Review Article

Mental health and unemployment: A systematic review and meta-analysis of interventions to improve depression and anxiety outcomes

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ABSTRACT

Background: Unemployment is associated with substantially greater depression and anxiety, constituting a considerable public health concern. The current review provides the most comprehensive synthesis to date, and first meta-analysis, of controlled intervention trials aimed at improving depression and anxiety outcomes during unemployment.

Methods: Searches were conducted within PsycInfo, Cochrane Central, PubMed and Embase from their inception to September 2022. Included studies conducted controlled trials of interventions focused on improving mental health within unemployed samples, and reported on validated measures of depression, anxiety, or distress (mixed depression and anxiety). Narrative syntheses and random effects meta-analyses were conducted among prevention- and treatment-level interventions for each outcome.

Results: A total of 39 articles reporting on 33 studies were included for review (sample sizes ranging from 21 to 1801). Both prevention and treatment interventions tended to be effective overall, with treatment interventions producing larger effect sizes than prevention interventions. The clearest evidence for particular intervention approaches emerged for prevention-level Cognitive Therapy/CBT, followed by prevention-level work-related interventions, although neither produced entirely consistent effects.

Limitations: Risk of bias was generally high across studies. Low numbers of studies within subgroups precluded any comparisons between long-term and short-term unemployment, limited comparisons among treatment studies, and reduced the power of meta-analyses.

Conclusions: Both prevention- and treatment-level mental health-focused interventions have merit for reducing symptoms of anxiety and depression among those experiencing unemployment. Cognitive Therapy/CBT and work-related interventions hold the most robust evidence base, which can inform both prevention and treatment strategies implemented by clinicians, employment services providers, and governments.

1. Introduction

Employment plays a critical role in not only satisfying core survival needs through financial security, but also in satisfying other basic human needs (including time structure, purpose, and social connection) that are fundamental to positive mental health and wellbeing (Creed and Macintyre, 2001; Paul and Batinic, 2010; Paul et al., 2009). It is therefore unsurprising that considerable research indicates a strong association between unemployment and common mental health issues such as depression and anxiety (McKee-Ryan et al., 2005; Nam et al., 2021; Paul and Moser, 2009; Zuelke et al., 2018). Evidence suggests that unemployment both leads to increased anxiety and depression, and that

heightened anxiety and depression can, in turn, predict future unemployment (Andreeva et al., 2015; McKee-Ryan et al., 2005; Olesen et al., 2013; Paul and Moser, 2009; Stolove et al., 2017). The risk of depression, anxiety and suicide is particularly high among those with a longer duration of unemployment (McKee-Ryan et al., 2005; Milner et al., 2013; Paul and Moser, 2009), with rates of diagnosed depression estimated to be as high as 50 % for those experiencing long-term ($\geq$12 months; OECD, 2016) unemployment (Nurmela et al., 2018).

Unemployment became a particularly prominent public health concern in the wake of the COVID-19 pandemic (International Labour Organization, 2021; Xiong et al., 2020), where coupled with the added strains of social distancing measures and an uncertain economic

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recovery, rates of severe psychological distress among those who lost their job were estimated to be as high as 8.4 times greater than for those who continued working as normal (Griffiths et al., 2021). Adding to this concern are findings that unemployment is associated with delayed impacts on mental health and suicide even many years afterward (Fountoulakis et al., 2014; Pharr et al., 2012; Strandh et al., 2014). Both prevention and treatment programs are critical to interrupting potential long-term and entrenched impacts of unemployment, and understanding which mental health interventions are effective for this population is key to informing such strategies.

Many interventions conducted within unemployed populations have a primary goal of improving re-employment or other job-related outcomes, which may in turn impact secondary mental health outcomes. Indeed, some past systematic reviews and meta-analyses reflect this focus on vocational interventions and/or outcomes, including quite limited coverage of the effects on mental health outcomes (Audhoe et al., 2010; Frederick and VanderWeele, 2019; Hult et al., 2020; Kinoshita et al., 2013; Mawn et al., 2017; van Rijn et al., 2016). Other systematic reviews have placed greater emphasis on mental health interventions and outcomes (Celume and Korda, 2021; Hollederer, 2019; Koopman et al., 2017; Moore et al., 2017), generally finding evidence for improvements in mental health for at least some types of interventions, and particularly in the short-term. However, these past reviews have not conducted meta-analyses for intervention effects on mental health, on the basis of reported heterogeneity between studies or insufficient data reported within studies. These reviews focused exclusively on mental health prevention or promotion interventions, and methodological decisions either limited the retrieval and comparison of depression and anxiety outcomes, included uncontrolled studies, or only included randomized controlled studies. Furthermore, different conclusions were possible among these reviews regarding the effectiveness of certain interventions for depression and anxiety—for instance, mixed (Moore et al., 2017) versus consistent beneficial (Hollederer, 2019) effects for CBT, and consistent beneficial (Moore et al., 2017) versus partial beneficial (Hollederer, 2019) or consistent non-significant (Koopman et al., 2017) effects for work-focused interventions. By tailoring the search strategy and inclusion criteria to specifically target depression and anxiety outcomes while including all controlled intervention studies, it may be possible to retrieve sufficient studies to provide more nuanced comparisons between different outcomes, interventions, and sample types; conduct meta-analyses among suitably homogenous subsets of studies; and thereby help to clarify the mixed findings of past reviews.

Using a PICOT framework, the current systematic review aims to determine whether diverse mental health-focused interventions (compared to any control group) are effective in reducing depression and anxiety for people experiencing unemployment, within all available timeframes. This review intends to build on the literature by conducting the first meta-analyses on comparable effects in this field, and examining the efficacy of interventions within samples not experiencing clinical mental health issues (considered here as 'prevention'-level interventions) as well as experiencing clinical mental health issues (considered here as 'treatment'-level interventions). Inclusion of both levels of intervention was considered essential to reflecting population variability in mental health. Given the recent surge in e-health interventions and their potential to minimize access barriers common during unemployment (e.g., stigma, cost, a shared space for intervention delivery; Muñoz, 2010; Pharr et al., 2012; Staiger et al., 2018), this review also aims to assess the availability and efficacy of such interventions used within this population. Where possible, comparisons will be made between different types of interventions, and between short-term and long-term (< or ≥ 12 months) unemployed samples.

2. Methods

2.1. Search strategy and selection criteria

The systematic review was conducted in line with PRISMA guidelines (Page et al., 2021) and was prospectively registered with PROSPERO (CRD 42021240795). Literature searches were last conducted on the 21st of September 2022 using four electronic databases (PsycInfo, Cochrane Central Register of Controlled Trials, PubMed, and Embase). Three blocks of terms were combined, pertaining to (a) an unemployed population (e.g., "unemploy*", "out of work"), (b) a controlled study design (e.g., "controlled stud*", "RCT"), and (c) mental health outcomes (e.g., "anxiet*", "depressi*"). See Supplementary materials (Table S1) for a complete list of search terms used for each database. No language or date restrictions were applied, but where possible, results were filtered to include peer-reviewed original research articles on adult human populations using relevant methodologies. Reference lists of the final included studies and relevant past reviews (Audhoe et al., 2010; Celume and Korda, 2021; Creed et al., 1998b; Frederick and Vander-Weele, 2019; Hollederer, 2019; Hult et al., 2020; Kinoshita et al., 2013; Koopman et al., 2017; Mawn et al., 2017; Moore et al., 2017; Paul and Moser, 2009; van Rijn et al., 2016) were searched for additional relevant papers.

Included studies were controlled trials (randomized or non-randomized), drawing participants from adult samples of unemployed people with or without clinical mental health problems. Samples were excluded if they contained underemployed participants, those employed but on sick leave, or those unavailable for work or not in the workforce (e.g., prisoners, inpatients). Included interventions were those using a theoretical framework that supported a direct effect on mental health, defined by either including a core mental health-focused component within the intervention itself, or listing mental health as a primary outcome. Outside of this criterion, included interventions were defined in a way that was intentionally broad, involving any method of delivery (e.g., synchronous or asynchronous interaction, individual or group-administered). This was intended to maximize the retrieval of mental health-focused intervention trials within the review's scope and maximize the potential for grouping studies by comparable types of interventions and therapeutic content. No restrictions were placed on the type of control group used. Included outcomes were validated multi-item scales of depressive or anxiety symptoms or validated indices of caseness, including measures of psychological distress comprised of combined depression and anxiety symptoms. All studies were published in peer-reviewed journal articles.

We note one deviation from the PROSPERO protocol regarding the age of included study participants. While we intended to include studies with participants aged exclusively ≥18 years, we broadened this criterion to include samples with a reported mean, mode or median for age ≥18. This allowed for a more comprehensive review capturing relevant studies predominantly focused on adults, despite the age range of participants including those in the workforce <18 years.

2.2. Study selection

Fig. 1 outlines the flow of studies from identification to final selection. All identified studies were uploaded onto Covidence systematic review software (Veritas Health Innovation, 2022). Duplicates were removed before a subset of 20 % of titles and abstracts were independently double-screened by AA and SM. Strong interrater reliability was achieved ($\kappa = 0.89$) and disagreements were resolved through discussion, before all remaining titles and abstracts were screened by either AA or SM. Full-text articles were all double-screened by AA and either SM or SS, with any disagreements resolved in discussions with MD. When full-texts were unavailable or core information was unclear within the articles, attempts were made to contact study authors for access to papers or clarification. At this stage, 2 articles written in German were
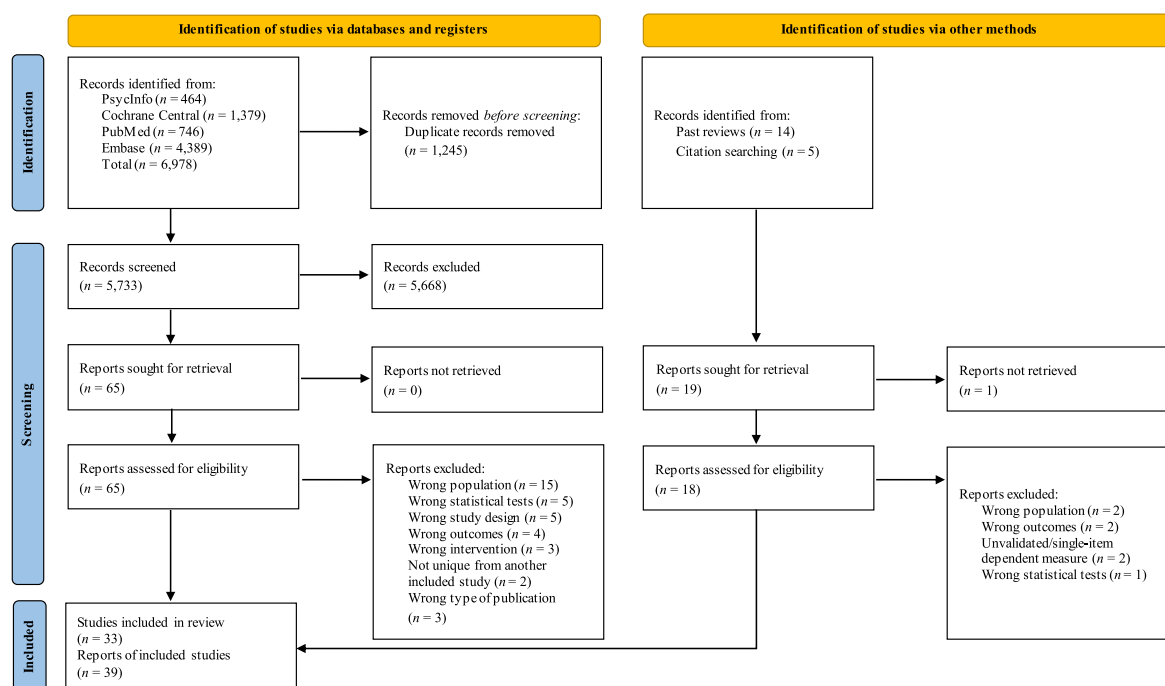
Fig. 1. PRISMA flow chart.

translated into English using Google Translate, with any unclear expressions cross-checked with other online translators. Both articles were excluded without disagreement.

2.3. Data extraction

Data extraction was conducted independently in duplicate by AA and either SS or DW within Covidence, recording: authors, year of publication, country and region, study design, participant eligibility and duration of unemployment, sample size and characteristics (gender, age), intervention details (name, delivery method, duration, focus), control group, outcome measures, follow-up periods, main findings, and moderation analyses. Any disagreements were cross-checked with the original article and consensus was reached through discussion where necessary. Included articles were checked for redundancy, and multiple articles reporting on the same study were included and combined as a single row where such articles each provided unique information. In one such case where different tests of the same question were available (Caplan et al., 1989; Price et al., 1992; Vinokur et al., 1991), the most fully-adjusted analyses were prioritized for extraction (in this case, those which accounted for baseline levels of outcomes when comparing between groups). Overall, five studies reported multiple relevant measures of the same outcome (Carlier et al., 2018; Dambrun and Dubuy, 2014; Himle et al., 2014; Merakou et al., 2019; Saam et al., 1995), in which results were retained for the measure that was most used or most comparable among the full set of included studies. While this approach does not account for potentially disparate results between different measures of the same outcome, it maximizes comparability between study effects and reduces heterogeneity (which was a priority for this sample of studies). Efforts were made to contact authors for further details when insufficient data was available for meta-analyses.

2.4. Risk of bias assessment

Risk of bias assessment of the final included studies was conducted using the Cochrane Collaboration's Risk of Bias (RoB) 2 tool (Sterne et al., 2019) for randomized trials, and ROBINS-I tool for non-randomized trials (Sterne et al., 2016). The RoB 2 tool is a structured framework that assesses five domains of bias: randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result. Reviewers answer a series of questions that estimate the risk of bias in each of these five domains for each study, and the RoB 2 algorithmically proposes a risk of bias score for each domain as either 'low', 'some concerns', or 'high'. The ROBINS-I functions similarly to the RoB 2, using slightly different risk of bias domains: confounding, participant selection, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, selection of reported result. Risk of bias within each domain is classified as 'low', 'moderate', 'serious', 'critical' or 'no information'. For both tools, the overall risk of bias for each study is equivalent to the highest risk of bias classification reached in any single domain. Assessments for each included study were independently conducted by both MH and DC, with initial interrater reliability being substantial overall ($\kappa = 0.65$), although all disagreements were resolved through discussion and consensus with both assessors and AA.

2.5. Data synthesis and statistical analysis

A narrative synthesis approach was first undertaken to assess trends across the entire set of included studies with comparable outcomes (depression, anxiety and distress) and level of intervention (prevention and treatment), for the earliest reported follow-up. Where available, narrative syntheses were then conducted for subgroups with comparable intervention types (e.g., work-related, CBT, guided, unguided) and duration of unemployment (short-term or long-term). Given the use of diverse follow-up periods, differences in the trends at different time-points (posttest, <6-month follow-up, ≥6-month follow-up) were also considered.

Where a minimum of two studies with sufficient data were available within each of the above categories (Higgins et al., 2022), meta-analyses were conducted to estimate pooled effects using Comprehensive Meta-Analysis 3.0 software (Borenstein et al., 2013). Effect sizes with 95 % confidence intervals were calculated as standardized mean differences (Cohen's d) between intervention and control groups. Effect sizes of 0.2, 0.5, and 0.8 considered small, medium, and large, respectively (Cohen,

2013). Any combination of available datapoints reported in publications that could be used to calculate Cohen's *d* within Comprehensive Meta-Analysis software were sufficient for analyses, and further information was requested from authors where insufficient data were reported. In one case where multiple interventions within the same category (CBT with and without physiological feedback) were tested against a single control group (Botella et al., 2016), recommended guidelines for avoiding unit-of-analysis issues were followed (Higgins et al., 2022), by combining both intervention groups' data using the appropriate formulae (chapter 6.5.2.10).

Random effects models were employed to allow for variation between studies, particularly since a relatively high level of heterogeneity was anticipated among the included studies. For each meta-analysis conducted, heterogeneity was considered using the I^2 statistic, with values of 25 % considered small, 50 % considered moderate, and 75 % considered large. The described subgroup analyses were well-positioned to probe for underlying causes of high heterogeneity, and sensitivity analyses were also conducted to assess the stability of the meta-analytic results while excluding studies at high/serious risk of bias. All subgroup analyses used a single pooled estimate of tau-squared (between-study variance) rather than separate estimates for each subgroup, which is recommended particularly when subgroup sizes are low (Borenstein et al., 2011). Potential publication bias was assessed by visually inspecting funnel plots and running Egger's Test (using a recommended criterion of $p < .10$; Egger et al., 1997) for meta-analyses containing at least 10 studies (Sterne et al., 2011). If Egger's Test was significant, Duval and Tweedie's trim and fill method was employed to estimate and impute potential unpublished effects to assess their impact on the pooled effect size and significance (Duval and Tweedie, 2000).

3. Results

3.1. Study characteristics

Searches returned a total of 6978 articles, and 19 articles were identified through reference lists of included studies (see Fig. 1). After removing duplicates, screening titles, abstracts and full-texts, and checking for redundant studies, a total of 39 articles reporting 33 unique studies were ultimately selected for review. Sample sizes ranged from 21 to 1801. Table 1 provides a summary of extracted data for each study.

The majority of selected studies were conducted in the USA ($n = 15$) and Australia ($n = 8$), included a broadly aged sample ($n = 28$), and included a duration of unemployment that could not be categorized as exclusively long- or short-term ($n = 24$). A randomized controlled trial (RCT) design was used in 13/23 prevention studies and all 10 treatment studies. Prevention intervention types consisted of work-related ($n = 10 + 1$ work-related/supported employment), CT/CBT ($n = 7$), and one each of emotion competencies, physical health, imagery, positive psychology, and mindfulness. A majority were exclusively guided ($n = 17$), with one exclusively unguided intervention; and a majority were exclusively group-administered ($n = 12$), with a small number of exclusively individual-administered ($n = 4$) interventions. They assessed distress ($n = 14$), depression ($n = 13$), and anxiety ($n = 5$) outcomes. Treatment intervention types consisted of cognitive remediation ($n = 4$), CT/CBT ($n = 2$), and one each of physical health, paid work, mindfulness, and supported employment. A majority were exclusively guided interventions ($n = 9$), with a small number of exclusively individual- ($n = 3$) or group-administered ($n = 1$) interventions. They assessed distress ($n = 6$), depression ($n = 5$), and anxiety ($n = 2$) outcomes.

A broad range of measures were used to assess outcomes, with forms of the GHQ ($n = 9$), PANSS-Depression/Dysphoria ($n = 5$) and SF Survey ($n = 4$) being the most common for distress, forms of the BDI ($n = 5$) and HSCL ($n = 4$) being the most common for depression, and the DASS ($n = 2$) and STAI-State ($n = 2$) being the most common for anxiety. Four studies reported outcomes pertaining to caseness in addition to

dimensional outcomes (Caplan et al., 1989; Himle et al., 2014; Proudfoot et al., 1997; Vinokur et al., 1995); however, all but one were based upon dichotomization of self-report scales rather than formal diagnostic interview. These findings did not enable an effective synthesis of the presence or absence of diagnosis, and are therefore not described below.

3.2. Risk of bias assessment

The risk of bias of the included studies was rated as quite high overall. Among the 23 RCTs assessed using the RoB 2, 13 (57 %) were classified overall as having 'some concerns', and 10 (43 %) were classified as 'high risk' (see Table 2). No study was classified as 'low risk' owing to domain 5 of the tool (selection of the reported result), given that trial protocols listing pre-specified analysis plans were unavailable. The RCTs also performed fairly poorly on domain 4 (measurement of the outcome), given the risk of bias inherent in using self-report outcome measures when participants are aware of their group allocation. All 10 non-RCTs were classified as having 'serious risk' of bias owing to domain 6 of the tool (measurement of outcomes), due to the same risk of bias inherent in using self-report outcome measures. The non-RCTs also performed poorly overall on domain 1 (confounding) due to limited control of potentially confounding variables, and domain 5 (missing data) due to limited evidence that results were robust against missing data. Given that all non-RCTs were classified as 'serious risk' of bias, all sensitivity analyses that excluded studies with high/serious risk of bias included RCTs only.

3.3. Prevention-level interventions

3.3.1. Depression outcomes

At the earliest available timepoint for the 13 prevention studies assessing depression outcomes (Barry et al., 2006; Botella et al., 2016; Caplan et al., 1989; Creed et al., 1996a; Dambrun and Dubuy, 2014; Della-Posta and Drummond, 2006; Harry and Tiggemann, 1992; Howe, 2022; Joseph and Greenberg, 2001; Muller, 1992; Rife and Belcher, 1994; Vinokur et al., 1995; Vuori et al., 2002),[1] five (38 %) reported interventions that performed significantly better than controls (positive effects). A meta-analysis of 10 studies with sufficient data produced a significant, small overall positive effect; $I^2 = 74.37$ % (see Fig. 2 for all prevention-level meta-analyses). Heterogeneity was very close to the high cut-off within this subgroup of studies. This meta-analysis contained sufficient studies to examine potential publication bias. The funnel plot suggested potential publication bias (see Fig. 3), and Egger's Test met the recommended criterion of significance ($p = .079$). Implementing Duval and Tweedie's trim and fill method suggested imputing five values to correct the asymmetry of the funnel plot, reducing the pooled effect size which became non-significant; $d = 0.11$, 95 % CI = −0.08–0.30. A sensitivity analysis excluding studies at high/serious risk of bias ($n = 4$ studies with some risk of bias) decreased the overall effect size but remained significant; $d = 0.17$, 95 % CI = 0.03–0.30, $p = .016$, $I^2 = 45.30$ %.

Among the nine studies examining work-related interventions (Barry et al., 2006; Caplan et al., 1989; Creed et al., 1996a; Harry and Tiggemann, 1992; Howe, 2022; Muller, 1992; Rife and Belcher, 1994; Vinokur et al., 1995; Vuori et al., 2002), four (44 %) reported a significant positive effect, and a meta-analysis of seven studies produced a significant, small positive effect; $I^2 = 79.08$ %. Heterogeneity was high within this subgroup of studies. A sensitivity analysis excluding studies at high/serious risk of bias ($n = 3$ studies with some risk of bias) decreased the effect size but remained significant; $d = 0.17$, 95 % CI = 0.01–0.33, $p = .034$, $I^2 = 62.84$ %. Among the two studies examining CT/CBT

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[1] Studies that are reported on within multiple articles are referred to in text by the first relevant article cited in Table 1 (i.e., the article pertaining to that study that was published first).

Table 1
Characteristics of included studies.

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
Prevention-level interventions					
Caplan et al. (1989), Vinokur et al. (1991), Price et al. (1992); USA (Michigan); RCT; RoB: High risk; *N* = 928; 1-month FU: 74.7 %; 4-month FU: 67.7 %; 28-month FU: 65.8 %	Unemployed for <4 months; eligible/ applying for unemployment compensation; not within 2 years of retirement; not expected to be recalled to previous job; no obvious signs of mental illness; no preference for one condition over the other. Total: 54%F; *M*~age~= 35.9 (10.6); DU *M(SD)* = 13 (9) weeks.	Work-Related. Applied problem-solving and decision-making; inoculation against setbacks; social support and positive regard from trainers; job search skills. DB: Pairs of skilled male/ female trainers DM: Face-to-face in groups DR: 2 weeks (eight 3-hour training sessions)	VSAU. Information booklet on job-seeking tips, equivalent to 2.5 single-spaced pages of text.	Depression (HSCL) 1-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression. 4-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression. 28-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression. Anxiety (HSCL) 1-month FU: Intervention did not significantly predict anxiety. 4-month FU: Intervention did not significantly predict anxiety.	Depression (1, 4 and 28-month FU): Intervention is almost exclusively effective for those with high risk for depression. NS: Re-employment. Anxiety (1 and 4-month FU): NS: Re-employment.
Rife and Belcher (1994); USA; RCT; RoB: Some concerns; *N* = 52; Posttest: 100 %	Older unemployed workers (aged 50+); seeking employment; voluntarily applied for employment assistance services; not unemployed due to physical or mental disabilities. Total: 44%F; *M*~age~= 58 (82 % <62 years); DU not reported.	Work-related. Job search skills; peer support and information on job leads; facilities to contact employers. DB: Workshop facilitators, peers, self-administered. DM: Face-to-face in groups DR: 12 weeks (one half-day workshop, meetings two afternoons/ week)	VSAU. State government and community agency program, including employment registration, information about job openings, job referrals.	Depression (GDS) Posttest: Intervention significantly predicted decreased depression.	–
Vinokur et al. (1995), Vinokur et al. (2000); USA (Michigan); RCT; RoB: Some concerns; *N* = 1801; 2-month FU: 80.1 %; 6-month FU: 87.1 %; 24-month FU: 79.4 %	Unemployed for <13 weeks; seeking work; not new to the labor market, on strike or expecting to be recalled for work; not within 2 years of retirement; no preference for one condition over the other; not very high on depression. Total: 55%F; *M*~age~= 36.20 (10.38); DU *M(SD)* = 4.11 (3.8) weeks.	Work-related. Sense of mastery; personal control; applied problem-solving and decision-making; inoculation against setbacks; social support and positive regard from trainers; job search skills and self-efficacy. DB: Pairs of skilled, job-seeking male/female trainers DM: Face-to-face in groups DR: 1 week (five 4-hour sessions)	VSAU. Information booklet on job-seeking tips, equivalent to 3 single-spaced pages of text.	Depression (HSCL) 2 and 6-month FU: Significant group × time interaction. Greater reductions in depression within intervention compared to control. 24-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression (+ demographics); $\beta = 0.06$.	Depression (2 and 6-month FU): Intervention only effective for those screened as high risk for depression (2 months $d = 0.20$; 6 months $d = 0.22$). NS: Intervention site, trainers, trainer experience. Depression (24-month FU): Those with lower baseline sense of mastery benefited more from the intervention ($\beta = 0.16$). NS: depression risk, job search motivation, all demographics.
Vuori et al. (2002), Vuori and Silvonen (2005); Finland; RCT; RoB: Some concerns; *N* = 1261; 6-month FU: 97.1 %	Unemployed or had received a termination notice and were searching for a job. Intervention: 76.8%F; Age range = 18–61, *M*~age~= 36.9 (8.6). Control: 78.7%F; Age range = 18–61, *M*~age~= 37.3 (8.6).	Work-related. Social modelling and support; inoculation against setbacks; job search skills, self-efficacy and motivation. DB: Pairs of skilled male/ female trainers DM: Face-to-face in groups DR: 5 days (one 4-hour session/day)	Active. Printed information on intervention content and guidance on employment services, managing unemployment and job-seeking.	Depression (HSCL-Finnish) 6-month FU: Intervention did not significantly predict depression, controlling for baseline depression (+ demographics); $\beta = -0.04$. 24-month FU: Intervention significantly predicted decreased depression, controlling for	Depression (6-month FU): NS: baseline risk for depression, job search intensity, short-term unemployment. Distress (6-month FU): Those with higher baseline risk for depression and more

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Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
24-month FU: 90.6 %	Total: DU *M(SD)* = 10.7 (17.3) months.			baseline depression (+ demographics); $\beta = -0.06$. Distress (GHQ-12) 6-month FU: Intervention significantly predicted decreased distress, controlling for baseline distress (+ demographics); $\beta = -0.06$.	recently unemployed benefited more from intervention (βs = −0.11 and −0.07, respectively). NS: job search intensity.
Howe (2022); USA (Michigan, Maryland); RCT; RoB: Some concerns; *N* = 1487; 12-month FU: 86.1 %	Unemployed for <15 weeks; seeking work; not on strike or expecting to be recalled for work; not within 2 years of retirement; below clinical cut-off for depression; part of a heterosexual marriage or cohabitating relationship for ≥4 months with a partner willing to participate. Total:%F not reported; Age range = 18–76, $M_{age=}$ 38; DU not reported.	Work-related (+ control). Couples Employment Program. Meeting job loss challenges as a couple; communication skills; job search skills and motivation; sense of mastery; family finances. DB: Pairs of skilled male/female trainers DM: Face-to-face in groups DR: 10 days (8 sessions)	VSAU. Information book on coping with unemployment.	Depression (CES-D-Shortened) Over 12-month FU: Intervention did not significantly predict change in depression over the entire follow-up period (baseline, posttest, 6, 12-month FU), controlling for education, gender, gender × group; $\beta = 0.03$.	Depression (Over 12-month FU): Those with lower baseline job search behavior/motivation benefited more from intervention ($b = 0.10$). NS: Baseline depression, gender, sense of mastery, negative or positive couple communication.
Harry and Tiggemann (1992); Australia (South Australia); Non-RCT; RoB: Serious risk; *N* = 206; 1-month FU[c]: 62.6 %	Unemployed sole female parents receiving a Supporting Parent's Pension; interested in gaining entry/re-entry into workforce. Intervention: 100%F; $M_{age=}$ 35.8. Control: 100%F; $M_{age=}$ 33.7. Total: DU *Mo* = 1–5 years.	Work-related. Access to facilities; identifying skills; self-confidence; positive self-image; goal setting; thinking and communication skills; career planning. DB: Course trainers DM: Face-to-face in groups DR: 3 weeks and 2 days (full-time)	Inactive. Those interested in course, but waitlisted due to unavailability in their area at the time.	Depression (RDAS) 1-month FU[c]: Intervention did not significantly predict depression, controlling for baseline depression (+ demographics). Distress (GHQ-12) 1-month FU[c]: Intervention significantly predicted decreased distress, controlling for baseline distress (+ demographics).	–
Muller (1992); Australia (Queensland); Non-RCT; RoB: Serious risk; *N* = 39; Posttest: 92.3 %; 2-month FU: 64.1 %; 6-month FU: 76.9 %	Unemployed women registered with employment services; actively seeking work and keen to re-enter the workforce. Total: 100%F; Age range = 22–55, $M_{age=}$ 38; DU >6 months.	Work-related. Self-esteem; stress management and assertion; psychoeducation; communication; identifying skills; goal setting; employer and industry visits; discussion of Job Clubs, SkillShare and vocational training options; job applications and preparation. DB: Unclear DM: Face-to-face DR: 1 week	Inactive. Waitlisted.	Depression (BDI-Long) Posttest: Intervention did not significantly predict depression, controlling for baseline depression. 2-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression. 6-month: Intervention did not significantly predict depression, controlling for baseline depression. Distress (GHQ-30) Posttest, 2-month FU, and 6-month FU: Intervention did not significantly predict distress at any FU, controlling for baseline distress.	–
Creed et al. (1996a), Creed et al. (1998a); Australia (Brisbane); Non-RCT; RoB: Serious risk; *N* = 133;	Unemployed; registered for work with the national employment agency; eligible for employment retraining courses. Intervention: 48%F; $M_{age=}$ 33; DU *Mo* = 89 % ≥6 months.	Work-related. Occupational skills training (minimum 60 %, e.g., computer skills); personal development training (grooming, communication, interview preparation). DB: SkillShare center	Inactive. Waitlisted.	Depression (BDI-Short) Posttest and 3-month FU: Significant group × time interaction. Greater reductions in depression within intervention compared to control. Posttest: Intervention significantly	Depression (Posttest): Intervention only significantly decreased depression for those with high baseline depression. Distress (Posttest): NS: High baseline distress.

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Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
Posttest: 100 % 3-month FU: 68.4 %	Control: 44%F; $M_{age=}$ 33 DU *Mo* = 100 % ≥6 months.	trainers DM: Face-to-face in groups DR: 4−7 weeks		predicted decreased depression. 3-month FU: Intervention did not significantly predict depression. Distress (GHQ-12) Posttest and 3-month FU: Significant group × time interaction. Greater reductions in distress within intervention compared to control. Posttest: Intervention significantly predicted decreased distress. 3-month FU: Intervention did not significantly predict distress.	
Creed et al. (1996b); Australia (Queensland); Non-RCT; RoB: Serious risk; $N = 82^d$; Posttest: Unclear [d]	Unemployed youth meeting selection criteria for Youth Conservation Corps courses. Intervention: 33%F; $M_{age=}$ 18.76. Control: 48%F; $M_{age=}$ 18.81. Total: DU >6 months.	Work-related. Occupational, social and life skills training. DB: Youth Conservation Corps, experienced trades people DM: Face-to-face in groups DR: 16 weeks (full-time)	Inactive. Waitlisted.	Distress (GHQ-12) Posttest: Intervention did not significantly predict distress, controlling for baseline distress.	Distress (Posttest): NS: Neuroticism.
Barry et al. (2006), Reynolds et al. (2010); Ireland (Donegal, Sligo, Leitrim), Northern Ireland (Londonderry Derry); Non-RCT; RoB: Serious risk; $N = 352$; 4-month FU: Not reported 12-month FU: 56.0 %	Unemployed; aged 18–65 years; ready to begin work or training. Intervention: 70.4%F; $M_{age=}$ 34.77 (11.78); DU *M(SD)* = 5.06 (5.80) years. Control: 48.9%F; $M_{age=}$ 33.02 (10.87); DU *M(SD)* = 3.09 (4.05) years.	Work-related. Self-efficacy; supportive learning environment; inoculation against setbacks. DB: Pairs of skilled male/ female trainers DM: Face-to-face in groups DR: 2 weeks (5 half-day workshops, total 20 h)	VSAU. Standard training courses offered by local training and employment offices.	Depression (HSCL) 4-month FU: Intervention did not significantly predict depression, controlling for baseline depression (+ all other outcomes, demographics). 12-month FU: Intervention did not significantly predict depression, controlling for baseline depression (+ all other outcomes, demographics); $\beta = -0.05$.	–
Carlier et al. (2018); Holland (Rotterdam); Non-RCT; RoB: Serious risk; $N = 434$ Posttest: 36.4 %	Receiving unemployment benefits; deemed capable of employment by social service officer; recently referred to a re-employment program by local employment center. Intervention: 59.7%F; $M_{age=}$ 38.1 (7.7); DU *Mo* = 39.8 % 1−5 years Control: 51.8%F; $M_{age=}$ 42.2 (8.4); DU *Mo* = 53.8 % >5 years	Work-related/ Supported Employment. Interdisciplinary 'train then place' program. Individual assessment; addressing barriers to paid employment; coaching and cognitive counselling; tailored job search support; voluntary work placement. DB: Mental health professionals, social workers, employment specialists DM: Unclear DR: Up to 2 years	VSAU. Various programs not involving individualized guidance by interdisciplinary team. Included voluntary work, physical activity, life coaching. Duration up to 1 year.	Distress (SF-12-MCS) Posttest: Intervention did not significantly predict changes in distress; $\beta = 1.38$.	–
Saam et al. (1995); USA (midwestern city); RCT; RoB: Some concerns;	Middle- to upper-level managers who had lost their job within the prior week; were sponsored in individual outplacement programs. Intervention: 25%F. Control: 13.6%F.	CT/CBT. Psychoeducation; monitoring, refuting and reframing irrational cognitions about stressful events; job search skills. DB: 1 outplacement	TAU/VSAU. General stress management advice given by outplacement counsellors; job search skills.	Anxiety (STAI-state) 2 week FU: Intervention significantly predicted decreased anxiety, controlling for baseline anxiety; effect size = 0.89 SD difference between groups.	–

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
N = 42; 2 week FU: 100 %	Total: Age range = 35–56, *M*~age~= 46; DU <1 week.	counsellor DM: Face-to-face individually, homework exercises DR: 4 weeks (1–2 h counselling/ week, daily 20-min homework)			
Proudfoot et al. (1997); England (London); RCT; RoB: High risk; *N* = 244; Posttest: 85.7 % 3–4-month FU: 75.0 %	Long-term unemployed professionals (managerial, administrative, professional, technical or sales job classifications). Total: 17%F; Age range = 23–62, *M*~age~= 43. Intervention: DU *M* = 25.8 months. Control: DU *M* = 23.1 months.	CT/CBT. Eliciting, recording, and testing the validity of thoughts; reattribution; behavioral monitoring; experimentation; applying techniques to job-seeking. DB: 2 psychologists (1 investigator, 1 co-trainer) DM: Face-to-face in groups; individual homework exercises DR: 7 weeks (one 3-hour session/ week)	Active. Social support program, building social and professional networks.	Distress (GHQ-30) Posttest; 3–4-month FU: Intervention significantly predicted decreased distress, controlling for baseline distress.	–
Harris et al. (2002); Australia (Sydney); RCT; RoB: High risk; *N* = 195; 3–4-month FU: 51.3 %	Unemployed job seekers aged 18–45 years; had "barriers" to employment (e.g., limited education/ training, risk factors for long-term unemployment); no major drug/alcohol problem or psychiatric disorder. Total: 50%F; *M*~age~= 35 (9.8); DU *M(SD)* = 39 (50.2) months.	CT/CBT. Cognitive restructuring; problem solving; breathing and relaxation techniques. DB: 2 facilitators (including a clinical psychologist) DM: Face-to-face in groups DR: 2 days (11 h)	VSAU. 2-day first aid certification course, matched in time to CBT program.	Distress (SF-36-MCS) 3–4-month FU: Intervention did not significantly predict distress, controlling for baseline distress (+ self-esteem).	–
Della-Posta and Drummond (2006); Australia (Western Australia); RCT; RoB: High risk; *N* = 39; Posttest: 100 %	Unemployed workers' compensation clients receiving rehabilitation; ready and able to work; referred for a Job Search program to find employment with a new employer. Intervention: 42.1%F; Age range = 19–60, *M*~age~= 43.4 (9.8); DU unclear. Time since original injury *M(SD)* = 62.5 (45.8) weeks. Control: 20%F; Age range = 19–60, *M*~age~= 37.7(11.0) DU unclear. Time since original injury *M(SD)* = 65 (45.8) weeks.	CT/CBT (+ control). 4 Job Search sessions on goal setting, job search and application, handling rejection; 4 CBT sessions on stress reduction, planning pleasant activities, communication, thought patterns. DB: Vocational rehabilitation provider; CBT manual developed by lead author. DM: Face-to-face in groups DR: 4 weeks (eight 2-hour sessions)	VSAU. Standard Job Search program (4 Job Search sessions followed by 4 additional sessions to practice learnt strategies).	Depression (DASS-Depression) Posttest: Non-significant time × group interaction. Anxiety (DASS-Anxiety) Posttest: Significant time × group interaction. Greater reductions in anxiety within intervention compared to control. Distress (DASS-Stress) Posttest: Significant time × group interaction. Greater reductions in distress within intervention compared to control.	–
Botella et al. (2016); Spain; RCT; RoB: Some concerns; *N* = 60; Posttest: 91.7 % 3-month FU: 88.3 %	Unemployed men aged 18–65 years; suffering financial and family stress; BDI-II score <19; no personal or family history of depression/ psychosis; no epilepsy, heart conditions, daily recreational drug use, use of sleep/ cardiovascular medication. Total: 0%F; *M*~age~= 32.35 (9.55); DU *M* = 15.3 months.	CT/CBT: CCBT. Coping skills; behavioral activation. DB: Self-administered DM: Individual, internet-based DR: 6–10 weeks CT/CBT: CCBT + physiological sensors. As above, with additional physiological monitoring and feedback.	Inactive. No treatment between pre and post-test (10 weeks)	Depression (BDI-II) Posttest: Interventions did not significantly predict depression, controlling for baseline depression. Anxiety (OASIS) Posttest and 3-month FU: No significant time × group interaction; unadjusted *d* (baseline to follow-up) CCBT = 0.44, CCBT+S = 0.37, Control = 0.08.	–

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
Creed et al. (1999); Australia (Brisbane); Non-RCT; RoB: Serious risk; *N* = 65; Posttest: 92.3 % 4-month FU: 49.2 %	Long-term unemployed young people living in a metropolitan area; eligible for government sponsored labor market training programs Total: 46%F; Age range = 16.9–23.8, M_{age}= 19; DU ≥1 year	CT/CBT. Coping skills for unemployment-related emotional problems; automatic/distorted thinking; optimistic explanatory styles. DB: Trained, registered psychologists DM: Face-to-face DR: 3 days (5 h/day)	Inactive. Waitlist.	Distress (GHQ-12) Posttest: Intervention significantly predicted decreased distress, controlling for baseline distress (+ recreation coping). 4-month FU: Significant time (posttest, FU) × group interaction, controlling for baseline distress. Scores reverted to baseline levels by FU.	Distress (Posttest): High baseline distress predicted greater benefit from the intervention.
Machin and Creed (2003); Australia (Queensland); Non-RCT; RoB: Serious risk; *N* = 182; Posttest: 70.9 %	Unemployed; attending occupational skills training in metropolitan area; registered for work with national employment agency; receiving unemployment benefits. Intervention: 87%F; Age range = 16–56, M_{age}= 32.63 (10.60); DU *M(SD)* = 36.71 (53.17) months. Control: 71%F; Age range = 18–54, M_{age}= 36.57 (11.15); DU *M(SD)* = 52.48 (77.30) months.	CT/CBT (+ control). Well-being and self-efficacy training prior to job skills course; based on CBT, self-management training and thought self-leadership training. DB: Private training providers DM: Unclear DR: 2 days pre-training	VSAU. Computer and administrative skills course (5 weeks full-time).	Distress (GHQ-12) Posttest: No significant time × group interaction.	–
Hodzic et al. (2015); Spain; RCT; RoB: Some concerns; *N* = 75; 2 week FU[e]: 100 %	Unemployed; motivated for intervention; no extensive knowledge of intervention content; no planned psychotherapy during study; no drug or alcohol abuse; no use of psycho-pharmaceuticals. Intervention: 92.7%F; M_{age}= 32.68 (10.34); DU *M* = 17.34 months. Control: 79.4%F; M_{age}= 36.4 (12.02); DU *M* = 16.35 months	Emotional Competences Training. Identifying and understanding emotions; regulation of one's own and others' emotions; conflict management. DB: 2 lecturers DM: Face-to-face in groups DR: 2 weeks (15 h over 3 days)	Inactive. Waitlist control.	Distress (GHQ-12) 2 week FU[e]: Intervention did not significantly predict distress, controlling for baseline distress.	Distress (2-week FU): NS: Unemployment duration.
Schuring et al. (2009); Holland (Rotterdam); RCT; RoB: High risk; *N* = 653; 6-month FU Intervention: 49.2 %	Unemployed; on social security benefits; partly attributed unemployment to chronic health problems (68 % determined to have chronic pain); declared capable of full-time employment by a physician, psychologist and employment specialist. Intervention: 49.8%F; Age range = 18–64, Mo_{age} = 52.8 % 18–44. Control: 48.4%F; Age range = 18–64, Mo_{age} = 52.9 % 18–44. Total: DU not reported.	Physical Health. Behavioral education (health-related insight, positive coping, self-esteem, social skills); physical activity; improving structured routine. DB: Prevention workers; physical education teachers DM: Face-to-face DR: 12 weeks (three 1- hour sessions/week)	VSAU. Non-health-related reorientation on employment and employability, enhancement of job search skills and efforts.	Distress (SF-36-MHS) 6-month FU: No significant effect of intervention, controlling for differences at baseline.	Distress (6-month FU): NS: participating in minimum of 70 % intervention sessions; participating in additional job search training during FU period.
Joseph and Greenberg (2001); USA (California); RCT; RoB: High risk; *N* = 52; 2-month FU: 92.3 %	Businesspeople unemployed for <6 months; no intent to work part-time (<30 h per week) or on contract (temporary); not in psychotherapy. Total: 40%F; Age range = 29–64,	Guided Imagery. Passive muscle relaxation; guided imagery of expressing emotions related to job loss, positive possible self, successful job interview and obtaining work, receiving spiritual guidance, positively reframing the job	Inactive. Guided imagery (through written instructions) of executing job search plans and activities. Time-matched with intervention.	Depression (CES-D) Posttest and 2-month FU: No significant group × time interaction.	–

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
	$M_{\text{age}=}$ 46.8; DU $M = 2.3$ months.	loss. DB: Lead author DM: Audio tape DR: 2 weeks (six 20-min sessions)			
Dambrun and Dubuy (2014); France; Non-RCT; RoB: Serious risk; *N* = 21; Posttest: Unclear 1 week FU: 81.0 %	Long-term unemployed; had previously been employed. Total: 52.4%F. Intervention: $M_{\text{age}=}$ 38; DU $M = 1.25$ years. Control: $M_{\text{age}=}$ 45; DU $M = 1.33$ years.	Positive Psychology. Altruism; gratitude; strengths-based goal setting; optimism. DB: Psychologist DM: Individual face-to-face, booklet exercises DR: 2 weeks (30 mins therapy/ week, plus self-paced exercises)	VSAU. Usual care provided by employment assistance association.	Depression (BDI-Short) Posttest and 1 week FU: Significant time × group interaction; $\eta^2 =$ 0.47. Greater reductions in depression within intervention compared to control. Posttest: Intervention group significantly decreased in depression, but control group did not. 1 week FU: No significant difference from posttest within intervention or control group (effect of intervention maintained). Anxiety (STAI-state) Posttest and 1 week FU: No significant time × group interaction overall; however, this was probed with more specific follow-up tests for each timepoint. Posttest: Significant time × group interaction; $\eta^2 =$ 0.38. Greater reductions in anxiety within intervention compared to control. 1 week FU: No significant difference from posttest (effect of intervention maintained).	–
Roemer et al. (2021); New Zealand; Non-RCT; RoB: Serious risk; *N* = 239; Posttest: 75.3 %	Unemployed members of a Defence Force program assisting youth to develop skills needed to enter the workforce. Total: Age range = 17–25; DU not reported. Intervention: 30.2%F; $M_{\text{age}=}$ 19.93 (2.03). Control: 40.4%F; $M_{\text{age}=}$ 20.13 (2.12).	Mindfulness (+ control). Mindfulness education and exercises. DB: Trained external instructor DM: Face-to-face in groups, self-administered DR: 4 weeks (one 1-hour session/ week; 10–15 min daily exercises)	VSAU. Regular Defence Force self-development camp. Skills workshops; team building; self-confidence; life skills; physical exercise.	Distress (K10) Posttest: Significant group × time interaction controlling for baseline mindfulness and wellbeing; $\eta_p^2 = 0.02$. Greater reductions in distress within intervention compared to control.	–

Treatment-level interventions

| McGurk et al. (2005); USA (New York); RCT; RoB: Some concerns; *N* = 44; Posttest: 79.5 % | Adults with SMI; not competitively employed; desire for competitive work; enrolled in supported employment program; prior job failure (getting fired or leaving a job held for <3 months before securing another). Total: 45%F; $M_{\text{age}=}$ 35.6 (10.7); DU $M(SD) = 42.28$ (33.87) months. | Cognitive Remediation (+ control). Cognitive training (e.g., attention); tailored job search planning; transferring cognitive skills to work; minimizing persisting impairments. DB: Cognitive training specialist DM: Face-to-face individually, computer-based | VSAU Supported employment. Searching for and retaining competitive employment in integrated community settings. | Distress (interview-based PANSS-Depression) Posttest: Intervention significantly predicted lower distress, controlling for baseline distress. | Distress (Posttest): NS: Treatment site. |

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
		DR: Approx. 12 weeks (24 h training)			
McGurk et al. (2009); USA (New York); RCT; RoB: Some concerns; N = 34; Posttest: 94.1 %	Adults with SMI; interest in obtaining work; prior job failure (getting fired or leaving a job before securing another). Intervention: 39%F; M_{age} 45.5 (9.58); DU M(SD) = 66.44 (75.10) months. Control: 44%F; $M_{age=}$ 42.44 (8.52); DU M(SD) = 63.44 (47.52) months.	Cognitive Remediation (+ control). Cognitive training (e.g., attention); weekly group discussions on work-related cognitive challenges and problem solving. DB: Cognitive training specialist DM: Face-to-face (partly group), computer-based DR: 3 months (approx. 24 h training)	VSAU/TAU Either time-limited competitively paid internships integrated at a hospital, or supported employment based on IPS; TAU.	Distress (interview-based PANSS-Depression) Posttest: No significant effect of intervention, controlling for baseline distress.	–
McGurk et al. (2016); USA (New York); RCT; RoB: Some concerns; N = 54; Posttest: 94.4 % 15-month FU: 64.8 %	Adults with SMI; in vocational rehabilitation for ≥3 months without employment or with unsuccessful ending of job lasting <3 months; no medical condition likely to result in significant decline in ability to work over the following 18 months. Intervention: 25%F; M_{age} 36.43 (10.01). Control: 34.6%F; M_{age} 39.04 (8.62). Total: DU *Mo* = 92 % <5 years	Cognitive Remediation (+ control). Cognitive training; individualized strategy coaching to improve cognitive performance and work-related behavior; job search planning. DB: Trained specialists integrated within vocational team. DM: Computer-based, face-to-face DR: 12 weeks (one or two 45–60 min session/week).	Active. Enhanced vocational rehabilitation, with usual providers trained on the impact and minimization of cognitive issues for those with SMI.	Distress (PANSS-Dysphoria) Posttest and 15-month FU: No significant group × time interaction effects, controlling for education and vocational rehabilitation program. Intervention did not significantly predict distress at both timepoints, controlling for baseline distress.	–
Twamley et al. (2019); USA (San Diego); RCT; RoB: High risk; N = 153; Posttest: 60.1 % 21-month FU: 38.6 %	Unemployed adult outpatients with SMI (mood and schizophrenia-spectrum disorders but no dementia or intellectual disability); stating a goal of work. Intervention: 44.2%F; M_{age}: 44.43 (11.17). Control: 76; 42.1%F; M_{age}: 42.96 (12.14). Total: DU ≥1 month.	Cognitive Remediation (+ control). Compensating for SMI-related cognitive difficulties (e.g., memory training). DB: A master's-level employment specialist DM: Face-to-face individual DR: 12 weeks (one 1-hour session/week).	VSAU/TAU. IPS, focused on individualized job searching and support within integrated mental health and employment services; TAU. Continued for duration of study.	Depression (HRSD) Posttest: Intervention significantly predicted decreased depression, controlling for baseline depression (+ diagnosis, treatment × diagnosis, demographics); η_p^2 = 0.063. Over 21-month FU: No significant group × time (baseline, posttest, 3, 9, 15, 21-month FU) interaction. Benefits at posttest were not maintained over FU.	Depression (Posttest, 3, 9, 15, and 21-month FU): NS: Diagnosis (mood vs schizophrenia/ schizoactive).
Fournier et al. (2009)[f]; USA (Pennsylvania, Nashville); RCT; RoB: Some concerns; N = 30 (17 % of total sample); Posttest: 84.4 %	Outpatients diagnosed with major depressive disorder (and no presence/history of several other psychiatric conditions, unresponsiveness to medication, high suicide risk); aged 18–70; scored ≥20 HRSD twice over 2 weeks. Total: 58%F; $M_{age=}$ 39.94 (11.55); DU not reported.	CT/CBT. Identifying, evaluating and responding to automatic or dysfunctional thoughts, emotions and beliefs; modifying beliefs. DB: 6 therapists, 3 at each of 2 sites DM: Face-to-face DR: 16 weeks (one or two 50-min sessions/ week)	Active. Antidepressant medication (primarily paroxetine) for 16 weeks (one 20–45-min session with psychiatrist/ week).	Depression (HRSD completed by independent evaluators) Posttest: Among unemployed participants, intervention significantly predicted decreased depression, controlling for baseline depression; d = 1.19.	–
Himle et al. (2014); USA (Detroit); RCT; RoB: Some concerns; N = 58; Posttest: 86.2 % 3-month FU: 72.4 %	Unemployed vocational service-seeking adults with social anxiety disorder; no drug use or active manic/ psychotic symptoms deemed to interfere with participation; no high risk of suicide/ homicide. Intervention: 31%F; Age range = 31–60, $M_{age=}$ 44.93 (6.19). Control: 34.5%F;	CT/CBT (+ control). Work-related CBT; psychoeducation, cognitive restructuring, exposure exercises, work-related social skills training. DB: Vocational services employees trained in CBT for anxiety DM: Face-to-face in groups	VSAU. Career assessment, résumé construction, interview skills, and job placement assistance.	Depression (PHQ-9)[g] Posttest: Intervention significantly predicted decreased depression, controlling for baseline depression. 3-month FU: Intervention significantly predicted decreased depression, controlling for baseline depression; d = −1.2.	–

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
	Age range = 19–60, M_{age} = 42.24 (10.21). Total: DU *Mo* = 55.17 % <1 year.	DR: 4 weeks (eight 2-hour sessions)		Anxiety (BAI)[g]h Posttest: Intervention significantly predicted decreased anxiety, controlling for baseline anxiety. 3-month FU: Intervention significantly predicted decreased anxiety, controlling for baseline anxiety; $d = -0.87$.	
Kneipp et al. (2011); USA (Florida); RCT; RoB: High risk; *N* = 432; Posttest: 66.0 %	Unemployed women aged 18–60 years; receiving welfare; have at least 1 chronic physical or mental health condition; not pregnant; not receiving disability income; did not move during the study Intervention: 100%F; M_{age} 28.8 (7.3). Control: 100%F; M_{age} 30.8 (8.9). Total: DU *Mo* = 82.7 % <1 year.	Physical Health. Individualized case management; health care knowledge and access; health education; stress management. DB: Public health nurse, community research assistants (Medicaid training only) DM: Face-to-face DR: 9 months (minimum four 1-hour case management meetings + one 2-hour Medicaid training session)	Inactive. Waitlisted for reduced intervention.	Depression (BDI-II) Posttest: Significant treatment × time (baseline, 3, 6, 9 months post-baseline) interaction. Greater reductions in depression within intervention compared to control, particularly at 3 and 6 months post-baseline.	–
Bell et al. (1993); USA (Connecticut); RCT; RoB: High risk; *N* = 77; Posttest: 100 %	Unemployed veterans diagnosed with schizophrenia or schizoaffective disorder; at a stable phase of disorder; no physical handicap or organic brain syndrome. Total: 7.5%F; M_{age} 40; DU not reported.	Paid Supported Employment. Paid, supervised supported work placement at a variety of work sites; weekly support groups. DB: Veterans Affairs Medical Centre and hospital staff DM: Face-to-face individual and group DR: 5 months (until posttest)	VSAU. Same opportunities and support as intervention, without pay.	Distress (PANSS-Depression) Posttest: Intervention significantly predicted decreased distress, controlling for baseline distress.	–
Mueser et al. (2004); USA (Connecticut); RCT; RoB: Some concerns; *N* = 204; Posttest: 81.4 %	Unemployed with SMI (Axis I or borderline personality disorder and severe psychosocial impairment); receiving services at a community mental health center; desire for competitive work. IPS: 38.2%F; M_{age} 41.7 (8.8); DU *Mo* = 42.6 % <5years. PSR: 40.3%F; M_{age} 41.1 (9.5); DU *Mo* = 29.9 % <5 years. Control: 36.2%F; M_{age} 40.9 (9.3); DU *Mo* = 40.6 % <5 years.	Supported Employment: IPS. Integration of vocational and psychiatric services; vocational/interest assessment; job-seeking and job support; employment held by client. DB: 3 employment specialists DM: Face-to-face DR: Up to 24 months Supported Employment: PSR. Vocational (clerical and janitorial) training; transitional, time-limited employment (held by program); support to obtain competitive work. DB: 3 PSR employees DM: Face-to-face DR: Up to 24 months	VSAU. Choice of standard supported employment or placement into janitorial jobs paying sub-minimum wage. All participants in the study had access to a drop-in center, support groups, recreational outings, and residential services.	Distress (PANSS-Depression) Posttest: No significant group (all conditions) × time (baseline, 6, 24 months post-baseline) interaction.	–
Merakou et al. (2019); Greece (Athens); RCT; RoB: High risk;	Long-term unemployed; requesting counselling after anxiety disorder diagnosis; no co-morbid chronic mental or physical diseases; not receiving unemployment or other (e.g., disability) benefits;	Mindfulness (+ control). Progressive muscle relaxation. Learning to relax certain muscle groups in one's body.	TAU. Counselling service as usual (delivered weekly). Waitlisted for intervention.	Depression (DASS-21-Depression)h Posttest: Intervention significantly predicted greater improvements in depression over time.	–

Table 1 (*continued*)

Author/s (year); location; design; risk of bias (RoB); baseline *N*; % retention	Participant eligibility; % female (F); age range, M (SD); duration unemployed (DU)	Intervention type; focus; delivered by (DB); delivery method (DM); duration (DR);	Control type[a]; description	Results by outcome (measure) and by follow-up (FU) period[b]	Moderators
N = 50; Posttest: 100 %	not on anti-anxiety, anti-depressant or alternative regimen. Intervention: 53.3%F; $M_{age=}$ 34 (6.4); DU *M(SD)* = 2.8 (2.9) years. Control: 55%F; $M_{age=}$ 32.8 (6.6); DU *M(SD)* = 3.3 (2.7) years.	DB: Professional trainer, CD recordings DM: Face-to-face in groups, self-administered individually DR: 2 months (four weekly 45-min sessions, followed by 4 weeks of twice-daily practice)		Anxiety (DASS-21-Anxiety)[h] Posttest: Intervention significantly predicted greater improvements in anxiety over time. Distress (SF-12-MCS)[h] Posttest: Intervention significantly predicted greater improvements in distress over time.	

Note. BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; CES-D = Center for Epidemiological Studies- Depression scale; CCBT = computerized cognitive behavioral therapy; CT/CBT = cognitive therapy/cognitive behavioral therapy; DASS = Depression Anxiety Stress Scales; GDS = Geriatric Depression Scale; GHQ = General Health Questionnaire; HRSD = Hamilton Rating Scale for Depression; HSCL = Hopkins Symptom Checklist; IPS = individual placement and support; K10 = Kessler Psychological Distress Scale; NS = Non-significant; OASIS = Overall Anxiety Severity and Impairment Scale; PANSS = Positive and Negative Syndrome Scale; PHQ = Patient Health Questionnaire; PSR = Psychosocial Rehabilitation; RCT = randomized control trial; RDAS = Rosenberg Depressive Affect Scale; SF-MCS = Short Form Health Survey- Mental Component Summary; SF-MHS = Short Form Health Survey- Mental Health Subscale; SMI = serious mental illness; STAI = State Trait Anxiety Inventory.

[a] Control groups were categorized as follows: Active = control intervention with a core mental health component; Inactive = no, delayed, or placebo intervention; TAU = mental health treatment as usual; VSAU = vocational services as usual, including information packages and skills training

[b] Follow-up period is consistently reported as time after posttest or the completion of the intervention, rather than time since baseline.

[c] An additional time point was tested only in the intervention group (posttest). Control outcomes were measured once, at 3-4 weeks after the duration of the course, and this data was used as the comparison for both intervention posttest and 1-month FU. Due to the overlapping control sample data, the most appropriate comparison to report is for the 1-month FU (these are also the most fully adjusted models).

[d] Baseline *N* not reported, but for *t*-tests of differences with non-completers, *df* = 201, implying there is possibly over 50 % attrition.

[e] An additional follow-up was conducted at 6 months, though this was not included in the table as no statistical tests were reported for this timepoint. Nonetheless, sufficient data was available for this timepoint to include it within the meta-analysis

[f] While the total sample in this study was not exclusively unemployed, relevant subset analyses were run on unemployed participants.

[g] Interaction terms were also tested between condition and time (posttest and 3-month FU), controlling for baseline (significant for depression and non-significant for anxiety). However, there may be multiple possible interpretations of these interactions without further verbal or visual description available, and as in the source paper, the focus is on describing the individual FU results.

[h] Authors state that effects were similar after adjusting for demographic variables.

interventions (Botella et al., 2016; Della-Posta and Drummond, 2006), one (50 %) reported a significant positive effect, and a meta-analysis of these two studies was non-significant; I^2 = 0 %. No sensitivity analysis could be conducted for this subgroup.

In comparing the effects found at different timepoints, 3/7 studies reported significant posttest effects (five studies were meta-analyzed; *d* = 0.69, 95 % CI = 0.42–0.97, *p* < .001, I^2 = 11.01 %), whereas 4/8 reported significant effects at <6 month follow-up (five studies were meta-analyzed; *d* = 0.19, 95 % CI = −0.03–0.40, *p* = .089, I^2 = 79.39 %), and 3/6 reported significant effects at 6+ months follow-up (four studies were meta-analyzed; *d* = 0.12, 95 % CI = −0.04–0.28, *p* = .132, I^2 = 0 %). It appears that overall, there was little evidence for sustained intervention effects.

3.3.2. Anxiety outcomes

At the earliest available timepoint for the five prevention studies assessing anxiety outcomes (Botella et al., 2016; Dambrun and Dubuy, 2014; Della-Posta and Drummond, 2006; Saam et al., 1995), 3 (60 %) reported significant positive effects. A meta-analysis of these five studies produced a significant, moderate positive effect; I^2 = 83.35 %. Heterogeneity among these studies was high. A sensitivity analysis excluding studies at high/serious risk of bias (*n* = 2 studies with some risk of bias) increased the effect size, although this became non-significant; *d* = 0.62, 95 % CI = −0.28–1.53, *p* = .177, I^2 = 78.03 %. Caution should therefore be taken when interpreting the overall effect.

Among the three studies examining CT/CBT interventions (Botella

et al., 2016; Della-Posta and Drummond, 2006; Saam et al., 1995), two (67 %) reported a significant positive effect, and a meta-analysis of these three studies produced a significant, moderate-large positive effect; I^2 = 63.08 %. The sensitivity analysis for this subgroup included the same two studies as above, which resulted in the same non-significant effect. Thus, caution should be taken when interpreting this effect.

In comparing the effects found at different timepoints, 2/3 studies reported significant posttest effects (all were meta-analyzed; *d* = 0.74, 95 % CI = 0.03–1.44, *p* = .040, I^2 = 62.34 %), whereas 2/4 reported significant effects at <6-month follow-up (all were meta-analyzed; *d* = 0.51, 95 % CI = −0.07–1.08, *p* = .085, I^2 = 80.59 %), and no studies reported outcomes at 6+ months follow-up. It appears that overall, there was little evidence for sustained intervention effects.

3.3.3. Distress outcomes

At the earliest available timepoint for the 14 prevention studies assessing distress outcomes (Carlier et al., 2018; Creed et al., 1996a; Creed et al., 1998a; Creed et al., 1996b; Creed et al., 1999; Della-Posta and Drummond, 2006; Harris et al., 2002; Harry and Tiggemann, 1992; Hodzic et al., 2015; Machin and Creed, 2003; Muller, 1992; Proudfoot et al., 1997; Roemer et al., 2021; Schuring et al., 2009; Vuori et al., 2002), seven (50 %) reported significant positive effects. A meta-analysis of 12 of these studies produced a significant, small overall positive effect; I^2 = 60.13 %. This meta-analysis contained sufficient studies to examine potential publication bias. The funnel plot suggested potential publication bias (see Fig. 4), and Egger's Test met the

Table 2

Risk of bias assessments for randomized and non-randomized controlled trials.

Randomized Controlled Trials: RoB 2

Study	Intervention	Outcome	D1	D2	D3	D4	D5	Overall
Caplan et al. (1989), Vinokur et al. (1991), Price et al. (1992)	P: Work-Related	Depression	+	+	!	!	−	−
		Anxiety	+	−	−	!	!	−
Rife and Belcher (1994)	P: Work-Related	Depression	!	!	+	!	!	!
Vinokur et al. (1995) Vinokur et al. (2000)	P: Work-Related	Depression	+	+	+	!	!	!
Vuori et al. (2002) Vuori and Silvonen (2005)	P: Work-Related	Depression, Distress	+	+	+	!	!	!
Howe (2022)	P: Work-Related	Depression	+	+	!	!	!	!
Saam et al. (1995)	P: CT/CBT	Anxiety	+	!	+	+	!	!
Proudfoot et al. (1997)	P: CT/CBT	Distress	+	−	!	+	−	−
Harris et al. (2002)	P: CT/CBT	Distress	!	−	!	!	!	−
Della-Posta and Drummond (2006)	P: CT/CBT	Depression, Anxiety, Distress	+	!	+	−	!	−
Botella et al. (2016)	P: CT/CBT	Depression, Anxiety	+	+	+	!	!	!
Hodzic et al. (2015)	P: Emotional Competences	Distress	!	+	+	!	!	!
Schuring et al. (2009)	P: Physical Health	Distress	+	−	!	+	!	−
Joseph and Greenberg (2001)	P: Guided Imagery	Depression	+	−	+	+	!	−
McGurk et al. (2005)	T: Cognitive Remediation	Distress	+	+	!	!	!	!
McGurk et al. (2009)	T: Cognitive Remediation	Distress	+	!	+	+	!	!
McGurk et al. (2016)	T: Cognitive Remediation	Distress	+	+	+	+	!	!
Twamley et al. (2019)	T: Cognitive Remediation	Depression	!	−	+	+	!	−
Fournier et al. (2009)	T: CT/CBT	Depression	!	+	+	+	!	!
Himle et al. (2014)	T: CT/CBT	Depression	+	+	+	+	!	!
Kneipp et al. (2011)	T: Physical Health	Depression	+	−	!	−	!	−
Bell et al. (1993)	T: Paid Supported Employment	Distress	!	−	!	!	!	−
Mueser et al. (2004)	T: Supported Employment	Distress	+	!	!	!	!	!
Merakou et al. (2019)	T: Mindfulness	Depression, Anxiety, Distress	−	!	+	!	!	−

Non-Randomized Controlled Trials: ROBINS-I

Study	Intervention	Outcome	D1	D2	D3	D4	D5	D6	D7	Overall
Harry and Tiggemann (1992)	P: Work-Related	Depression, Distress	−	+	+	+	!	−	!	−

Study	Intervention	Outcomes	D1	D2	D3	D4	D5	D6	D7	Overall
Muller (1992)	P: Work-Related	Depression, Distress	−	+	+	+	−	−	!	−
Creed et al. (1996a) Creed et al. (1998a)	P: Work-Related	Depression, Distress	−	+	+	+	−	−	!	−
Creed et al. (1996b)	P: Work-Related	Distress	−	+	+	+	−	−	!	−
Barry et al. (2006), Reynolds et al. (2010)	P: Work-Related	Depression	!	+	+	+	!	−	!	−
Carlier et al. (2018)	P: Work-Related	Distress	!	+	−	!	!	−	!	−
Creed et al. (1999)	P: CT/CBT	Distress	!	+	+	+	!	−	!	−
Machin and Creed (2003)	P: CT/CBT	Distress	−	+	+	+	−	−	!	−
Dambrun and Dubuy (2014)	P: Positive Psychology	Depression, Anxiety	−	+	+	+	−	−	!	−
Roemer et al. (2021)	P: Mindfulness	Distress	−	+	+	+	!	−	!	−

Note. + low risk, ! some concerns/moderate risk, − high/serious risk, × (ROBINS-I only) critical risk; P = prevention, T = treatment.

RoB 2: D1 = randomization process, D2 = deviations from intended interventions, D3 = missing outcome data, D4 = measurement of outcome, D5 = selection of the reported result.

ROBINS-I: D1 = confounding, D2 = selection of participants into the study, D3 = classification of interventions, D4 = deviations from intended interventions, D5 = missing data, D6 = measurement of outcomes, D7 = selection of reported result.

recommended criterion of significance ($p = .079$); however, implementing Duval and Tweedie's trim and fill method suggested no adjustments were required to correct the asymmetry of the funnel plot. Therefore, any potential publication bias was considered minimal. A sensitivity analysis excluding studies at high/serious risk of bias ($n = 2$ studies with some risk of bias) decreased the effect size but remained significant; $d = 0.13$, 95 % CI = 0.02–0.24, $p = .022$, $I^2 = 0$ %.

Among the six studies examining work-related interventions (Carlier et al., 2018; Creed et al., 1996a; Creed et al., 1996b; Harry and Tiggemann, 1992; Muller, 1992; Vuori et al., 2002), three (50 %) reported a significant positive effect, and a meta-analysis of four studies was non-significant; $I^2 = 65.48$ %. Among the five studies examining CT/CBT interventions (Creed et al., 1999; Della-Posta and Drummond, 2006; Harris et al., 2002; Machin and Creed, 2003; Proudfoot et al., 1997), three (60 %) reported a significant positive effect, and a meta-analysis of these five studies produced a significant, small positive effect; $I^2 = 77.48$ %. Heterogeneity within this subgroup analysis was high. Risk of bias sensitivity analyses could not be conducted within either subgroup.

In comparing the effects found at different timepoints, 5/9 studies reported significant posttest effects (eight studies were meta-analyzed; $d = 0.32$, 95 % CI = 0.13–0.50, $p = .001$, $I^2 = 71.03$ %), whereas only 2/7 reported significant effects at <6 month follow-up (three studies were meta-analyzed; $d = 0.20$, 95 % CI = −0.10–0.50, $p = .198$, $I^2 = 0$ %), and 1/3 reported significant effects at 6+ months follow-up (three studies were meta-analyzed; $d = 0.12$, 95 % CI = −0.14–0.37, $p = .371$, $I^2 = 0$ %). Overall, findings indicate that interventions were only effective in the short-term.

3.3.4. Post hoc meta-analyses pooling across outcomes for prevention-level interventions

Given the restricted sample sizes in some subgroups of intervention types, further clarification on the nature of these effects was sought by conducting exploratory post hoc meta-analyses aggregating across all three outcome variables. At the earliest available timepoint, a meta-analysis of nine work-related interventions produced a significant, small positive effect; $d = 0.20$, 95 % CI = 0.03–0.37, $p = .020$, $I^2 = 67.44$ %. This effect became non-significant within a sensitivity analysis ($n = 3$ studies with some risk of bias); $d = 0.19$, 95 % CI = −0.01–0.40, $p = .059$, $I^2 = 62.86$ %. A meta-analysis of seven CT/CBT interventions at the earliest available timepoint produced a significant, small-moderate positive effect; $d = 0.34$, 95 % CI = 0.11–0.57, $p = .004$, $I^2 = 72.62$ %. This effect increased in size and remained significant within a sensitivity analysis ($n = 2$ studies with some risk of bias); $d = 0.59$, 95 % CI = 0.13–1.05, $p = .013$, $I^2 = 76.79$ %.

3.4. Treatment-level interventions

3.4.1. Depression outcomes

All five treatment studies assessing depression outcomes (Fournier et al., 2009; Himle et al., 2014; Kneipp et al., 2011; Merakou et al., 2019; Twamley et al., 2019) reported significant positive effects at the earliest available timepoint. A meta-analysis of four of these studies produced a significant, moderate-large overall positive effect; $I^2 = 0$ % (see Fig. 5 for treatment-level meta-analyses). A sensitivity analysis excluding studies at high/serious risk of bias ($n = 2$ studies with some risk of bias) increased the effect size and remained significant; $d = 0.80$, 95 % CI = 0.14–1.45, $p = .017$, $I^2 = 52.69$ %.

Among the two studies examining CT/CBT interventions (Fournier et al., 2009; Himle et al., 2014), both reported a significant positive effect, and a meta-analysis of these two studies produced a significant, large overall positive effect; $I^2 = 52.69$ %. Neither of these studies had high/serious risk of bias.

In comparing the effects found at different timepoints, 5/5 studies reported significant posttest effects (four studies were meta-analyzed; $d = 0.63$, 95 % CI = 0.39–0.86, $p < .001$, $I^2 = 0$ %), and although only one study had published effects available for narrative synthesis at <6 month follow-up, two studies were meta-analyzed due to additional data provided by authors ($d = 0.43$, 95 % CI = 0.16–0.71, $p = .002$, $I^2 = 0$ %). Overall, findings suggest some sustained effects of interventions.

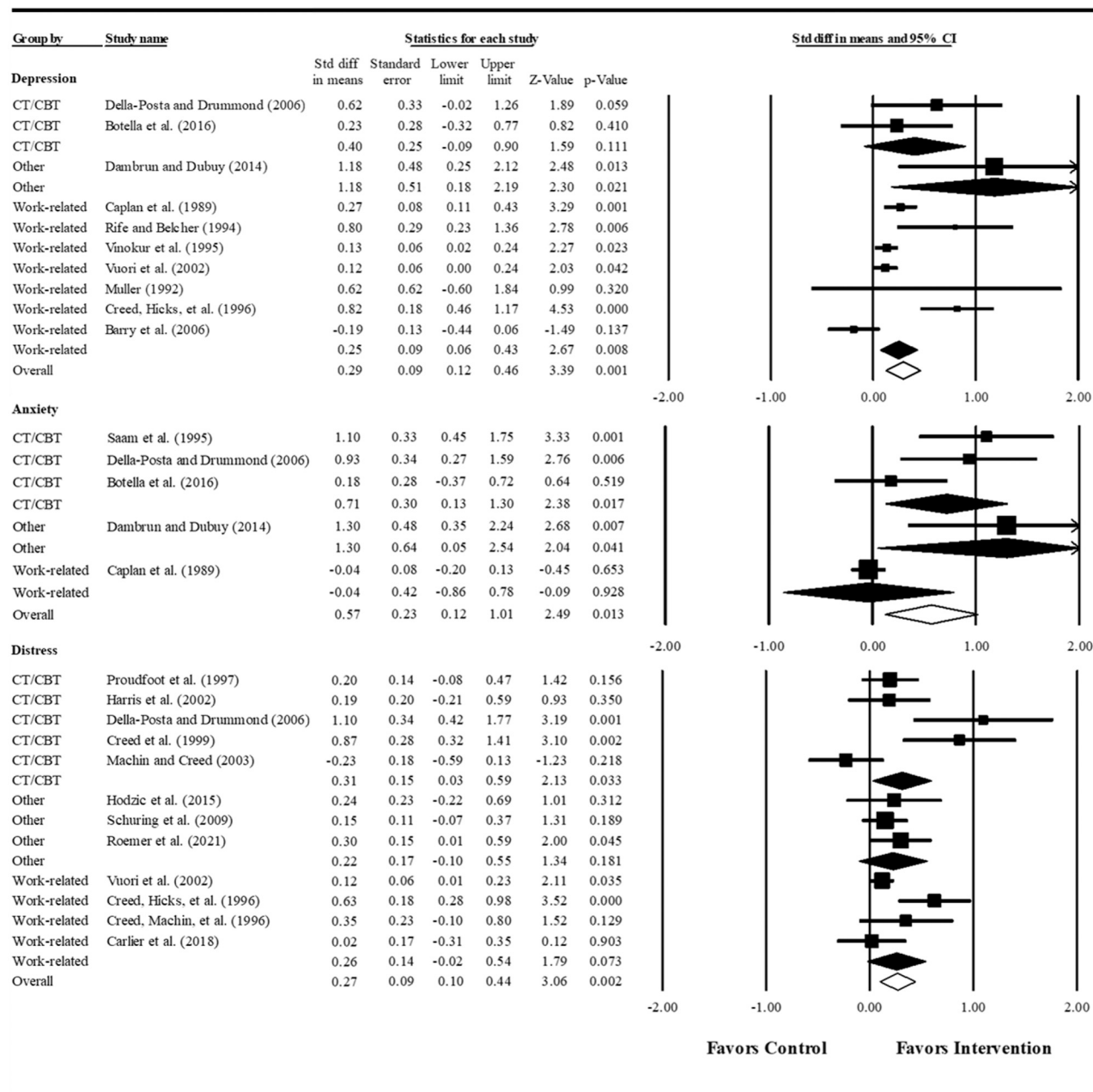| Group by	Study name	Std diff in means	Standard error	Lower limit	Upper limit	Z-Value	p-Value
Depression							
CT/CBT	Della-Posta and Drummond (2006)	0.62	0.33	-0.02	1.26	1.89	0.059
CT/CBT	Botella et al. (2016)	0.23	0.28	-0.32	0.77	0.82	0.410
CT/CBT		0.40	0.25	-0.09	0.90	1.59	0.111
Other	Dambrun and Dubuy (2014)	1.18	0.48	0.25	2.12	2.48	0.013
Other		1.18	0.51	0.18	2.19	2.30	0.021
Work-related	Caplan et al. (1989)	0.27	0.08	0.11	0.43	3.29	0.001
Work-related	Rife and Belcher (1994)	0.80	0.29	0.23	1.36	2.78	0.006
Work-related	Vinokur et al. (1995)	0.13	0.06	0.02	0.24	2.27	0.023
Work-related	Vuori et al. (2002)	0.12	0.06	0.00	0.24	2.03	0.042
Work-related	Muller (1992)	0.62	0.62	-0.60	1.84	0.99	0.320
Work-related	Creed, Hicks, et al. (1996)	0.82	0.18	0.46	1.17	4.53	0.000
Work-related	Barry et al. (2006)	-0.19	0.13	-0.44	0.06	-1.49	0.137
Work-related		0.25	0.09	0.06	0.43	2.67	0.008
Overall		0.29	0.09	0.12	0.46	3.39	0.001
Anxiety							
CT/CBT	Saam et al. (1995)	1.10	0.33	0.45	1.75	3.33	0.001
CT/CBT	Della-Posta and Drummond (2006)	0.93	0.34	0.27	1.59	2.76	0.006
CT/CBT	Botella et al. (2016)	0.18	0.28	-0.37	0.72	0.64	0.519
CT/CBT		0.71	0.30	0.13	1.30	2.38	0.017
Other	Dambrun and Dubuy (2014)	1.30	0.48	0.35	2.24	2.68	0.007
Other		1.30	0.64	0.05	2.54	2.04	0.041
Work-related	Caplan et al. (1989)	-0.04	0.08	-0.20	0.13	-0.45	0.653
Work-related		-0.04	0.42	-0.86	0.78	-0.09	0.928
Overall		0.57	0.23	0.12	1.01	2.49	0.013
Distress							
CT/CBT	Proudfoot et al. (1997)	0.20	0.14	-0.08	0.47	1.42	0.156
CT/CBT	Harris et al. (2002)	0.19	0.20	-0.21	0.59	0.93	0.350
CT/CBT	Della-Posta and Drummond (2006)	1.10	0.34	0.42	1.77	3.19	0.001
CT/CBT	Creed et al. (1999)	0.87	0.28	0.32	1.41	3.10	0.002
CT/CBT	Machin and Creed (2003)	-0.23	0.18	-0.59	0.13	-1.23	0.218
CT/CBT		0.31	0.15	0.03	0.59	2.13	0.033
Other	Hodzic et al. (2015)	0.24	0.23	-0.22	0.69	1.01	0.312
Other	Schuring et al. (2009)	0.15	0.11	-0.07	0.37	1.31	0.189
Other	Roemer et al. (2021)	0.30	0.15	0.01	0.59	2.00	0.045
Other		0.22	0.17	-0.10	0.55	1.34	0.181
Work-related	Vuori et al. (2002)	0.12	0.06	0.01	0.23	2.11	0.035
Work-related	Creed, Hicks, et al. (1996)	0.63	0.18	0.28	0.98	3.52	0.000
Work-related	Creed, Machin, et al. (1996)	0.35	0.23	-0.10	0.80	1.52	0.129
Work-related	Carlier et al. (2018)	0.02	0.17	-0.31	0.35	0.12	0.903
Work-related		0.26	0.14	-0.02	0.54	1.79	0.073
Overall		0.27	0.09	0.10	0.44	3.06	0.002

Fig. 2. Effect of prevention-level interventions on depression, anxiety, and distress outcomes at the earliest available timepoint, split by type of intervention.

3.4.2. Anxiety outcomes

The two treatment studies assessing anxiety outcomes (Himle et al., 2014; Merakou et al., 2019) reported significant positive effects at the earliest available timepoint. A meta-analysis of these two studies produced a significant, large overall positive effect; $I^2 = 31.10$ %. Due to the limited number of studies, no trends within different intervention types or timepoints could be meaningfully compared, and a risk of bias sensitivity analysis could not be conducted.

3.4.3. Distress outcomes

At the earliest available timepoint for the six treatment studies assessing distress outcomes (Bell et al., 1993; McGurk et al., 2009; McGurk et al., 2005; McGurk et al., 2016; Merakou et al., 2019; Mueser et al., 2004), three (50 %) reported significant positive effects. A meta-

analysis of four of these studies produced a significant, moderate overall positive effect; $I^2 = 43.36$ %. A sensitivity analysis excluding studies at high/serious risk of bias ($n = 3$ studies with some risk of bias) decreased the effect size which became non-significant; $d = 0.34$, 95 % CI = -0.01–0.69, $p = .058$, $I^2 = 1.75$ %. Caution should therefore be taken when interpreting the overall effect.

Among the three studies examining cognitive remediation interventions (McGurk et al., 2005, 2009, 2016), one (33 %) reported a significant positive effect, and a meta-analysis of these three studies was non-significant; $I^2 = 1.75$ %. None of these three studies scored a high/serious risk of bias. Timepoints could not be meaningfully compared.
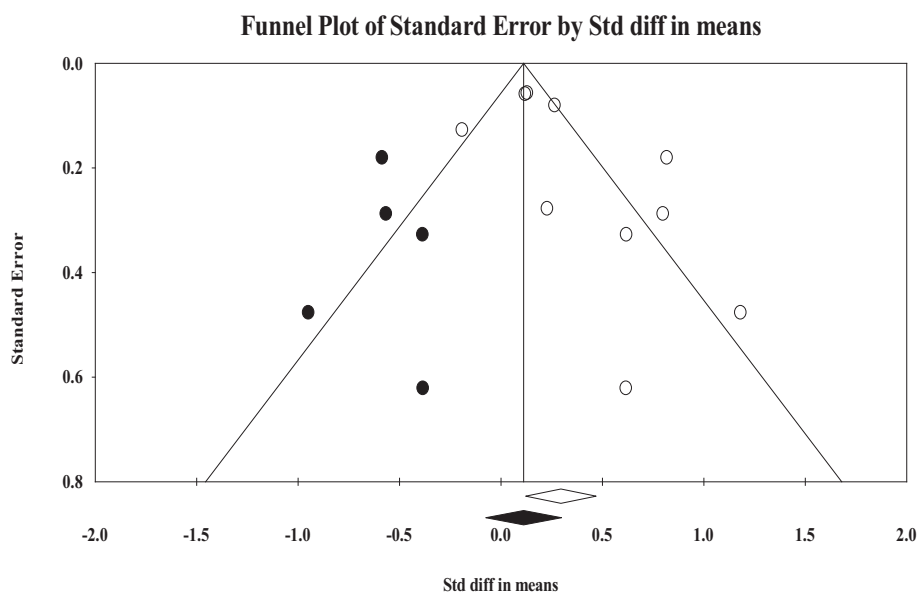
Fig. 3. Funnel plot examining potential publication bias among prevention studies reporting depression outcomes.
Note: Filled circles represent imputed effects to correct for funnel plot asymmetry and potential publication bias based on Duval and Tweedie's trim and fill method. The filled diamond represents the suggested correction to the pooled effect size.
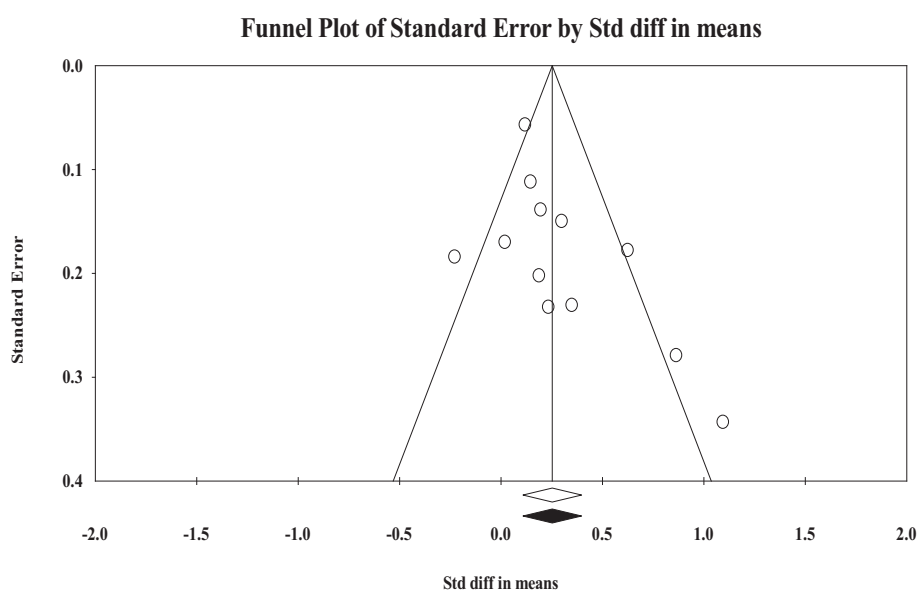
Fig. 4. Funnel plot examining potential publication bias among prevention studies reporting distress outcomes.
Note: The filled diamond represents the suggested correction to effect size based on Duval and Tweedie's trim and fill method for correcting potential publication bias.

3.4.4. Post hoc meta-analyses pooling across outcomes for treatment-level interventions

Given the restricted sample sizes within subgroups of intervention types, further clarification on the nature of these effects was sought by conducting exploratory post hoc meta-analyses aggregating across all three outcome variables. At the earliest available timepoint, a meta-analysis of four cognitive remediation interventions produced a significant, small-moderate positive effect; $d = 0.43$, 95 % CI = 0.17–0.70, $p = .001$, $I^2 = 0$ %. A sensitivity analysis excluding studies at high/serious risk of bias contained only those studies assessing distress, producing the same non-significant effect as above. A meta-analysis of two CT/CBT interventions at the earliest available timepoint produced a significant, moderate-large positive effect; $d = 0.77$, 95 % CI = 0.32–1.23, $p = .001$,

$I^2 = 46.79$ %. Neither of these studies had high/serious risk of bias.

4. Discussion

The present systematic review and meta-analysis aimed to synthesize the evidence for mental health-focused interventions conducted within controlled trials to improve depression and anxiety outcomes among those experiencing unemployment. The meta-analytic approach was novel in this field, extending the work of past reviews by enabling a more precise estimate of overall effect size and significance among various subgroups of studies, as a step toward clarifying the disparate findings of past reviews. This is also the first review on this topic to consider treatment studies and directly compare them with prevention
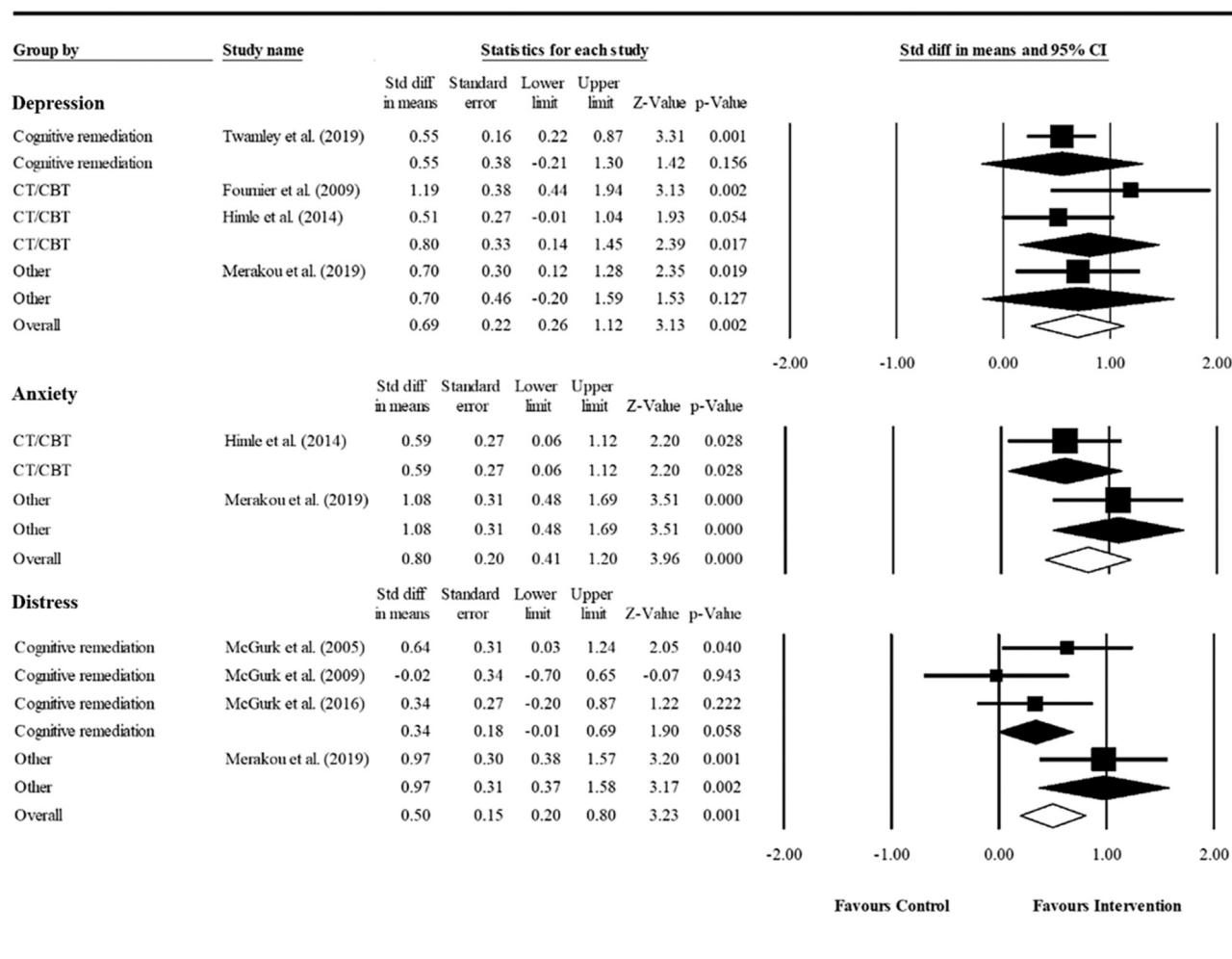
Fig. 5. Effect of treatment-level interventions on depression, anxiety, and distress outcomes at the earliest available timepoint, split by type of intervention.

studies. Through making other more fine-grained distinctions between studies, the present review also identified several specific gaps in the literature where there is a need for further research below.

Overall effects averaged over intervention types tended to be positive and significant for depression, anxiety, and distress outcomes within both prevention and treatment studies (acknowledging the potential publication bias that emerged for prevention-level interventions assessing depression). This evidence implies that interventions can generally improve mental health within this population, although certain limitations of the evidence (e.g., the commonly high risk of bias) somewhat restrict the strength of conclusions. Furthermore, the utility of these overall findings is limited, and so it is imperative to probe effects within more comparable subgroups of studies. In terms of specific interventions, concerns around the quality of available evidence remained, yet the most comparatively robust evidence emerged for the effectiveness of prevention-level CT/CBT to improve distress, and for prevention-level work-related interventions to improve depression.

Across different outcomes and levels of intervention, 50–100 % of CT/CBT interventions showed a significant positive effect. The clearest evidence for an effect emerged for distress outcomes within prevention studies, although the aggregated effect size was small. There was also evidence among prevention studies of a moderate-large effect on anxiety that became non-significant when only including the highest quality RCTs; however, care needs to be taken when interpreting these sensitivity analyses, given they also decrease power (in this case, including only two studies). Similarly, while the pooled effect of CT/CBT on

depression was non-significant among prevention studies yet significant (and large) among treatment studies, these analyses only included two studies each. Overall, CT/CBT appears to be a potentially effective intervention for people experiencing unemployment (reinforced by the consistently significant prevention and treatment-level post hoc analyses pooling across outcomes), although there is a need for further studies before more confident conclusions can be drawn regarding varied types of outcomes and samples. While Hollederer's (2019) systematic review found such interventions to be consistently beneficial, the findings of the current synthesis and those of Moore et al. (2017) suggest that more work is required to fully justify this position.

One factor which may impact the effectiveness of CT/CBT is initial symptom severity, as one prevention study found that the intervention had greater benefits when baseline symptoms were higher and therefore had more salience and greater scope for improvement (Creed et al., 1999). A recent individual participant data meta-analysis on the effects of indicated internet-based CBT also found that higher depression symptom severity predicted greater intervention effects within general, sub-clinical samples (Reins et al., 2021). It is possible that indicated prevention interventions may be more beneficial than universal approaches for unemployed people with sub-clinical symptoms, yet without replication this remains speculative. It is also important to keep recommendations specific to particular types of populations, as prior research has tended to find that for clinical samples, traditional CBT is instead less effective for those with more severe or chronic depression (Driessen and Hollon, 2010; Hamilton and Dobson, 2002). More work is

needed to clearly establish the moderating and mediating factors impacting CT/CBT effects within unemployed populations specifically, in order to better understand the conditions under which this approach ought to be recommended. Nonetheless, one benefit of CT/CBT approaches is their adaptability to varied contexts and modes of delivery, including self-paced digital delivery for varied audiences (Deady et al., 2017; Linardon et al., 2019; Reins et al., 2021), making them particularly advantageous for distributing at scale.

There was less supporting evidence for work-related interventions compared to CT/CBT, although there were also only 2 subgroups with sufficient studies to assess these interventions, with 44–50 % of studies finding significant positive effects. As with CT/CBT, the clearest evidence was for a small prevention-level effect; however, this emerged for depression rather than distress outcomes (noting that the analysis for distress was less highly powered and approached significance, and there was some post hoc evidence for a significant effect when pooling across outcomes). Among work-related interventions, there is reasonable evidence of the effectiveness in reducing depressive symptoms. It should, however, be noted that most of these studies were over 20 years old, suggesting that contemporary interventions should be considered. In the case of these interventions, it is likely that addressing the underlying work-related factors contributing to or maintaining depressive symptoms among sub-clinical unemployed samples can reduce the chances of symptoms escalating into clinical disorders (Price et al., 1992; Vinokur and Schul, 1997; Vuori and Vinokur, 2005). Notably, these interventions often rely upon face-to-face group processes like social support and social modelling, which are considered core, active components and may make them more difficult or expensive to implement at scale compared to CT/CBT. No conclusions can be made regarding anxiety or treatment-level interventions, which reveals notable gaps in the literature. Overall, similar to the findings within Hollederer's (2019) systematic review, there is some evidence for the effectiveness of work-related interventions in improving the mental health of unemployed people, as opposed to a consistent beneficial (Moore et al., 2017) or consistent non-significant (Koopman et al., 2017) effect.

Several prevention studies tested moderating factors which impacted the effectiveness of work-related interventions, often finding that they were more (or exclusively) effective for those with higher initial symptoms or risk for depression (Caplan et al., 1989; Creed et al., 1996a; Vinokur et al., 1995; Vuori et al., 2002). This again implies that among sub-clinical unemployed populations, indicated interventions that target high-risk individuals may be particularly effective implementation strategies. Only one study directly tested the moderating role of re-employment and did not find a significant effect (Caplan et al., 1989); however, two further studies not included for review found that intervention effects on depression were mediated by re-employment (Vinokur and Schul, 1997) and decreased financial strain (Vinokur and Schul, 1997; Vuori and Vinokur, 2005), in addition to increased job-search preparedness (Vinokur and Schul, 1997) and sense of mastery (Vuori and Vinokur, 2005). This gives insight into the active ingredients of work-related interventions, and implies that while re-employment is a valuable pathway to improving mental health, it is not the sole pathway and may not always resolve mental health issues. Indeed, Moore et al. (2017) found mixed evidence of re-employment outcomes coinciding with improved depression symptoms. This dovetails with findings that re-employment does not resolve all mental health issues for all job-seekers, and that the quality of re-employment is an important consideration (Arena et al., 2022; Llena-Nozal, 2009; Waters, 2007).

Governments and policymakers should consider the research on work-related interventions when implementing changes in welfare systems and models of unemployment assistance. These interventions substantially overlap with many Active Labor Market Policies (ALMPs) increasingly being adopted across the globe, that incentivize or mandate job-seeking or upskilling activities in exchange for welfare benefits (Brown and Koettl, 2015; Martin, 2015). These types of ALMPs have generally shown modest, positive impacts on wellbeing (Sage, 2015),

although the available evidence suggests that to support mental health, such policies should balance the focus on re-employment with individuals' psychosocial needs. Core elements of the reviewed work-related interventions involve social support, positive regard from trainers, and building self-efficacy or a sense of mastery—yet it is known that the experience of people participating in ALMPs and interacting with welfare systems often starkly contradict these elements, including exposure to stigmatizing or uncaring attitudes and harsh or demoralizing mandatory requirements (Morris and Wilson, 2014; Productivity Commission, 2020). The existing research may serve as a basis for re-evaluating elements of ALMPs that are not conducive to positive mental health.

From the available evidence, it appears that cognitive remediation is not particularly effective for reducing distress among clinical samples. Therefore, this may not be the optimal approach for treatment programs in the current context to take when the core intention is to address distress symptoms. By targeting mental illness-related cognitive impairments which hinder employment, alongside assistance to better manage these impairments in the workplace, such interventions may be better suited to improving work and cognitive outcomes as these studies' results suggest. The reasons why this may not necessarily feed back into improved distress outcomes is worthy of further investigation, particularly since some post hoc evidence for effectiveness emerged when pooling across outcomes.

Despite there being insufficient studies to identify trends among 'third wave' cognitive behavioral approaches (including mindfulness and positive psychology; Hayes and Hofmann, 2017), such approaches may be promising avenues for improving mental health during unemployment. Significant effects of mindfulness were found for varied outcomes in one treatment (Merakou et al., 2019) and one prevention (Roemer et al., 2021) study, and a positive psychology intervention had significant effects within a prevention study (Dambrun and Dubuy, 2014). These relatively more recent therapeutic approaches have demonstrated effectiveness in more general populations (Carr et al., 2021; Khoury et al., 2015; Vøllestad et al., 2012), are easily adaptable to varied contexts and delivery methods, and are therefore deserving of further attention in the field. Physical health interventions did not show as clear potential for benefits, with one treatment study finding a significant effect for depression, and one prevention study finding a non-significant effect for distress. Although there was very limited evidence based on supported employment interventions (which are typically focused primarily on re-employment outcomes), there are several other reviews which focus on these interventions (Frederick and VanderWeele, 2019; Kinoshita et al., 2013; van Rijn et al., 2016), finding beneficial effects for employment but not mental health outcomes.

There were many more prevention than treatment studies meeting inclusion criteria, which limited the capacity to draw conclusions regarding specific intervention types within clinical samples. Overall, however, the consistency of evidence for interventions was similar between treatment and prevention studies, with effect sizes generally larger for treatment studies. This difference is not uncommon (e.g., Garber et al., 2016; Hall et al., 2016), due at least in part to attenuation effects as a result of lower baseline scores in non-clinical samples. Despite this smaller effect size inherent in prevention intervention research, the scale to which these programs can be implemented at a population level makes the potential for impact no less valid (Cuijpers et al., 2021).

Anxiety was by far the least studied outcome, although pooled effects tended to be significant and fairly large when there were reasonable numbers of studies within meta-analyses. Anxiety is inherent to the experience of unemployment, for instance due to the uncertainty and stress involved in job-seeking, having limited financial resources, and relying on unstable or punitive welfare systems (Krueger et al., 2011; Morris and Wilson, 2014; Williams, 2021). Furthermore, the increase in anxiety symptoms and disorders associated with unemployment is similar to that found for depression (Dobson et al., 2020; Paul and

Moser, 2009), although some have found that rates of anxiety disorders during unemployment have modestly increased over time while depression has not (Dobson et al., 2020). Together, this implies that anxiety may be a particularly promising target of interventions for unemployed people, and that future research ought to pay greater attention to anxiety outcomes.

When assessing differences in effects across different follow-up periods, prevention-level interventions were only effective at posttest and did not sustain these effects over the long-term for depression, anxiety or distress outcomes. It is noted that although several studies found sustained effects for depression at longer-term follow-ups, the non-significant pooled effects were largely driven by a single study (Barry et al., 2006). Treatment-level interventions demonstrated some evidence of sustained effects for depression within six months. It may appear that these interventions produce more lasting effects than prevention-level interventions, although the limited number of analyzed treatment studies reduces confidence in this conclusion. Overall, this review supports Koopman et al.'s (2017) conclusion that there is strong evidence for short-term benefits but weak evidence of sustained benefits. It is reasonable to expect intervention effects to be strongest immediately following interventions, and it is possible that as some control participants become re-employed over time, some of the underlying issues feeding into mental health symptoms are slowly resolved, in turn weakening long-term effect sizes. Even in cases where an immediate but not long-term effect is found, such results may imply a quicker improvement for those in the intervention group (e.g., Kneipp et al., 2011), which is valuable for encouraging early recovery and potentially earlier re-integration into the workforce. More research needs to not only assess long-term follow-ups, but also present non-significant effects in a way that enables clear interpretation of their meaning.

4.1. Limitations and future directions

Several limitations were present within the literature, which in turn limit the insights that can be gleaned from the present review. The risk of bias among the sample of studies was quite high overall, decreasing the confidence with which conclusions can be drawn. Certain qualities of the research conducted in this field (e.g., reliance on self-report scales and difficulty in blinding participants to intervention conditions) may make it difficult to conduct studies with low risk of bias, yet there is a clear need for higher quality trials to improve the strength and accuracy of claims. The limited number of studies available within certain subgroups made it difficult or impossible to draw clear conclusions on important aspects of the research. Notably, the review was unable to compare interventions within long-term versus short-term unemployed samples. This comparison would have been particularly valuable, given the literature has uncovered that long-term unemployment is related to greater and unique mental health needs compared to short-term unemployment (McKee-Ryan et al., 2005; Paul and Moser, 2009). Two studies assessed the moderating role of unemployment duration, finding mixed effects (Hodzic et al., 2015; Vuori et al., 2002). More work is needed to compare the effectiveness of interventions between these groups, in order to better inform how individuals are matched with interventions appropriate to their needs. Furthermore, there were very few caseness outcomes available, meaning that 'true' prevention of mental illness is not well-studied in the unemployment context, and that conclusions are limited to symptom reduction in prevention-level interventions conducted with sub-clinical samples. Only one digital intervention was retrieved for review (Botella et al., 2016), despite the capacity for such interventions to overcome many common barriers to help-seeking for people experiencing unemployment (e.g., stigma and cost). More work is needed to produce evidence-based digital interventions tailored to the needs of this group.

There was evidence of potential publication bias among the total sample of prevention-level studies assessing depression outcomes. The funnel plot was notably asymmetrical and correcting for this rendered the pooled effect non-significant, raising questions as to its reliability. However, publication bias is only one potential explanation for funnel plot asymmetry. This is also likely to have been impacted by the presence of some smaller studies with lower methodological quality that produced larger effects, in addition to the high heterogeneity in this overall analysis that pooled across intervention types (Higgins et al., 2022). A degree of publication bias may have been introduced by not including grey literature within the current synthesis, which in turn could have inflated pooled effect sizes, constituting a limitation (Hopewell et al., 2005). Yet the current approach had the intended benefit of ensuring all trials were subject to peer-review, and minimized the potential for the decreased or uncertain methodological rigor, unreliable reporting, or other biases (e.g., vested interests) often present within grey literature (Hopewell et al., 2005).

The limited number of studies with sufficient available data for meta-analysis decreased the power of several subgroup analyses, particularly when running sensitivity analyses that excluded studies with high/serious risk of bias. Many analyses included only 2–3 studies, which is within best practice guidelines (Higgins et al., 2022), but has implications for interpretability. Estimates of heterogeneity were low for tests within treatment samples, but often moderate to high within prevention samples. Heterogeneity can often be inflated in analyses with small numbers of studies, although some of the larger analyses within narrow subgroups still produced fairly high estimates (e.g., work-related prevention-level interventions for depression; $k = 7$). Despite efforts to minimize heterogeneity through the grouping of meaningfully similar studies, variation in any number of factors (e.g., intervention duration, study design, unemployment duration or other sample characteristics) may have contributed to the observed heterogeneity.

To maximize the homogeneity and comparability of studies, the present review excluded samples that were not exclusively unemployed. However, research shows that underemployment, while a unique experience, can often have similar psychological impacts as unemployment (Dooley and Prause, 2003), and is certainly worthy of tailored research to investigate the gaps and effectiveness of interventions in this space. Similarly, youth unemployment is a valuable avenue for further research, given evidence that unemployment during youth can have serious and long-term mental health effects, and younger people may be more prone to the mental health impact of unemployment (McKee-Ryan et al., 2005; Paul and Moser, 2009; Strandh et al., 2014). Lastly, future research could consider expanding the outcomes included in the present review to indices of wellbeing, as these are also predictive of important outcomes for unemployed populations (Krueger et al., 2011). Given the ongoing economic downturn in many countries, increased levels of unemployment are likely in the future, suggesting that finding answers to these questions needs to be a priority.

4.2. Conclusions

Through narrative synthesis and meta-analysis, the present review found that mental health-focused interventions for people experiencing unemployment generally have value at both treatment and prevention levels. Regarding specific intervention approaches, both prevention-level CT/CBT and work-related interventions hold merit for reducing depressive and anxiety symptoms, and are worthy of consideration by clinicians, employment services providers, and policymakers when deciding upon strategies to improve mental health during unemployment. There are several shortcomings in the literature revealing a need for further high-quality trials, in particular those geared toward understanding the effectiveness of treatment-level interventions, differences based on duration of unemployment, effects on anxiety outcomes, and the effectiveness of digital and third wave cognitive behavioral interventions.

Contributors

MD, AFA, DC and SM designed and wrote the protocol for the review. AFA and SM conducted the literature searches. AFA, SM, SS and MD conducted the screening; AFA, SS and DW completed the data extraction; and AFA, MH and DC conducted the risk of bias assessments. AFA synthesized the data, conducted the meta-analyses, and led the writing of the manuscript; AFA, MD, SBH edited the manuscript. All authors contributed to and have approved the final manuscript.

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Declaration of competing interest

All authors report no competing interests.

Data availability

The raw data used for meta-analyses can be made available from the corresponding author upon request.

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