Brief Advice plus Internet Program	84	Depression (subthreshold depression)	Active	Valid tie (depression)		Indicated prevention	17.3 (14–20)	HIC (United States)	Home	Brief advice followed by unguided self-help (web-based)	Specialist	14
Wright et al. (2017)	Stress Busters	91	Depression (elevated depression symptoms)	Active	Loss (depression)	Loss (anxiety)	Indicated prevention	15.5 (13–17)	HIC (United Kingdom)	Home	Unguided self-help (by computer)	None	8
Gaete et al. (2016)	Cognitive Behavioral Therapy – Yo Piensio Siento Activo (YPSA- [†])	342	Depression (elevated depression symptoms)	No treatment	Loss (depression)	Loss (anxiety)	Indicated prevention	15.9 (14–19)	HIC (Chile)	School	Group, face-to-face	Specialist	8
Jacobs et al. (2016)	Rumination-Focused Cognitive Behavior Therapy	33	Depression (history of depression currently in partial or full remission)	No treatment	Win (depression)		Relapse prevention	15.4 (12–18)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	8
Deady et al. (2016)	Computerised Cognitive Behavioural Therapy and Motivational Interviewing website (DEAL Project)	104	Depression (moderate depression symptoms and hazardous drinking)	Other	Win (depression)		Indicated prevention	21.7 (18–24)	HIC (Australia)	Home	Unguided self-help (web-based)	None	4
Mufson et al. (1998)	Interpersonal Psychotherapy	48	Depression (depression diagnosis)	Other	Win (depression)		Treatment	15.7 (13–17)	HIC (United States)	School	Individual, face-to-face	Specialist	12
Srasak et al. (2012)	Computerized Cognitive Behavioural Therapy	34	Depression (elevated depression symptoms)	Other	Win (depression)	Win (functioning)	Treatment	15.5 (13–17)	HIC (New Zealand)	School	Unguided self-help (by computer)	None	7
Alavi et al. (2013)	Cognitive Behavior Therapy	30	Depression (suicide attempt in past 3 months and mild-moderate depression symptoms)	Waitlist	Win (depression)		Treatment	16.1 (13–18)	MIC (Iran)	Clinic	Individual, face-to-face	Specialist	12
Clarke et al. (1999) (Study 1)	Cognitive Behavior Therapy	81	Depression (depression or dysthymia diagnosis)	Waitlist	Win (depression)	Win (functioning)	Treatment	16.2 (14–18)	HIC (United States)	Clinic	Group, face-to-face	Specialist	16
Clarke et al. (1999) (Study 2)	Cognitive Behavior Therapy	78	Depression (depression or dysthymia diagnosis)	Waitlist	Win (depression)	Win (functioning)	Treatment	16.2 (14–18)	HIC (United States)	Clinic	Adolescent group, face-to-face + parent group, face-to-face	Specialist	16
Lewinsohn et al. (1990) (Study 1)	Adolescent Coping with Depression (CWD-A)	38	Depression (depression diagnosis)	Waitlist	Win (depression)		Treatment	16.3 (14–17)	HIC (United States)	Clinic	Group, face-to-face	Specialist	14
Lewinsohn et al. (1990) (Study 2)	Adolescent and Parent Coping with Depression (CWD-A and Parent)	40	Depression (depression diagnosis)	Waitlist	Win (depression)		Treatment	16.2 (14–17)	HIC (United States)	Clinic	Group, face-to-face	Specialist	21
Rosello and Bernal (1999)	Interpersonal Psychotherapy	71	Depression (depression diagnosis)	Waitlist	Win (depression)		Treatment	15.0 (13–17)	HIC (United States)	Clinic	Individual, face-to-face	Specialist	12
Smith et al. (2015)	Stress Busters	112	Depression (elevated depression symptoms)	Waitlist	Win (depression)	Win (anxiety)	Indicated prevention	14.0 (12–16)	HIC (United Kingdom)	School	Unguided self-help (by computer)	None	8
Anxiety studies Murphy et al. (2017)	Cognitive Behavioral Therapy – Multimodal Anxiety and Social Skill Intervention	43	Anxiety (Autism spectrum disorder and anxiety diagnoses)	Active	Loss (anxiety)		Treatment	14.9 (12–17)	HIC (United Kingdom)	Clinic	Individual, face-to-face + group, face-to-face	Specialist	12
Hayward et al. (2000)	Cognitive Behavioral Therapy	35	Anxiety (social phobia diagnosis)	No treatment	Win (anxiety)		Treatment	15.8 (13–18)	HIC (United States)	Clinic	Group, face-to-face	Specialist	16
Ingul et al. (2014)	Cognitive Behavioral Therapy	128	Anxiety (social phobia diagnosis)	Other	Loss (anxiety)	Win (depression); Loss (functioning)	Treatment	14.3 (13–16)	HIC (Norway)	Clinic	Group, face-to-face	Specialist	17
Sanghvi (1995)	Study Skills Training Group	40	Anxiety (high test anxiety)	Other	Win (anxiety)		Indicated prevention	15.0 (15–16)	MIC (India)	Not specified	Individual, face-to-face	Specialist	6
Sud (1994) (Study 1)	Attentional Skills Training	20	Anxiety (high test anxiety)	Other	Win (anxiety)		Indicated prevention	14.0 (not stated)	MIC (India)	Not specified	Individual, face-to-face	Specialist	1
Sud (1994) (Study 2)	Cognitive Modeling	20	Anxiety (high test anxiety)	Other	Win (anxiety)		Indicated prevention	14.0 (not stated)	MIC (India)	Not specified	Individual, face-to-face	Specialist	1
Craddock et al. (1978)	Cognitive Rehearsal	40	Anxiety (speech anxiety symptoms)	Waitlist	Win (anxiety)		Indicated prevention	14.5 (14–15)	HIC (United States)	School	Individual, face-to-face	Specialist	6

(continued on next page)

Table 1
Continued

Study ^a	Intervention description (from original paper)	Study N	Sample selection	Comparison group	Primary outcome(s)	Secondary outcome(s)	Intervention type	Mean age, years (range)	Country	Location	Modality	Provider	Number of sessions
Lenhard et al. (2017)	Internet-Based Cognitive-Behavioral Therapy	67	Anxiety (obsessive compulsive disorder diagnosis)	Waitlist	Win (anxiety)	Win (functioning)	Treatment	14.2 (11–16)	HIC (Sweden)	Home	Guided self-help (remotely by email and telephone)	Specialist	12
Sud and Sharma (1990)	Attentional Skills Training	120	Anxiety (elevated anxiety symptoms)	Waitlist	Win (anxiety)		Indicated prevention	14.5 (14–15)	MIC (India)	Not specified	Individual, face-to-face	Specialist	1
Dear et al. (2017)	Clinical-Guided Internet Delivered CBT	110	Transdiagnostic (self-reported anxiety or depression symptoms)	Active	(i) Nonvalid tie (anxiety); (ii) Nonvalid tie (depression)		Indicated prevention	21.5 (18–24)	HIC (Australia)	Home	Guided self-help (web-based)	Specialist	4
Stallard et al. (2012)	Classroom-based Cognitive Behavior Therapy	1,064	Depression (elevated depression symptoms for 2 weeks)	Other	Win (depression)		Treatment	13.9 (12–16)	HIC (New Zealand)	School	Group, face-to-face	Specialist	9
Stallard et al. (2011)	Computerised Cognitive Behavioural Therapy	20	Transdiagnostic (elevated mental health symptoms)	Other	Loss (mental health symptoms)		Treatment	14.0 (11–17)	HIC (United Kingdom)	Not specified	Guided self-help (by computer)	Not specified	6

HIC = high-income country; MIC = middle-income country.

^a Full references are listed in Appendix B.

intervention protocols into their constituent “practice elements” (i.e., discrete clinical procedures). This method enables trial evidence to be indexed efficiently and reliably based on the presence of particular elements, which may occur in multicomponent protocols or in more parsimonious configurations with only one or two elements. The PWEBS database is continually updated with new RCTs, for which intervention manuals are independently double-coded by trained Practice-Wise staff and consultants as per a standardised codebook [27].

We focused on codes that had been applied by PWEBS to “specific” elements (i.e., elements derived from a particular empirically supported intervention), which can be differentiated from “nonspecific” engagement factors and in-session techniques (i.e., practices that are shared across a number of psychotherapies) [28]. For the purpose of the current review, a “PST” was identified when the intervention protocol included problem solving and no more than one other specific element (e.g., psychoeducation or relaxation). Protocols where problem solving was delivered in a package with at least two other specific practice elements were coded as “multicomponent interventions.” Questions about applicability of problem-solving interventions to diverse populations and contexts were addressed using only PST studies. Analyses of overall effectiveness of problem-solving practices additionally included outcomes from trials of multicomponent interventions.

Study outcomes were defined using an established PWEBS evidence hierarchy. A “win” was applied to a study in which an index intervention performed better than one or more comparison groups at the first post-treatment end point. A “valid tie” was applied to studies where the index intervention achieved a similar effect on a given outcome as one or more other evidence-based interventions. A “nonvalid tie” reflected equivalence between the index intervention and a non-evidence-based protocol. A “loss” occurred where the index intervention performed worse than comparison groups.

Searches were carried out within PWEBS using the following filters: (1) intervention coded as PST or multicomponent intervention; (2) mean age of sample, 14–24 years; (3) sample selected by screening for symptoms or diagnosis of anxiety and/or depression; (4) outcome data available for anxiety, depression, aggregate measures of these, and/or functioning; and (5) comparison(s) made against another active intervention, waitlist, no intervention, and/or another control condition (e.g., attention control or usual care). Because the standard PWEBS database focuses on study samples aged up to 21 years, we applied the same filters to a complementary “transition age” database that included studies with older samples aged up to 27 years. We also ran new searches for RCTs published since January 1, 2020 (Appendix A, Table A2). Relevant outputs were coded from these supplementary sources using the PWEBS coding manual. Categorical data from all studies were organized and analysed descriptively as per the dimensions and definitions in Appendix A, Table A3. We used Comprehensive Meta-Analysis software to calculate effect sizes (Hedge’s *g*) based on extracted outcome data (postintervention means and standard deviations [SDs] for each trial arm).

Qualitative evidence. The purpose of the qualitative review was to explore the acceptability of problem-solving approaches for young people with depression and anxiety and to suggest putative mechanisms in the relationship between improved problem solving and beneficial outcomes. Evidence was sought from

Table 2
Qualitative study details

Study ^a	Index sample selection criteria	Sample for qualitative data	Country	Intervention
Gonsalves et al. (2019)	12–20 years with felt need for support with stress	<i>N</i> = 46; Mean age = 14.0; Female = 46%	MIC (India)	User-testing of problem-solving app designed to be delivered over four sessions by lay counsellors in schools
Gonsalves et al. (2021)	12–20 years with felt need for support with stress and problem-solving	<i>N</i> = 12; Mean age not reported, age range 13–17; Female = 50%	MIC (India)	Problem-solving app delivered over four sessions with support from lay counsellors in schools
Løvgren et al. (2019)	16–18 years with diagnosis of depression	<i>N</i> = 13; Mean age = 17; Female = 100%	HIC (Norway)	Twenty eight sessions of psychodynamic psychotherapy using “Improving Mood with Psychoanalytic and Cognitive Therapies” (IMPACT) manual delivered by trained therapists
Michelson et al. (2020a)	12–20 years with elevated mental health symptoms	Recipients of intervention <i>N</i> = 21; Mean age = 15.15 (SD 1.73); Female = not reported; Providers of intervention <i>N</i> = 7	MIC (India)	Six sessions of problem-solving therapy delivered by lay counsellors in schools
Schley et al. (2018)	12–25 years with general mental health problem or mild to moderate levels of mental disorder, low level of risk to self/others and limited complexity	Qualitative data from <i>N</i> = 90; Mean age of full sample (<i>N</i> = 122) = 16.9 (SD 3.35)	HIC (Australia)	Brief Interventions Clinic (BIC) with eight skill-building and behavioural intervention modules from which young people can choose. Maximum of six sessions delivered by graduate students under specialist supervision.
Van Vliet et al. (2017)	12–17 years with at least one mental health disorder in residential treatment centre	<i>N</i> = 28; Mean age = 14.2 (SD 1.26); Female = 50%	HIC (Canada)	Eight weeks of mindfulness-based stress reduction delivered in a residential treatment centre by trained therapists

HIC = high-income country; MIC = middle-income country.

^a Full references are listed in [Appendix B](#).

qualitative or mixed-method studies involving interviews with either intervention participants or providers of PST, or studies of other therapies in which problem solving was identified as a theme of the analysis ([Appendix A, Table A4](#)).

Study eligibility was established through title and abstract screening against inclusion criteria, followed by reading in full. Text-based findings from the results section and relevant portions of the abstract and discussion sections were entered verbatim into Nvivo software. Analysis followed three stages beginning with familiarization and line-by-line coding. Interrater reliability was not formally tested; instead, a lead coder (E.M.) consulted regularly with another author (D.M.) to discuss alternate perspectives and establish an agreed coding frame. Descriptive themes and subthemes were then developed deductively (based on established theoretical concepts such as stress-coping) and inductively from codes, again in consultation between E.M. and D.M. Finally, themes were consolidated and tabulated with corresponding illustrative quotes. Narrative summaries were indexed against research questions in an integrative framework synthesis (see further below).

Youth Advisory Group. An international Youth Advisory Group (YAG) included 12 members (11 females and one male) aged 17–25 years who self-identified as having lived experience of depression and/or anxiety. Five members were recruited from two existing youth participation groups linked to health and social care services in the United Kingdom. Another seven participants were recruited from India through a national youth mental health campaign (<https://itsoktotalk.in/>) coordinated by Sangath NGO. The purpose of sampling from two different

countries was to stimulate discussions about contextual applicability of evidence. We did not seek to obtain a “representative” sample based on overt demographic characteristics such as ethnicity, as we recognised that lived experiences can be shaped by multiple identity factors (both visible and invisible). Nor did we require participants to disclose specific information about their own histories of mental health problems or prior experiences of mental healthcare. YAG members were compensated for their time with prepaid vouchers.

Three virtual consultation meetings were conducted in English and consisted of semi-structured discussions focused on the acceptability and utility of problem solving, the credibility of the preliminary evidence synthesis, potential refinements, and implications for further research. Following recommendations from previous participatory research [29], we employed a variety of group tasks to democratize the consultative process and help young people’s “voices to come through more powerfully by leaving more space for individual styles of interaction and by opening more channels for expression” (p. 81). In practice, this meant a combination of small and larger group discussions so that stronger voices did not consistently drown out quieter members. Nonintrusive, task-based activities were also used (e.g., asking the YAG to describe an “ideal” problem-solving intervention).

Commentaries from the consultation meetings were transcribed verbatim, coded, and summarized using the same process that was applied to the published qualitative evidence. Tabulated summaries of themes, subthemes, and illustrative quotes were checked with YAG members to establish accuracy and resonance with individuals’ experiences.

The University of Sussex research governance team reviewed the role of the YAG in this project and confirmed that the methods and aims were consistent with guidelines on Patient and Public Involvement, rather than constituting primary research [30]. As such, the project was deemed to be exempt from a formal ethics review. All YAG members provided written permission for their commentary to be included in this report.

Framework synthesis

Framework synthesis is a pluralistic approach for aggregating and integrating qualitative, quantitative, and lived-experience evidence. It is driven by organizing concepts that cut across academic disciplines and epistemologies and is therefore well suited for applying diverse sources of evidence to applied research questions [31]. Our framework synthesis was built around four core research questions, which provided an explicit structure for assessing gaps in the published literature. This approach was also conducive to communicating research findings and facilitating discussions within the YAG, particularly around discrepancies in the published evidence base.

We approached the synthesis from the critical realist position that intervention processes are not directly observable but may be inferred through theoretical knowledge, empirical studies, and accounts of lived experience. Synthesis was led by two clinical psychologists (D.M. and E.M.) with direct experience of developing, supervising, and delivering problem-solving interventions for young people with diverse mental health problems in both high-income and low-income countries. Our perspectives facilitated interpretation of evidence as related to well-established theoretical foundations of problem-solving interventions and recent scientific developments related to “active ingredients” in youth mental health interventions [25]. The review was also shaped by YAG members who engaged with iterative summaries of the published quantitative and qualitative evidence. This engagement provided opportunities to challenge and qualify inferences drawn by the research team, ensuring that conclusions were meaningful and relevant to young people’s priorities.

Results

Study selection and characteristics

Forty eight RCTs were included: five studies assessed PST (sample selected on the basis of anxiety, $n = 1$; depression, $n = 2$; and transdiagnostic criteria, $n = 2$) and 43 examined multicomponent interventions which included problem solving (sample selected on the basis of anxiety, $n = 9$; depression, $n = 32$; and transdiagnostic criteria, $n = 2$) (Table 1). “Transdiagnostic” studies included mixed samples where participants screened positive for depression, anxiety, or both on standardized symptom measures or diagnostic tools. Multicomponent protocols were largely cognitive-behavioural in nature and contained a mean of 7.26 ($SD = 2.54$; range 4–11) specific practice elements. We identified six qualitative studies, which variously examined transdiagnostic PSTs ($n = 3$), a transdiagnostic multicomponent intervention with a problem-solving module ($n = 1$), psychodynamic therapy for depression ($n = 1$), and transdiagnostic mindfulness-based stress reduction ($n = 1$). Table 1 provides details of the included RCTs, Table 2 provides

details of the six included qualitative studies, and Appendix A, Figure A1 depicts the overall search process and results.

Synthesis

Q1. In what ways does problem solving work?

Quantitative evidence

Depression outcomes. Thirty six studies reported on depression outcomes and controlled effect sizes could be calculated for 33 studies (Table 3). Three PST studies were identified: two found PST to be superior to a waitlist in samples with depression [32,33] and one found that PST was equivalent to a waitlist on a measure of depression in a mixed sample with elevated anxiety or depression [34]. However, the latter study suffered from high dropout and may therefore have been underpowered. Across the three PST studies, the overall pooled controlled effect was moderate but did not reach significance ($g = 0.51$, $SD = 0.30$, $p = .09$).

Thirty two studies examined multicomponent interventions for depression and 20 of these studies reported a win or valid tie. Across all 32 multicomponent interventions, there was a moderate, statistically significant pooled controlled effect size for depression ($g = 0.40$, $SD = 0.08$, $p < .01$). One multicomponent intervention for anxiety measured depression as a secondary outcome and obtained a win, with an effect size of 0.35 ($SD = 0.12$) against an attention control [35].

Anxiety outcomes. Sixteen studies reported on anxiety outcomes and controlled effect sizes could be calculated for 14 studies (Table 4). Two PST studies were identified, both of which were coded as a loss and had a negative pooled controlled effect size of -0.37 ($SD = 0.18$, $p = .05$). This result was largely due to a study which found that a PST intervention, used as an active control, was significantly worse than CBT for social anxiety, although both groups improved [36]. Ten multicomponent interventions were evaluated in studies with anxiety as the primary outcome; the majority ($n = 7$) achieved a win or valid tie. The pooled controlled effect size for these interventions was significant and of moderate size ($g = 0.42$, $SD = 0.21$, $p = .04$). Four trials focused primarily on depression but included anxiety as a secondary measure. Problem-solving interventions in these trials achieved one win and three losses, with a nonsignificant overall pooled effect of $g = 0.14$ ($SD = 0.10$, $p = .15$).

Other outcomes. An additional PST study compared problem solving delivered by lay counsellors to an active control of self-completed problem-solving booklets without any counselling support [37]. One of two primary outcomes (total mental health symptoms including internalizing symptoms) constituted a nonvalid tie, whereas the other primary outcome (idiographic problems) constituted a win for counsellor-led PST. This was the only PST trial to include a measure of functioning as a secondary outcome (nonvalid tie). Total mental health symptoms were also reported in a study of a computerized multicomponent intervention, which constituted a loss against delayed delivery of the intervention [38].

Qualitative evidence. Experiential accounts of problem solving highlighted positive outcomes in two linked domains (Table 5). First, young people noted improvements in directly targeted

Table 3
Effects of problem-solving interventions on depression

Comparison groups	Intervention target	Outcome			Effect size		
		Study N	Total participant N	Win/valid tie –nonvalid tie/loss (study N)	Study N	Total participant N	Hedge's g controlled effect size (standard deviation)
PST: Depression as primary outcome							
All comparisons	Depression and transdiagnostic	3	354	2–1	3	354	0.51 (0.30)
Waitlist	Depression and transdiagnostic	3	354	2–1	3	354	0.51 (0.30)
Multicomponent: depression as primary outcome							
All comparisons	Depression and transdiagnostic	32	4,083	20–12	29	3,792	0.40 (0.08)
Active	Depression and transdiagnostic	19	2,008	8–11	17	1,750	0.25 (0.07)
No treatment	Depression	2	375	1–1	1	342	–0.01 (0.13)
Attention control or clinical monitoring	Depression	4	1,250	4–0	4	1,250	0.38 (0.19)
Waitlist	Depression	7	450	7–0	7	450	0.98 (0.23)
All problem-solving interventions: depression as secondary outcome							
All comparisons	Anxiety	1	128	1–0	1	128	0.35 (0.12)
Attention control	Anxiety	1	128	1–0	1	128	0.35 (0.12)
All problem-solving interventions: any depression outcome							
All comparisons	Depression, anxiety, and transdiagnostic	36	4,565		33	4,274	0.43 (0.07)

PST = problem-solving therapy.

Table 4
Effects of problem-solving interventions on anxiety

Comparison groups	Sample selection criteria	Outcome			Effect size		
		Study N	Total participant N	Win/valid tie–nonvalid tie/loss (study N)	Study N	Total participant N	Hedge's g controlled effect size (standard deviation)
PST: anxiety as primary outcome							
All comparisons	Anxiety and transdiagnostic	2	183	0–2	2	183	–0.37 (0.18)
Active	Anxiety	1	138	0–1	1	138	–0.51 (0.21)
Waitlist	Transdiagnostic	1	45	0–1	1	45	–0.12 (0.29)
Multicomponent: anxiety as primary outcome							
All comparisons	Anxiety and transdiagnostic	10	623	7–3	8	623	0.42 (0.21)
Active	Anxiety and transdiagnostic	2	153	0–2	2	153	–0.05 (0.31)
No Tx	Anxiety	1	35	1–0	1	35	1.21 (0.39)
Attention control	Anxiety	4	208	3–1	3	168	0.35 (0.52)
Waitlist	Anxiety	3	227	3–0	2	72	0.74 (0.20)
All problem-solving interventions: anxiety as secondary outcome							
All comparisons	Depression	4	732	1–3	4	732	0.14 (0.10)
Active	Depression	2	278	0–2	2	278	0.00 (0.23)
No Tx	Depression	1	342	0–1	1	342	0.07 (0.13)
Waitlist	Depression	1	112	1–0	1	112	0.41 (0.19)
All problem-solving interventions: any anxiety outcome							
All comparisons	Anxiety, depression, and transdiagnostic	16	1,558	7–5	14	1,478	0.08 (0.10)

PST = problem-solving therapy.

problems, which often included psychosocial difficulties related to relationships and academic performance. Second, improvements in emotion regulation, such as reduced reactivity to challenging interpersonal situations, were identified as a consequence of applying problem-solving skills. The practical focus on solving current, real-life problems was seen as being particularly helpful. Notably, a study of experiences in psychodynamic psychotherapy indicated a relative preference among some participants for more practical and concrete problem solving. The use of a modular structure, where problem solving could be learned and applied alongside other skills, was also valued.

Youth Advisory Group insights. The YAG indicated that a key strength of the problem-solving approach was learning a systematic method that could be applied to multiple situations, thus enhancing resilience to future challenges as well as helping with current stressors (Table 5). It was felt that improved problem solving would be equally relevant to depression and anxiety. On the other hand, problem solving by itself was viewed as insufficient to address the full spectrum of needs that could be presented by young people with depression and anxiety. This reflected a more general view that no single practice element—problem solving or otherwise—would be capable of providing an “end-all solution” to mental health problems. As such, PST as a stand-alone intervention was considered less potent than a multicomponent package.

Q2. For whom does problem solving work?

Quantitative evidence. Across the five PST trials, outcomes did not appear to vary depending on whether the intervention was delivered for the purpose of indicated prevention (one win, one nonvalid tie, and one loss) or treatment (one win and one loss). The only PST study to examine moderator variables did not find any effect of baseline severity or chronicity on either primary outcome (total mental health symptoms and idiographic problems) [37]. All studies included similar age ranges and both males and females, so it was not possible to explore the possibility of differential outcomes by age or gender.

Qualitative evidence. The qualitative studies did not directly address experiences of problem solving in different subgroups. However, it was apparent in one study from India that students with poor literacy experienced particular difficulties when engaging with written problem-solving materials [39] (Table 5).

Youth Advisory Group insights. The advisors felt that individuals with more severe, acute, and complex emotional problems would be less likely to benefit from a stand-alone PST (Table 5). They emphasized the importance of personalization through appropriate pacing, flexibility in delivery, and additional practice elements. On the other hand, there was consensus that problem solving as a focal element might be most appropriate for prevention and early intervention. There were mixed opinions about the age at which problem solving would be most appropriate. Although the clear step-by-step process of problem solving was seen as being suitable for younger adolescents, there was a counter view that problem solving requires a readiness to confront problems that may only develop at a later age.

Q3. In which contexts does problem solving work?

Quantitative evidence. All PST studies were conducted in high-income countries except for two from middle-income countries (Turkey and India), which demonstrated a win for depression and a nonvalid tie for total mental health symptoms (incorporating an internalizing symptoms subscale), respectively. Four of the PSTs were brief (5–6 sessions) and all were delivered on a 1:1 basis (two wins, one nonvalid tie, and one loss). A longer PST intervention (12 group sessions) was found to be significantly less effective than group-based CBT for social anxiety; it is likely this result reflects the comparison rather than being a factor of length or format [36]. There were mixed results by delivery setting, which included schools (one loss and one non-valid tie), homes (one win and one loss), and a single clinic study (win).

Similarly, mixed results were found with respect to provider support. PST providers offered face-to-face support (one win, one nonvalid tie, and one loss) or remote support (one win and one loss). One study of transdiagnostic internet-based PST [34] noted that insufficient support provided via e-mail may have contributed to non-significant findings. The only study that examined delivery of PST by nonspecialists found that support from a lay counsellor did not make a significant difference to mental health outcomes (including internalizing symptoms) compared to problem-solving booklets without any support [37]. However, improvement in self-defined psychosocial problems was significantly better for the counsellor-led variant.

Qualitative evidence. In two school-based studies from India, a mismatch was identified between generating alternative creative solutions on the one hand, and young people’s expectations of being told the “right answer” by a counsellor on the other [39,40]. This tension was linked to didactic teaching and rote learning styles which were noted as being characteristic of the Indian educational system. Engagement of teachers was also highlighted as an implementation challenge for school-based problem-solving interventions, whereas visibility of peers participating in the program was seen as having a potentially positive influence [39,41]. Cultural relevance of problem solving was enhanced through visually appealing and personally relatable intervention materials, such as illustrated vignettes based on realistic stories and characters.

Youth Advisory Group insights

Advisors saw the potential for problem solving to be adapted across diverse contexts as it teaches a systematic approach that can be applied to a wide range of stressful problems (Table 5). However, participants also acknowledged the limits of problem solving within wider social contexts marked by structural inequalities and prevailing stigma related to mental health problems and therapies. It was felt that problem solving could be usefully integrated into the school curriculum, although some Advisors noted that schools (particularly in India) are not always promotive of good mental health and that a culture shift would therefore be required.

Q4. Why does problem solving work?

Quantitative evidence. Two PST studies included a measure of problem solving. One found that the Perceived Stress Scale, measuring aspects of problem orientation, partially mediated

improvements in mental health (including internalizing) symptoms and psychosocial problems [37]. This finding implies that at least some of the benefits of the intervention derived from enhanced confidence in the ability to handle problems. The other PST study found that scores on the Problem Solving Inventory [42], a measure of problem-solving style and orientation, did not differ significantly between the PST group and waitlist group [32].

Four multicomponent intervention studies included a measure of problem solving and three of these found no significant difference in problem solving between trial arms (Social Problem Solving Inventory-Revised, measuring problem orientation and problem-solving style, $n = 2$; Problem Solving subscale of the Family Assessment device, measuring problem-solving style, $n = 1$) [43–45]. A study comparing a computerized multicomponent intervention with problem solving against an active control found a significant difference on the problem-solving subscale of the Adolescent Coping Scale, measuring problem-solving style [46]. This effect varied by age, with a larger effect in older participants (16–18 years vs. 13–15 years).

Qualitative evidence. There were indications that the experience of tackling problems led to increased hopefulness about managing future challenges and reduced avoidance, suggesting shifts in problem orientation and style. Furthermore, the importance of the therapeutic alliance in problem-solving interventions was endorsed across all of the qualitative studies, with corrective feedback and relational support seen as central to effectiveness.

Youth Advisory Group insights. The Advisors discussed mechanisms of problem solving in terms of generating positive beliefs, appraisals, and expectations about the ability to solve problems in the present and future. It was felt that while the process of developing mastery and generating hope may be common to many therapies, problem solving may be particularly useful in teaching simple procedures to motivate and achieve tangible progress (Table 5). There was also consensus that the ability of an intervention provider to offer a tailored, developmentally sensitive approach was more likely to strengthen rapport and build motivation for change.

Discussion

The current review examined multiple sources of evidence for problem solving as a potential active ingredient in the indicated prevention and treatment of youth depression and anxiety. Outcomes from RCTs provided evidence that problem solving may be effective as a stand-alone intervention for depression but not for anxiety. Multicomponent interventions that included problem solving were broadly effective for both depression and anxiety. There was no clear evidence of differential effects for indicated prevention relative to treatment. However, insights from the YAG suggested that problem solving may be most appropriate for young people during earlier clinical stages and potentially as part of primary prevention. There were also indications that problem-solving approaches can be generalized across diverse contexts, notwithstanding specific implementation challenges noted in schools and structural inequalities that can limit the scope of problem solving. In line with stress-coping theory, there was converging evidence across our sources for the effects of problem

solving being mediated through changes in problem orientation, and to a lesser extent through problem-solving style.

Our quantitative findings are consistent with the adult literature on PST, where the evidence of effectiveness is strongest for depression [18] despite research suggesting that problem-solving deficits occur transdiagnostically [47,48]. A systematic review of emotion regulation strategies across the lifespan found that problem-solving capacity had a marginally stronger association with depression (-0.33) than with anxiety (-0.27) [49]. It is possible that enhancements in problem-solving skills do not directly address covert avoidance, such as the use of distraction to deal with unwanted internal states, which can maintain anxiety in the long run [50].

An empathic, encouraging, and collaborative therapist was also identified as a key facilitator of problem solving. This came up repeatedly in qualitative studies and among the YAG, closely mirroring results from other research on young people's experiences and preferences for mental healthcare [51] and consistent with the well-established association between therapeutic alliance and outcomes [52]. The role of an intervention provider in providing "tips" about potential solutions and corrective feedback on the use of problem solving was also endorsed alongside the relational aspects.

While these relational processes are not specific to problem-solving interventions, the emphasis on finding practical, here-and-now solutions was highlighted by qualitative studies and the YAG as a distinctive benefit of problem solving. A desire for structure and concrete solutions to life difficulties has been reported in the wider literature on young service users' perspectives on mental healthcare [51,53]. We infer from our qualitative sources and lived experience panel that step-by-step problem-solving approaches can lead over time to mastery and an enhanced sense of control over unwanted internal states and external stressors. These changes may be part of a more hopeful, problem-solving mindset that promotes adaptive behaviour (e.g., more positive activity and less avoidance) and thereby leads to better mental health.

A shift in problem orientation was also supported by a mediation analysis in the largest PST trial in our review [37], although other studies did not find consistent effects on problem-solving measures. This inconsistency may reflect differences in the actual content of problem-solving interventions. For example, an explicit focus on problem orientation is often omitted from PST protocols for young people, notwithstanding the fact that this feature is associated with stronger effects in PST for adults with depression [54]. Problem orientation itself is also a broad concept, encapsulating a number of related but potentially distinct mechanisms of cognitive appraisals, self-efficacy, and optimism. Variation in the selection of problem-solving measures provides yet another source of heterogeneity.

PST has been delivered for young people in a range of modalities and locations, with no clear evidence for particular formats or settings being more or less conducive to positive outcomes. There is provisional evidence from one PST study [37] that problem solving delivered through lay counsellors can be effective, consistent with a growing literature around "task-sharing" models of delivery in low-resource settings [55]. It was also suggested by the YAG that problem solving may be less appropriate in contexts where structural problems impact on the daily lives of young people. That said, there are indications that problem-solving interventions can be adapted for populations

Table 5
Metasynthesis of qualitative evidence and lived experience

Theme	Subtheme	Findings from qualitative studies ^a	Findings from Youth Advisory Group ^b
Q1. In what ways does problem solving work?			
Utility of problem solving	Psychosocial problem resolution	Adolescent interviews reiterated the observed changes in ... functional impacts (related especially to family/peer relationships and academic performance). -school-based problem-solving intervention (Michelson et al., 2020a)	
	Improved emotion regulation	“Now I am doing regular practice sometimes because of which I feel relaxed and also getting less distraction so now I can give attention.” -school-based blended problem-solving intervention (Gonsalves et al., 2021) The themes of increased self-control, improved problem solving, and enhanced interpersonal relationships appeared most in the context of participants' accounts of using [mindfulness-based stress reduction] to reduce reactivity and aggression with family members. -mindfulness-based stress reduction (Van Vliet et al., 2017)	
	Generalisability	Importantly, students also spoke about ongoing practice and opportunities for future use of skills learned, suggesting that although the intervention is brief the learning may be able to be generalised. -school-based blended problem-solving intervention (Gonsalves et al., 2021)	“I thought it sounded really interesting how it was a logical and formulated approach and can be applied to lots of different situations as well, so it is something you can take with you. So if you have one identified difficulty you can then apply it to other things in the future.”
	Concrete, practical approach	Students also expressed a desire to access more directive tips and specific suggestions about ways to solve problems. -development of problem-solving app (Gonsalves et al., 2019) “It was when talking about things and getting some suggestions on concrete practical things one could do to get started. And that was what I felt as the most important to me.” -psychodynamic psychotherapy (Løvgren et al., 2019) Adolescents value problem solving and help with concrete challenges. -psychodynamic psychotherapy (Løvgren et al., 2019)	“I think the idea that younger people prefer more concrete solutions might be too broad a generalisation... I think there are a lot of people who need time to open up or become self-aware which is essentially needed to reflect back on your actions and your problem... I do not think younger people always want a faster solution.”
	Not enough on its own, but useful among other components	“The many modules I liked that I could work on many areas separately—this made everything clearer to understand. Also liked that I could select modules that were most relevant to me.” -modular brief treatment with problem-solving component (Schley et al., 2018)	“It is only going to be effective to a degree, it is not going to be an end-all solution.” “I feel like a lot of these techniques tend to become like too simple and when they become too simple we risk losing the person to the technique.” “I think the six session structure is something that is way too limiting and I think it would be very rare for that to work.” “I think even in therapy sessions the issue is that the time is so limited that you do not really get to build a proper relationship or explore the problem in detail. But perhaps if it was just kept like as a tool or methodology rather than the whole of the therapy and if you use it in collaboration with a lot of things that could be helpful.”

Table 5
Continued

Theme	Subtheme	Findings from qualitative studies ^a	Findings from Youth Advisory Group ^b
Q2. For whom does problem solving work?			
Literacy	-	The most common barriers to engaging with the workbook were difficulties with or lack of interest in reading/writing, lack of retained knowledge/ conceptual understanding about problem solving and insufficient time due to exams/other academic commitments.	
Age and stage	Age and readiness	-school-based problem-solving intervention (Michelson et al., 2020a)	<p>"I think if you look at 14-year-olds, most of them do not really have expectations for therapy...but most of them go to therapy because their parents wish for them to, they do not really have too much of a say in that. So I guess it could be helpful if you do not have much of an expectation, if you do not know about therapy, so it would be good to go in like a very logical, organised step by step process."</p> <p>"When I was 14 years old I was angry, I was rebellious, I was trying to find my own identity and I was not really in a place where something like problem solving would make sense to me....But when I became 17/18 I had already gone through some difficult phases and I was able to recognise that I needed better ways to cope. So when I have that urge to better equip myself with the tools that problem solving is providing me with, it seems like a more opportune moment."</p>
	Clinical staging	<p>Students who had previously received a face-to-face counselling intervention suggested that the game may be sufficient on its own for some students, but others with more severe problems might also require counsellor support.</p> <p>-development of problem-solving app (Gonsalves et al., 2019)</p>	<p>"I am not understanding how this process would work for something like as complicated as [mental] disorders. Because let us say for anxiety you would face many different problems because of [the condition]. So how would the person decide, 'OK, I am going to target this.' So it would work more feelings, less for disorders I think."</p> <p>"I think having it as a general education thing rather than something specifically for someone who is presenting with a difficulty, kind of having it as part of the school curriculum... So that people are equipped so that if a problem does come up then they can kind of stop it escalating into something that needs 1:1. So it might be more effective as an early intervention or preventative rather than actual therapy."</p>

(continued on next page)

Table 5
Continued

Theme	Subtheme	Findings from qualitative studies ^a	Findings from Youth Advisory Group ^b
Q3. In which contexts does problem solving work?			
Contextual influences on delivery	Generalisability across contexts		“I think it is giving people the skills to help themselves and so that would be transferable as it is not reliant on them having any sorts of resources or things that could only be available in one place or one social situation. It is just kind of self-reliant, so I think it would work really well across cultures or in different contexts globally.”
	Peer visibility	The program was found to be socially acceptable with participants noting the positive influence of seeing other students signing-up and no participants reporting difficulties related to teasing or stigma while leaving class to join sessions. -school-based blended problem-solving intervention (Gonsalves et al., 2021)	
	School and learning culture	Providers additionally reflected on the apparent mismatch between a required therapeutic stance involving supported autonomy and a culturally sanctioned ‘teacher-student’ model based on ‘giving the right answer.’ -school-based problem-solving intervention (Michelson et al., 2020a) User-testing sessions highlighted that while specific problem-solving behaviours were learned with relative ease, conceptual learning intended to address problem orientation was limited. -development of problem-solving app (Gonsalves et al., 2019) The intervention providers expressed concerns that teachers were generally sceptical and disengaged from the referral process, leading to suggestions for more focused teacher sensitisation activities. -school-based problem-solving intervention (Michelson et al., 2020a)	“If we use it as an early preventative technique in schools you would take into account the cultural differences. And if you were able to do it in schools in smaller groups of say four, five people, I think that is an area where problem solving could work well.” “My school does have these sessions, we call them wellbeing sessions where they teach us coping skills and other things. But I think one of the issues is it becomes so much like a class it becomes less about us thinking, ‘oh look, this could help me’ into ‘oh no, I might be tested at some point.”
	Contextual relevance of materials	Positive responses about the workbook emphasised the relatability of character-based narrative vignettes to students’ interests and personal circumstances. -school-based problem-solving intervention (Michelson et al., 2020a)	
	Challenges presented by wider society and culture		“It would be difficult because many cultures view therapy very differently and so do many socioeconomic groups. In India people have very varied opinions on therapy, a lot of people are super against it, a lot of people think it is helpful.” “Taking the Indian context for example... it was basically groups of people being actively segregated and discriminated against and these were problems that if you actually proposed to a person that like ‘why don’t you change your perspective on it’ like it is not really possible. It is not really sensitive because this is a case where someone’s entire identity is being questioned by the state or by the community surrounding them and there is only so much you can do with respect to problem solving, gaze shifting, and managing yourself... There are also external stressors that can be too much.”

Table 5
Continued

Theme	Subtheme	Findings from qualitative studies ^a	Findings from Youth Advisory Group ^b
Q4. Why does problem solving work? Mechanisms	Problem orientation	<p>“The problems I wrote are not affecting me in my life anymore, so now if I get a problem I think of myself as a [problem-solving] master! I realised that there are options in life and we have gone through that...to test one of them and which is the best so we can just try out them.”</p> <p>-school-based blended problem-solving intervention (Gonsalves et al., 2021)</p>	<p>“It is almost that the hope aspect is more important than what you are doing [through the problem-solving steps]. Because problems will be really different and you can have a strategy for one that might not work for another but if you have the brief that you can overcome it then that is going to be more helpful. But then just having the belief that you can overcome it is not necessarily going to be that helpful in a practical sense, so you need to have both.”</p> <p>“The concept of gaining mastery and being able to solve a problem through any therapy and getting hope that you can do it again is common to all therapy methods. But the [unique selling point] of this therapy is that it gives you a structure about the ‘how’ and tells you a very uncomplicated straight forward means of solving at least day to day problems or whatever is in your own personal control. And so everybody could benefit from that to an extent and it is just the extent that would vary from client to client.”</p>
	Therapeutic alliance	<p>“It was very encouraging. It was very helpful to have someone encouraging you to go through with your solutions.”</p> <p>-school based blended problem solving intervention.” (Gonsalves et al., 2021)</p> <p>Adolescents valued the practical/facilitative role of the psychologist in providing corrective feedback.</p> <p>-school-based problem-solving intervention (Michelson et al., 2020a)</p> <p>“The application helps with its stress relieving methods but what comes from the person is much better than that. I would not suggest it as much as talking to the person. That is much better, it makes you feel better. At least in my case it made me feel much better.”</p> <p>-school-based blended problem-solving intervention (Gonsalves et al., 2021)</p> <p>More significantly, most adolescents considered the quality of the therapeutic relationship to be of central importance to their engagement and outcomes in counselling. Indeed, for several participants, the problem-solving content was judged to be merely incidental compared to the potent relational ingredient of the guidance sessions.</p> <p>-school-based problem-solving intervention (Michelson et al., 2020a)</p>	<p>“I think also there are a lot of studies talking about the importance of the relationship between the individual and the therapist or counsellor. And having such a limited number of sessions will obviously really take away from being able to form that relationship and that is quite an important part of how successful a therapy intervention can be.”</p>

^a Quotation marks denote verbatim participant quotes from primary studies; text fragments without quotations are inferences/summaries taken verbatim from the primary studies.

^b Quotation marks denote specific comments made by Youth Advisory Group members.

facing systemic challenges such as gender-based violence and displacement due to conflicts [19,56].

We note several limitations and strengths of this review. The main PWEBS database focused on samples aged less than 20 years and we extracted data on older samples using a supplementary database without independent coding of study characteristics. Furthermore, the PWEBS system did not include an assessment of bias and we did not therefore examine the study quality. We also aggregated outcomes from a variety of post-treatment endpoints. Other sources of uncontrolled heterogeneity were related to differences in trial comparator arms and the specific outcome measures themselves. The relatively small number of trials that looked at stand-alone problem-solving interventions limited the options for comparing outcomes between subgroups, such as males and females. Taking all of these limitations into account, inferences drawn from the quantitative evidence alone are necessarily tentative.

Additional sources were used to aid interpretation of quantitative findings and supplement gaps in the overall evidence synthesis. While generally increasing the breadth and depth of evidence available for synthesis, we note that the qualitative analysis could have been strengthened by independent coding of published qualitative studies and transcripts of YAG consultations. That said, trustworthiness of findings was otherwise addressed through regular discussion of codes, themes, and subthemes between two authors and periodic feedback from the YAG on the accuracy and credibility of the overall thematic framework.

Recommendations

A number of research gaps were identified through the review. There was a notable lack of studies measuring functional outcomes, moderators, and mediators. There was also a scarcity of published qualitative data on users' and providers' perspectives. Future studies on problem-solving interventions should seek to address these gaps, for example, by using consistent measures of problem orientation and embedding process evaluations within trials. In addition, dismantling studies would enable a comparison of discrete practice elements (including problem solving) against multicomponent protocols with the goal of identifying which components are more likely to function as active ingredients.

The findings also have implications for the sequencing of problem solving within multicomponent interventions. Existing theory, corroborated by the current review, suggests that PST works in part through modifying problem orientation and giving participants a greater sense of optimism and control over their problems. We postulate that the procedural simplicity and concrete focus of problem solving make this element uniquely suited to a first-line intervention within stepped care or as part of a modular protocol, particularly (but not only) for depression. The strategic goal would be to achieve "quick wins" through judicious selection of problems and creative solutions, leading to successful problem resolution that instills hope and builds motivation for future change. This goal can be abetted by a strong therapeutic alliance.

Conclusion

Problem-solving approaches hold intuitive appeal to many young people and have been applied effectively in psychological

interventions across a range of ages and contexts. The current strength of trial evidence supports the use of problem solving as a stand-alone intervention for depression and in combination with other practice elements for anxiety. Evidence points to changes in problem orientation as an underlying transdiagnostic process. The practicality, simplicity, and flexibility of problem solving strengthen the case for including this practice element in early interventions for distressed young people with, or at risk of developing, depression and anxiety.

Acknowledgments

We would like to thank our Youth Advisory Group including Lauren Tasker, Cheshta Bhatia, Aayushi, Meghna Khatwani, Freya Selman, and Tarini Sehgal. And for their assistance in connecting Advisors to the project, we also thank the Youth Café at Sussex Partnership NHS Foundation Trust, User Voice and Participation Group at Surrey County Council, and the It's Ok To Talk initiative at Sangath NGO.

Funding Sources

This work was supported by a Wellcome Trust, United Kingdom Mental Health Priority Area "Active Ingredients" commission awarded to Dr Daniel Michelson (PI) at the University of Sussex.

Supplementary Data

Supplementary data related to this article can be found at <http://doi.org/10.1016/j.jadohealth.2022.05.005>.

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