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Effects of workplace acceptance and commitment therapy (ACT) programs on psychological flexibility's subprocesses: A systematic review

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ABSTRACT

Despite growing interest in applying *acceptance and commitment therapy* (ACT) in workplace settings, recent reviews raised doubt about the efficacy of staff-focused ACT programs for improving psychological flexibility. However, more specific processes targeted by these programs may have been obscured by aggregating effects across a wide array of psychological flexibility measures for meta-analytic review purposes. To investigate this possibility, the current systematic review examines workplace ACT intervention effects on psychological flexibility's subprocesses (i.e., contact with the present moment, acceptance, defusion, self-as-context, values, and committed action). The review protocol was registered with PROSPERO (reference: CRD42022349446). The literature search identified 30 staff-focused ACT trials (18 controlled trials) that administered measures that could be mapped onto one or more psychological flexibility subprocess. Collectively, this body of research indicates strongest evidence for the effectiveness of workplace ACT programs for targeting defusion (observed across three types of defusion measures), and moderate yet consistent evidence that these programs increase mindful awareness and acceptance. Due to measurement issues, effects on values-based action have been less consistent overall. The next generation of workplace ACT research could be advanced by 1) adopting multidimensional psychological flexibility and inflexibility instruments, 2) subprocess-level multiple mediation testing, and 3) increasing methodological quality.

1. Introduction

The prevalence of common mental health problems experienced by working adults remains a significant global challenge (Goetzel et al., 2018; Hassard et al., 2014, 2018; Johnston et al., 2019; World Health Organization, 2024). Data gathered from several countries indicate that around 1 in 7 workers could be experiencing a common mental health problem (e.g., depression, anxiety, burnout) at any one time (World Health Organization, 2024). Beyond the adverse impact on individuals, these rates of psychosocial distress place considerable financial burden on employers and wider societies. For instance, in the United Kingdom, presenteeism (suboptimal workplace functioning due to poor mental health) is estimated to cost employers over £21 billion per year, double the cost attributed to sickness absence (Parsonage & Saini, 2017). On a larger scale, it has been estimated that depression in the workforce could be costing the European economy €600 billion per year (Hassard et al., 2014). Hence, there are compelling moral and economic arguments for increasing people's access to evidence-based workplace mental health promotion initiatives.

Among the responses to this challenge, the past two decades have witnessed burgeoning interest in workplace training programs derived from *acceptance and commitment therapy* (ACT). Similar to ACT in clinical and health contexts, workplace ACT programs aim to improve mental health by cultivating *psychological flexibility*, which is broadly defined as an openness to experience difficult thoughts and feelings that arise while pursuing personally valued patterns of behavior (Ong et al., 2019). More specifically, psychological flexibility is conceptualized as a multidimensional capacity, which is strengthened in ACT by targeting six interrelated subprocesses: contact with the present moment, experiential acceptance, cognitive defusion, self-as-context, values, and

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committed action (Hayes et al., 2006).

Some features of ACT have facilitated its adoption in workplace settings as a mental health promotion program (Flaxman et al., 2013). First, ACT's transdiagnostic philosophy means that ACT-based programs can be delivered to a range of interested staff, without the need to screen for specific mental health conditions. Second, ACT is a skills-based approach, supporting translation into group-format or self-help training programs. Third, ACT's focus on expanding people's repertoires (rather than seeking to reduce unwanted inner states), and cultivation of values-based behavior, aligns with growing interest in promoting positive (e.g., eudaimonic) well-being in workplace settings (Flaxman et al., 2023; Howell & Demuynck, 2023). Fourth, evidence suggests that ACT's workplace applications can be relatively brief, an advantage in time-pressured work environments where it may be difficult for staff to complete lengthy training during working hours (Archer et al., 2024; Lu et al., 2023).

Recent reviews have documented mental health benefits gained by participants in workplace ACT interventions. Despite some variation in findings (depending on which studies and occupational groups were included), the extant body of evidence indicates that ACT leads to greater reductions in psychological distress, when compared to waiting list and active control conditions (Flaxman et al., 2023; Prudenzi et al., 2021; Reeve et al., 2018; Rudaz et al., 2017; Unruh et al., 2022). The active control conditions have mostly involved educational courses relevant to the occupational context and workshops for personal and professional development. ACT has also demonstrated potential for reducing job burnout. Towey-Swift et al.'s (2023) systematic review reported effects in favor of ACT over control conditions in 11 out of 14 trials that assessed burnout. Prudenzi et al.'s (2021) meta-analytic findings suggest that ACT may have a delayed influence on burnout, with a significant pooled effect in favor of ACT over control conditions detected only at follow-up.

Despite the encouraging outcome evidence, the review findings have cast doubt over whether workplace ACT interventions reliably improve psychological flexibility. Two meta-analyses focusing on healthcare and front-line support staff failed to detect a pooled effect of workplace ACT programs across various markers of psychological flexibility (Prudenzi et al., 2021; Reeve et al., 2018; also see Gloster et al., 2020). Unruh et al. (2022) found a statistically small and significant pooled effect of ACT on psychological flexibility measures relative to control conditions. However, there was moderate to high heterogeneity (I^2 = 62.9 %) in this effect, with subgroup analyses revealing inconsistency across different control conditions and occupational groups. Given that psychological flexibility is the core process of change targeted by ACT interventions (regardless of context), it is important to scrutinize this complication within the body of research surrounding ACT's workplace applications.

Although the recent meta-analyses delivered insights into ACT's efficacy for improving staff mental health and reducing burnout, aggregation of effects across a range of different scales may have obscured effects of these interventions on specific psychological flexibility subprocesses. Psychological flexibility variable clusters in the reviews have included the *acceptance and action questionnaire* (AAQ; Hayes, Strosahl, et al., 2004) and AAQ-II (Bond et al., 2011) alongside measures of mindful awareness, thought believability, thought suppression, cognitive fusion, and values-based behavior (Gloster et al., 2020; Prudenzi et al., 2021). As a result, we lack understanding of whether ACT programs delivered to staff groups are successfully targeting some aspects of psychological flexibility but not others (Flaxman et al., 2023; Rudaz et al., 2017; Towey-Swift et al., 2023). To address this gap in understanding, the current review is aimed at collating and inspecting findings reported among studies examining effects of workplace ACT programs on measures of psychological flexibility's subprocesses.

Synthesizing this strand of research could offer timely theoretical, methodological, and practical contributions to the ACT in the workplace literature. At a theoretical level, performing a subprocess-level review enables us to appraise this strand of ACT evidence through the lens of process-based models of change. In particular, the emergence of the *unified flexibility and mindfulness* (UFM) model (Rogge & Daks, 2021) has provided a framework for organizing psychological flexibility's subprocesses into three interrelated and stepwise stages. Stage 1 involves establishment of a set of *mindful lenses* (i.e., present moment awareness). Stage 1 is posited to provide essential foundations for developing a set of Stage 2 subprocesses, which are collectively labelled *flexible responses to difficult experiences* (comprising psychological flexibility's acceptance, self-as-context, and defusion subprocesses). Development of Stage 2 subprocesses is in turn expected to empower individuals to engage in *life-enriching and values-driven behavior* (i.e., Stage 3, comprising values and committed action subprocesses). The Stage 3 capacity to engage in personally valued behavior, despite setbacks and presence of difficult inner experiences, is assumed to give life greater meaning and vitality, and posited to be proximally linked to mental health and well-being outcomes (Parker et al., 2024; Rogge & Daks, 2021).

Given that workplace ACT programs are typically abbreviated versions of longer and more personalized psychotherapeutic interventions, it seems important to discern whether these programs are primarily effective at targeting the proposed foundational Stage 1 capacity for mindful awareness. Or whether these staff-focused programs provide an adequate dose of ACT to cultivate psychologically flexible strategies for responding to uncomfortable thoughts and emotions (i.e., Stage 2 subprocesses), and enhance the capacity for engagement in values-based action (i.e., Stage 3 subprocesses). Additionally, given that researchers now have access to multidimensional instruments for assessing psychological flexibility and inflexibility subprocesses, deeper knowledge of existing evidence could inform future hypotheses regarding ACT's mechanisms (Francis et al., 2016; Gillanders et al., 2024; Gloster et al., 2021; Kashdan et al., 2020; Rogge & Daks, 2021; Rolffs et al., 2018). From a practical standpoint, understanding specific psychological flexibility subprocesses that have been successfully modified by these interventions could indicate techniques that have been effective in workplace contexts.

Diverging from previous workplace ACT reviews, we exclude studies that only administered an overall measure of psychological flexibility or inflexibility (e.g., the AAQ, AAQ-II, or work-related AAQ). An initial scoping review revealed a modest number of controlled trials of workplace ACT interventions that tested for change on one or more psychological flexibility subprocess, and variation in how each subprocess was measured. Accordingly, we elected to conduct a systematic review and narrative synthesis of this strand of intervention research. The aim of our review is to address the following research question: Which psychological flexibility subprocesses have been effectively targeted by workplace (i.e., staff-focused) ACT programs?

2. Method

The systematic review was conducted in accordance with the PRISMA guidelines and checklist (Moher et al., 2009). Prior to the formal search, we submitted the study protocol to the Prospective Register of Systematic Reviews (PROSPERO) database (reference: CRD42022349446). The pre-registration was published on October 17, 2022.

2.1. Inclusion and exclusion criteria

Our inclusion criteria were workplace ACT intervention studies that: 1) were published in English in a peer-reviewed academic journal; 2) quantitatively evaluated an ACT or ACT-based intervention that was either delivered to staff at their workplace or delivered remotely to staff; and 3) administered measures that could be mapped onto one or more of the six subprocesses in ACT's model of psychological flexibility (contact with the present moment, acceptance, defusion, self-as-context, values and committed action; Hayes et al., 2006). As this is the first review of the workplace ACT literature to focus exclusively on psychological flexibility's subprocesses, we included RCTs, nonrandomized controlled

trials, quasi-experimental trials, and single-armed trials. Consistent with previous reviews of the workplace ACT literature, we included studies that focused on all types of occupations (Unruh et al., 2022); and we included a small group of studies that focused on samples of trainee nurses and clinical psychologists (Flaxman et al., 2023; Prudenzi et al., 2021). We excluded research that: 1) focused on student samples; 2) only administered an overall measure of psychological flexibility or inflexibility (e.g., using the AAQ, AAQ-II, or work-related AAQ); 3) evaluated a mindfulness-based intervention (without use of ACT theory and intervention strategies); 4) evaluated ACT in a clinical setting; 5) evaluated ACT for occupational rehabilitation; 6) evaluated ACT for a specific health condition (e.g., cancer or chronic pain); and 7) used qualitative methods. Bond and Bunce (2000) have been credited with publishing the first evaluation of ACT-based training in the workplace, so we searched databases from the year 2000.

2.2. Information sources

We conducted the literature search on various databases via EBSCO Host (dates in brackets): Medline (10/24/22, 10/25/22, 10/30/22), APA PsychInfo (10/26/22, 10/30/22), Business Source Ultimate (10/30/22), CINAHL Ultimate (10/30/22). This was supplemented by searching on EMBASE (10/31/22), Ovid Emcare (10/31/22), and Web of Science (11/2/22). In addition, we searched for published workplace ACT trials listed on the Association for Contextual Behavorial Science (ACBS) website (11/06/22), and scanned reference lists in identified articles and previous workplace ACT reviews. To capture studies published since the original search, we performed a final round of searches across all databases on September 22, 2024.

2.3. Search strategy

Our search consisted of key terms combined with "OR" and "AND". For example, ACT ("Acceptance and Commitment Therapy" or "ACT" or "Acceptance and Commitment Training" or "Acceptance-Based" or "ACT Intervention"), and Psychological Flexibility ("Psychological Flexibility" or "Psychological Inflexibility" or "Psychological Flexibility Subprocesses" or "Psych Flex" or "hexaflex"), combined with terms to capture ACT studies focusing on staff groups ("employees" or "worker" or "professionals" or "personnel" or "staff" or "working population" or "workplace" or "organization" or "organisation").

2.4. Study selection

Two reviewers selected studies to be included, using the EPPI-Reviewer website (Thomas et al., 2010). The main reviewer (YR) carried out the selection of all studies. A second reviewer (PF) acted as moderator by reviewing at least 20 % of studies identified for potential inclusion at each stage. Any uncertainties surrounding a study's inclusion/exclusion were resolved through discussion between these two reviewers and consultation with the wider research team. The main reviewer extracted study information, which was recorded in a spreadsheet and shared with the second reviewer. To ensure accuracy, a third reviewer (LZ) independently performed data extraction from 20 % of the studies identified for inclusion. Table 1 shows a condensed version of the data extraction spreadsheet and study characteristics.

Fig. 1 summarizes the number of studies excluded and progressed at each stage of the review process. Our initial search generated 1372 articles. Following removal of 532 duplicates, we progressed 840 articles to title screening. The final search round resulted in the inclusion of an additional 6 studies published in 2023 or 2024.

By the end of the review process, we had identified 30 staff-focused ACT intervention studies that met our inclusion criteria. The studies were published between 2004 and 2024. Among the final set of studies, 13 were RCTs, 1 was a cluster RCT, and 4 were nonrandomized waiting list controlled trials. The remaining 12 studies were single-armed trials. Biglan et al. (2013) randomized a mix of teams (teachers and assistants) and individuals (family consultants) to ACT and control groups. Given this departure from the conventional RCT design, we included this study with the nonrandomized controlled trials. For evaluating workplace interventions, the conventional RCT design is not always viable (e.g., Archer et al., 2024; Gillanders et al., 2014; Joyce et al., 2019; Stafford-Brown & Pakenham, 2012; Waters et al., 2018). Hence, we considered RCTs, the cluster RCT, and nonrandomized controlled trials as potentially equally valid designs in this context. For comprehensiveness, we supplemented our review of controlled trials with a briefer summary of subprocess results reported across the single-armed trials.

2.5. Sample characteristics

The reviewed studies included a total of 2265 participants. Sample sizes ranged from $N = 4$ to $N = 168$. Out of 1836 participants in the RCTs, cluster RCT, and nonrandomized controlled trials, 950 were in control or comparator conditions. Across the 12 single-armed studies, total sample size was 429 (range $N = 4$ to $N = 77$). Across all studies, most participants were female (71 %) and average age was 39.85 years. All but one of the included studies were conducted in high-income countries: 9 in the UK, 6 in the US, 6 in Australia, 2 in Sweden, 2 in Finland, 1 in China, 1 in Japan, 1 in Germany, and 1 in Italy. The exception was a study conducted in Sierra Leone.

In terms of occupations, 18 of the 30 studies (60 %) involved staff in a "helping" profession (i.e., health and social care, psychotherapeutic, or educational roles). Samples included staff in a special education setting (Biglan et al., 2013), intellectual disability service staff (Bethay et al., 2013; McConachie et al., 2014; Smith & Gore, 2012), staff working with patients with personality disorders (Clarke et al., 2015), nurses (Lu et al., 2023), mixed healthcare staff (Christodoulou et al., 2024; Prudenzi et al., 2022; Waters et al., 2018), nursing trainees (Frögéli et al., 2016, 2019), palliative care staff (Finucane et al., 2023; Gerhart et al., 2016), clinical psychology trainees (Pakenham, 2015; Stafford-Brown & Pakenham, 2012), psychologists working with multiple sclerosis (MS) patients (Pakenham et al., 2018), and substance misuse counselors (Hayes, Bissett, et al., 2004; Varra et al., 2008). The other studies involved firefighters (Joyce et al., 2018, 2019), farmers (Gunn et al., 2023), university staff (Burton et al., 2010), and mixed samples employed in various occupations (Gillanders et al., 2014; Hofer et al., 2018; Kinnunen et al., 2020; Puolakanaho et al., 2020; Reeve et al., 2021; Singh et al., 2020; Stewart et al., 2016).

2.6. Length and format of workplace ACT programs

On average, the workplace ACT interventions were delivered over 4.6 sessions (range = 1 to 12 sessions), spread over 5.4 weeks (range = 1–13 weeks), providing 10.4 h of in-session contact time (range = 1.5–24 h). Seven studies evaluated ACT programs with sessions attended within a narrow timeframe (i.e., single-day workshop, or workshops over 2 consecutive days; e.g., Clarke et al., 2015; Hayes, Bissett, et al., 2004; Varra et al., 2008; Waters et al., 2018). The remaining 23 studies evaluated programs with sessions spread over several weeks or months. In 22 of the 30 studies, the ACT program was delivered in-person using a group training format. Five studies evaluated ACT programs administered to staff via online platforms (Finucane et al., 2023; Gunn et al., 2023; Joyce et al., 2018, 2019; Lu et al., 2023), two studies evaluated combined e-learning and in-person training (Kinnunen et al., 2020; Puolakanaho et al., 2020), and one study focused on self-help bibliotherapy as the ACT delivery method (Hofer et al., 2018).

In 24 studies, the evaluated intervention appeared to be entirely based on the ACT approach, in that there was no reported combining of ACT with other training components. In 4 studies, ACT was combined with structured mindfulness training (Joyce et al., 2018, 2019; Kinnunen et al., 2020; Puolakanaho et al., 2020). Joyce et al. (2018, 2019) evaluated a self-paced online mindfulness-based training program,

Table 1
Study characteristics.

Author and year	Country	Study design	Participants	Total N	Control N	Average age	Female %	No. of sessions	Measure timepoints	Measures	Format	Control
Bethay et al. (2013)	USA	RCT	Intellectual disability staff	34	16	38	76.5	3	Pre, Post, 3 month follow up	Believability of burnout thoughts	F2F (group)	Applied behavior analysis training
Biglan et al. (2013)	USA	Non randomized control trial	Preschool program staff and family consultants	42	19	NI	NI	2	4 time points: week 1, week 5, 3 months after week 5, 7 weeks after timepoint 3	FFMQ VLQ	F2F (group)	Waitlist
Burton et al. (2010)	Australia	single-arm	Various professionals	16	N/A	36.5	85	11	Pre, post	MAAS VLQ	F2F (group)	N/A
Christodoulou et al. (2024)	UK	RCT	Healthcare staff	136	69	42	77	4	5 time points across 6 months	FFMQ VQ	F2F (group)	Waitlist
Clarke et al. (2015)	UK	RCT	Staff working with clients with personality disorders	140	63	41.47	72	2	Pre, post, 6 month follow up	VLQ	F2F (group)	Psycho-education
Finucane et al. (2023)	UK	single-arm	Palliative care staff	23	N/A	NI	93	8	Pre, mid intervention at week 4, and post at week 8. 1 month follow up.	CompACT MHS	Online modules and online group session	N/A
Frögéli et al. (2016)	Sweden	RCT	Nursing trainees	113	44	NI	NI	6	Pre, post, 3 month follow-up	MAAS	F2F (group)	Reflection seminars
Frögéli et al. (2019)	Sweden	RCT	Nursing trainees	113	44	24.7	78.8	6	Pre, post, 3 month, 15 month, 27 month, 40 month follow-ups	MAAS	F2F (group)	Reflection seminars
Gerhart et al. (2016)	USA	single-arm	Palliative care staff	21	N/A	53	81	10	Pre, mid, post	CFQ	F2F (group)	N/A
Gillanders et al. (2014)	UK	Non randomized control trial	Public sector and healthcare staff	119	70	41	78	3	Pre, post, 3 month follow-up	CFQ	F2F (group)	Waitlist
Gunn et al. (2023)	Australia	single-arm	Farmers	77	N/A	45.9	63	5	Pre, post, 6 month follow-up	CFQ ATQ-B	Online	N/A
Hayes et al. (2004a)	USA	RCT	Addiction counselors	90	59	53	63	1	Pre, post, 3 month follow-up	Believability of stigmatizing thoughts	F2F (group)	Educational workshop
Hofer et al. (2018)	Germany	RCT	Majority healthcare staff	119	58	43.8	70	NI	Pre, post, 3 month follow-up	CFQ KIMS	Bibliotherapy	Waitlist
Joyce et al. (2018)	Australia	single-arm	Firefighters	29	N/A	43.7	3	6	Pre, post	CFQ	Web-based	N/A
Joyce et al. (2019)	Australia	Cluster RCT	Firefighters	143	83	42.5	7	6	Pre, post, 6 month follow-up	CFQ	Web-based	Healthy living program
Kinnunen et al. (2020)	Finland	RCT	Employees with burnout	106	96	47.5	80	8	Pre, post, 10 month follow-up	FFMQ	Combined web based and F2F (group)	Treatment as usual
Lu et al. (2023)	China	RCT	Nurses	145	73	35.36	97.2	5	Pre, post	CFQ MAAS VQ	Phone app/web-based	Waitlist
McConachie et al. (2014)	UK	RCT	Intellectual disability staff	120	54	NI	74.2	2	Pre, post, 6 week follow-up	WBSI	F2F (group)	Waitlist
Pakenham (2015)	Australia	single-arm	Clinical psychology trainees (in supervised practice)	32	N/A	27.66	88	12	Pre, post	WBSI VLQ	F2F (group)	N/A
Pakenham et al. (2018)	Italy	single-arm	Psychologists working with MS patients	34	N/A	41.82	91	2	Pre, post, 6 month follow-up	MAAS VLQ CFQ	F2F (group)	N/A
Prudenzi et al. (2022)	UK	RCT	Healthcare staff	98	46	42.97	92.7	4	Pre, mid, post, 10 week follow-up	VQ	F2F (group)	Waitlist
Puolakanaho et al. (2020)	Finland	RCT	Employees with burnout	168	80	46.9	79	8	Pre, post, 6 and 12 month follow-up	ATQ-B	Combined web-based and F2F (group)	Treatment as usual
Reeve et al. (2021)	UK	single-arm	Temporary accommodation and outreach services	4	N/A	NI	100	3	Pre, post, 1 month follow-up	CompACT	F2F (1:1)	N/A
Singh et al. (2020)	USA	single-arm	Sexual minority employees	8	N/A	28.75	33	1	Pre, post	MAAS	F2F (group)	N/A
Smith and Gore (2012)	UK	single-arm	Intellectual disability staff	72	N/A	NI	67	5	Baseline, pre, post, 3 month and 6 month follow-up	Support Staff Values Questionnaire	F2F (group)	N/A

(*continued on next page*)

Table 1 (*continued*)

Author and year	Country	Study design	Participants	Total N	Control N	Average age	Female %	No. of sessions	Measure timepoints	Measures	Format	Control
Stafford-Brown and Pakenham (2012)	Australia	Non randomized control trial	Clinical psychology trainees (in supervised practice)	56	28	28.45	87.5	4	Pre, post, 10 week follow-up	WBSI VLQ	F2F (group)	Waitlist
Stewart et al. (2016)	West Africa	single-arm	NGO staff	57	N/A	34	54	1	Pre, post, 3 month follow-up	VQ	F2F (group)	N/A
Varra et al. (2008)	USA	RCT	Drug and alcohol counselors	59	30	53.68	58	1	Pre, post, 3 month follow-up	Believability of barriers	F2F (group)	Educational workshop
Watanabe et al. (2023)	Japan	single-arm	Clinical year medical students	56	N/A	24.1	48.2	3	Pre, post, 2 month follow-up	VQ	F2F (group)	N/A
Waters et al. (2018)	UK	Non randomized control trial	Healthcare staff	35	18	39.7	84	1	Pre, post	FFMQ ATQ-B	F2F (group)	Waitlist

Note. RCT = randomized controlled trial. F2F (group) = face-to-face (in-person intervention). 1:1 = individual (rather than group) delivery format. The measures column lists only the measures from each study that could be mapped onto a psychological flexibility subprocess.

involving six sessions each lasting between 20 and 25 min. ACT's defusion, acceptance, and values-based behavior strategies were combined with mindfulness and self-compassion practices. Reflecting the ACT-based approach, the program had modules entitled "Defusion and Values" and "Expansion and Valued Action". Two studies evaluated delivery of ACT's principles and practices in the structure of Williams and Penman's (2011) mindfulness training protocol, creating an 8-week mindfulness-, acceptance-, and value-based (MAV) program (Kinnunen et al., 2020; Puolakanaho et al., 2020). As noted by the studies' authors, the MAV program was designed to be ACT-based.

Two single-armed trials evaluated ACT components within multimodal training programs. Burton et al. (2010) evaluated an 11-session resilience training program, which targeted ACT processes (defusion, acceptance, and values-based action), and included modules on physical activity, mindfulness, social connectedness, relaxation, and activity scheduling. Gerhart et al. (2016) evaluated an 8-week (10-session) mindfulness-based communication program for palliative care professionals, which was augmented with psychological flexibility principles and values clarification exercises.

2.7. Control conditions

Among the 13 RCTs, 7 compared the ACT intervention to inactive control conditions (5 waitlist and 2 treatment as usual; Christodoulou et al., 2024; Hofer et al., 2018; Kinnunen et al., 2020; Lu et al., 2023; McConachie et al., 2014; Prudenzi et al., 2022; Puolakanaho et al., 2020). The remaining RCTs had active control conditions: applied behavior analysis (ABA) training alone (compared to ABA + ACT; Bethay et al., 2013); psychoeducation on personality disorders (Clarke et al., 2015); reflection seminars for personal and professional development (Frögéli et al., 2016, 2019); and educational and cultural awareness training (Hayes, Bissett, et al., 2004; Varra et al., 2008). Christodoulou et al.'s (2024) RCT compared ACT with mindfulness training and a waitlist control condition. The cluster RCT compared an online ACT-based program to a self-paced healthy living program, covering a range of health and well-being topics (Joyce et al., 2019). The 4 nonrandomized controlled trials had waitlist control groups (Biglan et al., 2013; Gillanders at el., 2014; Stafford-Brown & Pakenham, 2012; Waters et al., 2018).

2.8. Mapping measures onto psychological flexibility subprocesses

As shown in Table 2, we identified a total of 23 different self-report scales and subscales across the reviewed workplace ACT studies that we mapped onto five psychological flexibility subprocesses: contact with the present moment, defusion, acceptance, and a combination of values and committed action. This measurement map reflects the way that each scale/subscale has most commonly been described and used in the ACT and mindfulness literatures, and was informed by inspecting items in recently developed multidimensional psychological flexibility and inflexibility instruments (Francis et al., 2016; Gloster et al., 2021; McAndrews et al., 2019; Reilly et al., 2019; Rogge & Daks, 2021; Rolffs et al., 2018). Scales with only negatively worded items, such as the *Mindful Attention Awareness Scale* (MAAS; Brown & Ryan, 2003), may be most accurately described as measuring a psychological *in*flexibility subprocess (i.e., *lack of* contact with the present moment captured by MAAS items; Rogge & Daks, 2021; Rolffs et al., 2018). However, to avoid confusion, we have adopted psychological flexibility subprocess labels throughout this review.

Contact with the present moment was assessed by the MAAS and *act (ing) with awareness* subscales from the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004) and Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). These measures share similar item content, capturing the extent to which an individual is inattentive to present moment experience, preoccupied or distracted due to mind wandering, and acting on autopilot in daily life. Similar items are found

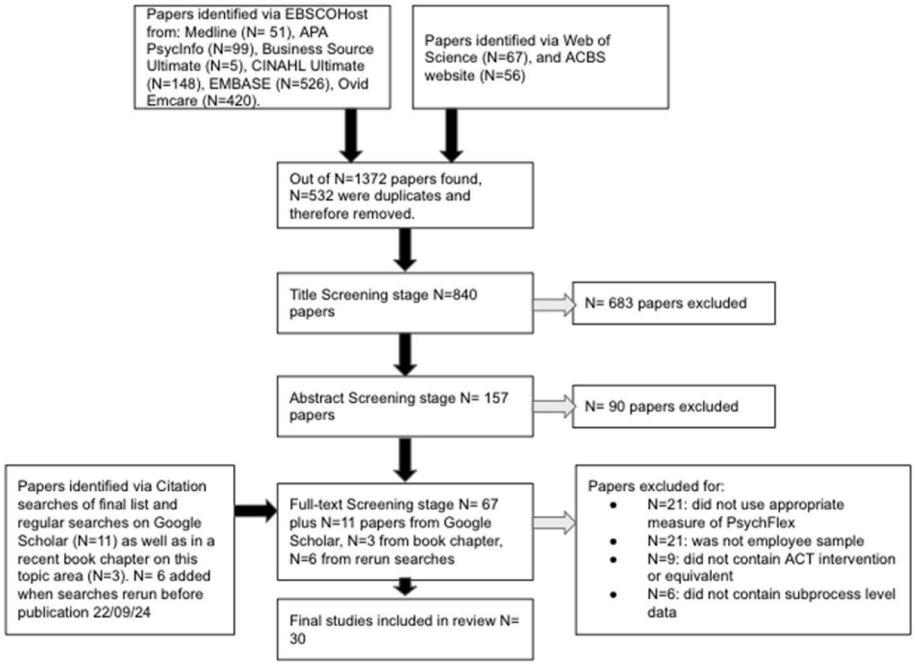

Fig. 1. Flowchart of study selection.

Table 2
Measures of psychological flexibility subprocesses in the reviewed workplace ACT studies.

Contact with the present moment	Defusion	Acceptance	Values and Committed action
• MAAS • KIMS *act with awareness* • FFMQ *acting with awareness* • KIMS *observing* • FFMQ *observing* • CompACT *behavioral awareness* • MHS *aware*	• Believability of stigmatizing thoughts • Believability of perceived barriers • Believability of burnout-related thoughts • ATQ-B • CFQ • FFMQ *nonreactivity* • MHS *defusion*	• KIMS *accept without judgement* • FFMQ *nonjudging* • WBSI • CompACT *openness*	• VLQ • VQ • CompACT *valued action* • MHS *engaged* • Support staff values questionnaire

Note. MAAS = Mindful Attention Awareness Scale (Brown & Ryan, 2003). KIMS = Kentucky Inventory of Mindfulness Skills (Baer et al., 2004). FFMQ = Five Facet Mindfulness Questionnaire (Baer et al., 2006). CompACT = Comprehensive assessment of Acceptance and Commitment Therapy processes (Francis et al., 2016). ATQ-B = Automatic Thoughts Questionnaire - believability dimension (Zettle & Hayes, 1986). CFQ = Cognitive Fusion Questionnaire (Gillanders et al., 2014). MHS = Mindful Healthcare Scale (Gillanders et al., 2024). WBSI = White Bear Suppression Inventory (Wegner & Zanakos, 1994). VLQ = Valued Living Questionnaire (Wilson et al., 2010). VQ = Valuing Questionnaire (Smout et al., 2014).

in the *behavioral awareness* subscale of the Comprehensive Assessment of Acceptance and Commitment Therapy Processes (compACT; Francis et al., 2016). A distinct aspect of present moment awareness was assessed with the KIMS and FFMQ *observing* subscales, which capture awareness of bodily sensations, thoughts and feelings, and 5-senses experience (e.g., tastes, smells, and sounds; Baer et al., 2006).

Defusion was most frequently assessed by ratings of believability in difficult or unhelpful thought content (e.g., Hayes, Bissett, et al., 2004; Varra et al., 2008; Waters et al., 2018) and with the *Cognitive Fusion Questionnaire* (CFQ; Gillanders et al., 2014). Studies administering the FFMQ *nonreactivity* subscale provided an additional method for assessing defusion (e.g., Waters et al., 2018). This subscale captures the ability to "step back" from difficult thoughts and let such thoughts go without overreacting or getting excessively caught up in them, and has similar item content to defusion subscales in recently developed psychological flexibility instruments (Gloster et al., 2021; Rogge & Daks, 2021; Rolffs et al., 2018).

Studies classified as assessing acceptance mainly administered the KIMS *accept without judgement* subscale or the similar FFMQ *nonjudging of experience* subscale, which capture the extent to which a person is judgmental and self-critical about experiencing undesirable (e.g., "bad" or "inappropriate") thoughts and feelings. These KIMS and FFMQ subscales were included in a recent review of acceptance measures used in the ACT literature (McAndrews et al., 2019); and they have been used extensively by mindfulness researchers to assess an accepting (i.e., nonjudgemental) attitude toward undesirable inner experience (Lindsay & Creswell, 2017). For the acceptance subprocess, we also reviewed studies that administered the *White Bear Suppression Inventory* (WBSI; Wegner & Zanakos, 1994), capturing change in the use of a potentially counterproductive internal avoidance strategy (suppression of unwanted thoughts).

A combination of values and committed action subprocesses (i.e., values-based action) was most frequently assessed with the *Valued Living Questionnaire* (VLQ: Wilson et al., 2010) and the *Valuing Questionnaire* (VQ; Smout et al., 2014). The VLQ involves rating the importance of 10 life domains (e.g., family, work, friendships, intimate relations) and the consistency with which one has recently lived in accordance with values in each domain. An overall valued living score is generated by multiplying importance and consistency ratings and averaging across the life domains (Wilson et al., 2010). The VQ has two subscales. VQ *progress* captures effective enactment of personal values, indicating behavioral persistence and progress toward personally important life directions and goals. VQ *obstruction* captures disruption to personal values enactment due to internal barriers (difficult thoughts and feelings) or inattentiveness. Aside from the VLQ and VQ, one single-armed study evaluated change in participants' ratings of importance on a set of values for staff in an intellectual disability support service (Smith & Gore, 2012). Finucane et al.'s (2023) single-armed study assessed change in values-based action using the compACT's *valued action* subscale and the Mindful Healthcare Scale *engaged* dimension (Gillanders et al., 2024).

In 5 of the 30 reviewed studies, subprocess measures were

administered on two occasions. The remaining 25 studies administered measures on three or more occasions. Among studies with three or more measurement time points, the average follow-up period was 4.5 months (range = 1–12 months).

2.9. Quality and risk of bias assessment tools

To estimate risk of bias among the RCTs, we used version 2 of the Cochrane Risk of Bias tool (RoB 2; Sterne et al., 2019). The RoB 2 algorithm generates one of three judgements: *low risk of bias*, *high risk of bias*, or *some concerns*. Two members of the research team (YR & PF) independently reviewed all included RCTs to estimate risk of bias. The reviewers resolved discrepancies in their overall RoB 2 judgements for each study by discussing their responses to the signaling questions within each of the tool's 5 domains.

In addition, for all 18 trials with a control group (i.e., 13 RCTs, 1 cluster RCT, and 4 nonrandomized controlled trials), we assessed study quality via an adapted version of the psychotherapy outcome study methodology rating scale (POMRF; Öst, 2008). This tool classifies study methodology as *poor* (0), *fair* (1), or *good* (2), and was used in previous reviews of workplace ACT research (Prudenzi et al., 2021; Unruh et al., 2022). In alignment with the earlier reviews, we omitted clinically oriented items (items 2, 3, 4, 8, and 21), which are not applicable to most evaluations of workplace ACT interventions (i.e., severity of disorder, clinical representativeness of sample, reliability of diagnosis, training of diagnostic assessors, and clinical significance). For the remaining 17 POMRF items, the two main reviewers independently computed a mean response for each item and an overall mean rating across all included studies with a control condition. The two reviewers resolved discrepancies through discussion and agreed final mean ratings. Finally, we computed item-level and overall POMRF means for the single-armed trials and report these ratings separately (see supplementary file).

3. Results

Table 3 provides a summary overview of our judgements on the weight of the RCT and nonrandomized controlled trial evidence across five psychological flexibility subprocesses assessed in the workplace ACT literature. The ratings of "strong", "moderate", and "weak" are presented as a heuristic, indicating the volume of studies reporting significantly greater subprocess improvements in the ACT condition relative to control condition(s), and consistency of those findings across measures and studies. In addition, we considered results of subprocess-level mediation tests, which were reported in a subset of RCTs and nonrandomized controlled studies (summarized in Table 4).

Based on these criteria, we judged the weight of evidence supporting the impact of workplace ACT interventions on defusion to be "strong" overall. Significant between-group effects on defusion in favor of ACT were reported in all 7 RCTs that included a measure of this subprocess, and in 2 of the 3 nonrandomized controlled trials. These effects were detected across three main types of defusion measure (thought believability scales, the CFQ, and FFMQ nonreactivity subscale), and were maintained over follow-up periods. Moreover, as summarized in Table 4, five studies reported that improvements on defusion measures mediated ACT's positive impacts on staff mental health and/or work-related outcomes.

We classified the weight of evidence surrounding workplace ACT's effects on contact with the present moment as "moderate". As summarized in Table 3, an effect in favor of the ACT condition was reported in a majority of controlled trials that included a measure of this subprocess. However, there was (potentially informative) variation in ACT's main and mediated effects reported across different mindful awareness scales (e.g., MAAS, FFMQ acting with awareness, and FFMQ observing). We also gave a "moderate" rating to the weight of available evidence for the effectiveness of workplace ACT programs in targeting acceptance. Encouragingly, there were reliable improvements reported on acceptance measures particularly at follow-up assessments. In addition, as reported in Table 4, there are emergent mediation findings suggesting that enhanced acceptance was especially influential for transmitting ACT's longer-term impact on burnout (Kinnunen et al., 2020). However, distinct acceptance scales were administered in only 3 of the reviewed RCTs; and only one study demonstrated that ACT outcomes were mediated specifically through improved acceptance.

Finally, we rated the evidence surrounding workplace ACT's effects on values and committed action as "weak" overall. This less favorable rating is largely attributable to inconclusive findings observed among a number of studies administering the VLQ. Among 3 controlled trials using this measure, 2 failed to detect a significant effect in favor of the ACT condition; and we found no studies reporting that change on the VLQ mediated ACT's impact on staff mental health.

To show how we arrived at these judgements, the following sections provide a more detailed narrative through patterns of subprocess change reported in the reviewed studies. We have organized the narrative into three main sections to separate findings reported in RCTs, nonrandomized controlled trials, and single-armed trials. Within each section, we highlight any notable variation in findings across different measures of each psychological flexibility subprocess.

3.1. Randomized controlled trials (RCTs)

3.1.1. Defusion

Four RCTs reported positive and significant effects of workplace ACT interventions on defusion when this subprocess was assessed by measures of believability in difficult or unhelpful thought content. Hayes, Bissett, et al. (2004) assessed believability in stigmatizing thoughts toward clients among addiction counselors. Over a 3-month period, staff that attended a 1-day ACT workshop reported a significantly greater reduction in believability compared to an educational control condition. Varra et al. (2008) assessed believability in the impact of perceived barriers to using new treatments among drug and alcohol counselors. Across a 3-month timeframe, staff that attended a 1-day ACT program reported increased acknowledgment of perceived barriers, alongside a significant decrease in the believability of those barriers' impact. As summarized in Table 4, these two studies also found that reduced thought believability (i.e., defusion) helped to explain ACT's beneficial impact on counselors' burnout, stigmatizing attitudes toward clients, and willingness to apply new treatments.

Bethay et al. (2013) investigated change in believability in

Table 3
Summary of the weight of evidence surrounding effects of workplace ACT programs on psychological flexibility subprocesses.

Subprocess	RCTs	Cluster-RCT	Nonrandomized controlled trials	Summary rating
Defusion	7/7 (100 %)	0/1 (0 %)	2/3 (67 %)	Strong
Contact with the present moment	4/5 (80 %)		1/2 (50 %)	Moderate
Acceptance	2/3 (67 %)		1/3 (33 %)	Moderate
Values and Committed action	3/4 (75 %)		1/2 (50 %)	Weak

Note. Numbers in cells indicate the number of studies that reported at least one statistically significant between-group effect in favor of ACT/number of studies in which the subprocess was assessed (stated as a percentage in brackets).

Table 4
Studies reporting statistically significant indirect (mediated) effects of workplace ACT programs via improvements on psychological flexibility subprocesses.

	Subprocess measure	Outcome variable	Control condition(s)	Summary of mediation results
Defusion				
Hayes et al. (2004a)	Believability of stigmatizing thoughts	1). Stigmatizing attitudes toward substance abusing clients 2). Burnout (exhaustion and depersonalization combined)	1). Multicultural training 2). Educational control	Indirect effects of ACT (vs educational control) on pre to follow-up burnout and stigmatizing attitudes via reduced believability in stigmatizing thoughts.
Varra et al. (2008)	Believability of perceived barriers to new treatments	1). Willingness to use new treatments 2). Reported client referrals to pharmacotherapy	Educational control	Specific indirect effects of ACT on pre to follow-up willingness to refer and number of referrals via pre-to-post reduction in believability (with AAQ in the same multiple mediator models).
Gillanders et al. (2014, Study 5)	CFQ	Psychological distress	Waitlist	Indirect effect of ACT on pre to follow-up distress via pre-to-post reduction in cognitive fusion.
Waters et al. (2018)	FFMQ- *nonreactivity*	Psychological distress	Waitlist	Specific indirect effect of ACT on pre-to-post distress via improved nonreactivity (with observing and negative thought frequency in the same multiple mediator model).
Lu et al. (2023)	CFQ	1). Anxiety 2). Depression	Waitlist	Indirect effects of ACT on pre-to-post anxiety and depression via reduction in cognitive fusion.
Contact with the present moment				
Frögéli et al. (2016)	MAAS	1). Perceived stress 2). Burnout	Seminars for personal and professional development	Specific indirect effects of ACT on pre-to-post stress and burnout via improvement on the MAAS (with avoidance and fusion questionnaire in the same multiple mediator models).
Waters et al. (2018)	FFMQ-*observing*	Psychological distress	Waitlist	Specific indirect effect of ACT on pre-to-post distress via improved observing (with nonreactivity and negative thought frequency in the same multiple mediator model).
Kinnunen et al. (2020)	FFMQ-*observing*	Burnout (reduced professional efficacy)	TAU	Indirect effect of ACT on professional efficacy at 10-month follow-up via pre-to-post improvement in observing.
Acceptance				
Kinnunen et al. (2020)	FFMQ-*nonjudging*	Burnout (exhaustion, cynicism, and reduced professional efficacy)	TAU	Indirect effects of ACT on exhaustion, cynicism, and professional efficacy at 10-month follow-up via pre-to-post improvement in nonjudging.
Values and committed action				
Prudenzi et al. (2022)	VQ	1). Psychological distress 2). Burnout (Physical fatigue, emotional exhaustion and cognitive weariness)	Waitlist	Indirect effects of ACT on pre-to-post distress and cognitive weariness via pre-to-mid reduction on VQ obstruction.
Lu et al. (2023)	VQ	1). Anxiety 2). Depression	Waitlist	Indirect effects of ACT on pre-to post anxiety and depression via increase on VQ progress and reduction on VQ obstruction.

burnout-related thoughts among staff working with people with intellectual disabilities. No overall effect of ACT on believability was found. However, among a subgroup of staff with higher baseline distress, attendance at a 6-h ACT workshop (combined with training in applied behavior analysis; ABA) resulted in a significantly greater reduction in believability of burnout-related thoughts compared to the control condition (ABA training only).

In their RCT of the 8-week MAV program, Puolakanaho et al. (2020) assessed believability in depressive cognitions, using the automatic thoughts questionnaire-believability dimension (ATQ-B; Zettle & Hayes, 1986). Immediately after the intervention, and at 6-month and 12-month follow-up, the MAV intervention group reported significantly lower ATQ-B scores compared to a TAU comparison group (between-group *d*s = .44, .49, .45 at post, 6-months, 12-months). In another RCT evaluating the same MAV program, Kinnunen et al. (2020) assessed change in defusion via the FFMQ nonreactivity subscale. Relative to the TAU comparison group, participants that had attended the intervention reported significantly improved nonreactivity scores at post-intervention and 10-month follow-up. However, the change in nonreactivity during the intervention did not mediate the program's longer-term effect on staff burnout over the follow-up period.

Two RCTs demonstrated positive effects of ACT programs on defusion via reduced scores on the cognitive fusion questionnaire (CFQ; Gillanders et al., 2014). Hofer et al. (2018) assessed CFQ change in their trial of a 6-week ACT-based bibliotherapy intervention to support people with work stress. At post-intervention, the ACT group had significantly reduced CFQ scores compared to a waitlist control group (d = .50). Within-group analysis revealed that CFQ scores continued to decrease significantly over three months following the self-help ACT intervention. In their trial of a 5-week web and mobile-based ACT program, Lu et al. (2023) found that reduced CFQ scores mediated ACT's pre-to post-intervention impact on nurses' anxiety and depression symptoms.

In the cluster RCT involving Australian firefighters, Joyce et al. (2019) failed to find an effect of an online ACT-based program on the CFQ relative to an active control condition (a healthy living intervention). Possible explanations for this null finding are the brief training format (providing around 2–2.5 h of training in total), and a pre-intervention CFQ mean score (19.6) that was considerably lower when compared to other workplace ACT studies (cf. Gillanders et al., 2014, Study 5; Gunn et al., 2023; Lu et al., 2023).

3.1.2. Contact with the present moment

Five RCTs included a measure of contact with the present moment, of which 4 reported at least one significant between-group effect in favor of ACT. Frögéli et al. (2016) included the MAAS in their trial of ACT for reducing stress and burnout among trainee nurses in Sweden. The ACT-based training was delivered in group format over 6 × 2 h sessions. The ACT condition was compared to an active control group attending seminars focused on personal and professional development. The MAAS was administered alongside a measure of overall psychological inflexibility (the avoidance and fusion questionnaire; AFQ-Y; Greco et al., 2008). The ACT group reported significantly greater improvement on the MAAS relative to the control group at post and 3-month follow-up. Moreover, change on the MAAS was a unique predictor of pre-to-post reductions in burnout and stress. In a follow-up study of the same sample, Frögéli et al. (2019) found that ACT's longer-term influence on perceived stress (over a 1-year follow-up) was mediated by the pre-to-post reduction in overall inflexibility (i.e., change on the AFQ-Y) and not by change on the MAAS.

Hofer et al. (2018) found support for ACT's short-term effectiveness for improving employees' capacity for present moment attention and awareness. In this study, participants in the ACT bibliotherapy course reported significantly greater pre-to-post improvement on the KIMS act with awareness subscale when compared to a waitlist control group. In their trial of a web- and mobile-based ACT intervention, Lu et al. (2023) found that the MAAS was the only subprocess measure that did not mediate ACT's beneficial effects on nurses' anxiety and depression symptoms. By contrast, improvements on the AAQ-II, CFQ, and VQ significantly mediated ACT's effects.

Other findings indicate that workplace ACT programs have successfully enhanced a distinct type of mindful awareness, as captured by the KIMS and FFMQ observing subscales. Kinnunen et al. (2020) found that the MAV intervention led to pre-to-post improvement on FFMQ acting with awareness and observing subscales. However, change on the acting with awareness subscale did not mediate the longer-term effect of the training on any burnout dimension. Over the 10-month follow-up period, pre-to-post change in observing mediated the program's positive impact on one burnout dimension (professional efficacy).

3.1.3. Acceptance

Two RCTs reported between-group effects indicating that workplace ACT programs helped staff cultivate a more accepting attitude toward difficult inner experience. In Kinnunen et al.'s (2020) study, improvement on FFMQ nonjudging was found to be particularly important for explaining longer-term effects of the MAV intervention on all dimensions of burnout syndrome. The program's beneficial effect on staff exhaustion over the 10-month follow-up period was mediated only by increased nonjudging scores.

McConachie et al. (2014) administered the WBSI in their evaluation of ACT for staff working with individuals with intellectual disabilities. The ACT program included a full-day workshop followed by a half-day refresher workshop 6 weeks later. Study measures were completed at pre, post, and 6-week follow-up. The ACT intervention had little effect on WBSI scores between pre- and post-intervention. However, between post-intervention and 6-week follow up, there was a significant reduction in WBSI scores (i.e., decreased thought suppression) in the ACT group and not in the control group. This apparently later emergence of acceptance was also reported in Hofer et al.'s (2018) study of an ACT self-help program. In this case, the ACT and control groups did not differ on the KIMS accept without judgement subscale at post-intervention. Nonetheless, accept without judgment scores subsequently increased significantly (while scores on other KIMS subscales remained stable) over a 3-month period after the ACT program.

3.1.4. Values and committed action

Four RCTs in our review evaluated effects of workplace ACT programs on psychological flexibility's combined values and committed action subprocesses (Christodoulou et al., 2024; Clarke et al., 2015; Lu et al., 2023; Prudenzi et al., 2022). Clarke et al. (2015) included the VLQ in their evaluation of ACT workshops for staff working with clients with personality disorders. They compared 2 days of ACT-based training with a psychoeducational program focused on improving understanding of personality disorders. Study measures were completed at pre, post, and 6-month follow-up. The ACT intervention had little impact on VLQ scores relative to the control condition.

By contrast, a set of three recent RCTs that utilized the VQ reported significant improvements on at least some aspects of values-based action. In their evaluation of a 4-week ACT program for healthcare workers, Prudenzi et al. (2022) found the strongest effect of ACT on the VQ obstruction subscale relative to a waitlist control group. As reported in Table 4, reduced VQ obstruction scores between mid- and post-intervention mediated positive effects of the ACT program on psychological distress and cognitive weariness. Lu et al. (2023) found that increased VQ progress and decreased VQ obstruction scores mediated positive pre-to post-intervention effects of a remote ACT program on nurses' anxiety and depression. Christodoulou et al. (2024) found that workplace ACT participants (but not mindfulness trained participants) experienced significantly greater improvement than a waitlist control group on the VQ (total score) over a 6-month period.

3.2. Nonrandomized controlled trials

3.2.1. Defusion

Two nonrandomized controlled trials assessing defusion reported a significant between-group effect in favor of ACT over waitlist control conditions. In Waters et al.'s (2018) evaluation of a 1-day ACT program for nurses, the ACT group showed a significantly greater reduction in ATQ-B scores (but not negative thought frequency scores) over a 3-month period compared to a waitlist control group. Waters et al. (2018) also found that the ACT group improved significantly on the FFMQ nonreactivity subscale relative to the waitlist control group. Moreover, the change in nonreactivity exceeded improvements on the other FFMQ subscales, and explained a unique portion of the beneficial effect of ACT on nurses' psychological distress.

Biglan et al. (2013) administered the FFMQ's nonreactivity subscale in a pilot study of ACT for staff working with young children with developmental disabilities. ACT was delivered in two sessions, 2–3 weeks apart, with each session lasting 3.5 h. Although this study did not report between-group tests, the results of (within-group) latent growth modelling indicated a significantly improved change trajectory on the nonreactivity subscale over a 4-to-5 month period after the ACT program.

The CFQ development and validation study reported findings from a nonrandomized waitlist controlled trial of a workplace ACT intervention (Gillanders et al., 2014, Study 5). The intervention was delivered to UK healthcare and government employees in group format over 3 x 3-h sessions spread over 3 months. Across a 5-month evaluation period, the ACT group reported significantly reduced CFQ scores (i.e., reduced fusion) relative to the waitlist control group; and change on the CFQ mediated ACT's positive influence on participants' mental health.

3.2.2. Contact with the present moment

Two nonrandomized controlled trials mirrored some of the RCT findings by revealing that ACT can have a stronger effect on the observing aspect of mindful awareness than on markers of distraction and inattention. In Biglan et al.'s (2013) study, ACT-based training led to significant within-group improvement on the FFMQ observing subscale but not on the acting with awareness subscale. Similarly, when assessing change on all FFMQ facets, Waters et al. (2018) found that a 1-day ACT workshop outperformed the waitlist control group in improving observing (but not acting with awareness) over a 3-month period. Moreover, as reported in Table 4, they found a specific indirect effect of ACT on mental health via the improvement in observing.

3.2.3. Acceptance

Three nonrandomized controlled trials measured acceptance. Biglan et al. (2013) found significant within-group improvement on the FFMQ nonjudging subscale following two ACT workshops. By contrast, Waters et al. (2018) found that the FFMQ nonjudging facet did not improve significantly (relative to a waitlist control group) over 3 months following a 1-day ACT workshop.

The WBSI was included in a cohort-controlled evaluation of a university-based ACT program for improving mental health and therapist qualities among clinical psychology trainees in Australia (Stafford-Brown & Pakenham, 2012). The ACT program was delivered over 4 weekly sessions. Results revealed that the ACT group experienced a greater reduction in thought suppression relative to the control group. Within-group tests indicated that WBSI scores then remained stable in the ACT group over a 10-week follow-up period. When the WBSI was entered into multiple mediation models alongside the AAQ, the VLQ, and FFMQ total score, the reduction in thought suppression was not a unique mediator of ACT's effect on mental health.

3.2.4. Values and committed action

Similar to the RCT findings, the nonrandomized controlled trials indicated an uncertain pattern of findings among studies administering the VLQ. Biglan et al. (2013) failed to find an effect on the VLQ following ACT workshops, even though present moment awareness, acceptance, and defusion skills (the FFMQ's observing, nonjudging, and nonreactivity facets) improved significantly. Stafford-Brown and Pakenham (2012) found that valued living scores increased to a significantly greater extent in the ACT group compared to a control cohort; and improved VLQ scores in the ACT group were maintained through to 10-week follow-up. However, mediation analyses revealed no specific indirect effect of ACT on psychological distress via improvement on the VLQ.

3.3. Single-armed trials

Rather than provide a detailed account of the 12 single-armed trials that administered subprocess measures (see Table 1), we inspected these studies with the aim of 1) exploring signs of consistency or inconsistency with results reported in the controlled trials, and 2) identifying any innovations in measurement practice, piloted ACT programs, or study design. Perhaps not surprisingly, the findings were broadly consistent with effects detected in the more conservative controlled evaluations.

Supporting a key theme of this review, a set of single-armed trials detected consistent improvements in defusion across the CFQ, ATQ-B, and FFMQ nonreactivity subscale following workplace ACT interventions (Gerhart et al., 2016; Gunn et al., 2023; Pakenham, 2015). Finucane et al. (2023) used a recently developed measure of psychological flexibility for healthcare staff (the Mindful Healthcare Scale [MHS]; Gillanders et al., 2024). They found that an ACT program for palliative care staff led to greater improvement on the MHS *defusion* subscale ($d = .64$) when compared to smaller changes reported on both the MHS *engagement* ($d = .15$) and *aware* ($d = .20$) subscales.

The study by Reeve et al. (2021) warrants mention, as it is the only trial in this review that utilized a single case design. This study evaluated the impact of implementing three ACT sessions (75–90 min each session) with a sample of $N = 4$ frontline staff working with homeless clients. Using daily rating scales across different phases of the design, results indicated that the intervention improved participants' capacity to align behaviors with personal values in at least one domain (work and/or home). This type of idiographic design offers a useful supplement to traditional group-based controlled trials, as participants serve as their own controls, and changes on psychological flexibility subprocesses can be assessed frequently in more naturalistic settings (i.e., as participants go about their daily lives).

3.4. Quality and risk of bias assessment ratings

According to the judgment generated by the Cochrane risk-of-bias tool (RoB 2), all 13 of the workplace RCTs included in this review had either a high risk of bias or some concerns. Working independently, the two raters agreed on their overall Rob 2 ratings for 10 of these 13 studies. When factoring in the role of chance agreements, this indicates a moderate level of interrater reliability (Cohen's *kappa* = .41). Fig. 2 summarizes the Rob 2 judgements that were agreed by the two raters following resolution of discrepancies on the signaling questions within each domain. Given that all the reviewed studies collected self-report data, and participants were usually aware that they were in an active intervention, the Rob 2 tool's algorithm would naturally signal concerns about possible risk of bias. Nonetheless, there are specific methodological and reporting improvements that could be implemented to reduce risk of bias in future workplace RCTs, including: improving reporting of the randomization procedure (e.g., use of computer-generated sequencing); applying intention-to-treat (ITT) analyses; and preregistering the data analytic plan.

Across all RCTs, the cluster RCT, and nonrandomized controlled trials included in the review (18 controlled studies in total), the overall POMRF rating (averaged across 17 items, and agreed between two raters) was .98, indicating that the methodological quality of this strand

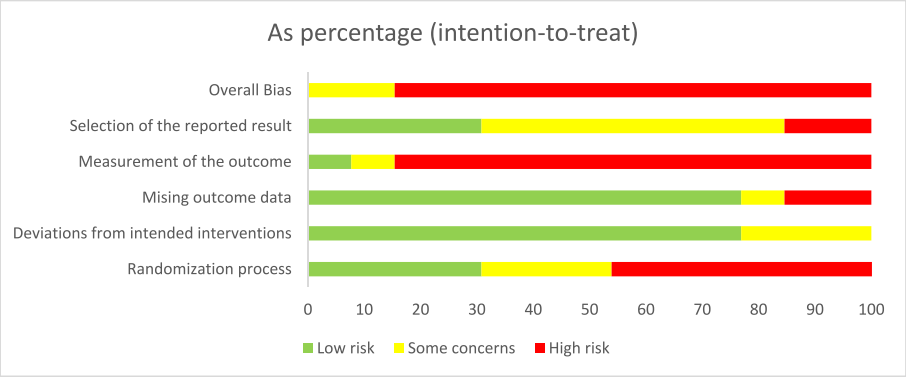

Fig. 2. Cochrane risk-of-bias (RoB 2) summary ratings for 13 randomized controlled trials included in the review.

of workplace ACT research should be viewed as fractionally below "fair" (see supplementary file). This corresponds with Unruh et al.'s (2022) POMRF rating of .91 for controlled evaluations of workplace ACT interventions (Unruh et al., 2022, supplementary Table B). Among the reviewed trials, the following limitations were common and lowered average POMRF quality ratings: lack of power analysis to determine adequacy of sample size; insufficient detail on the delivered ACT intervention (e.g., link to a training manual); lack of information on concomitant interventions (e.g., whether participants were currently in psychotherapy or another well-being initiative); and absence of formal checks for adherence to the ACT approach.

4. Discussion

Recent review findings raised doubt about the efficacy of workplace ACT interventions for improving psychological flexibility (Gloster et al., 2020; Prudenzi et al., 2021; Reeve et al., 2018; Towey-Swift et al., 2023; Unruh et al., 2022). The aim of this systematic review was to investigate whether previously aggregated findings have obscured finer-grained effects of staff-focused ACT programs on some of psychological flexibility's subprocesses. Within this strand of research, we found the most consistent and greatest volume of empirical support for the use of ACT to strengthen defusion skills in staff groups. A more modest, yet still convincing, set of findings indicates that these programs also lead to improvements on markers of mindful awareness and acceptance. We found an overall mixed pattern of results when examining effects of workplace ACT on measures of (combined) values and committed action subprocesses.

The conclusion that workplace ACT interventions improve defusion, present moment awareness, and acceptance offers a more favorable view when compared to recent meta-analytic reviews, which found null or uncertain effects of these programs on combined markers of psychological flexibility (Prudenzi et al., 2021; Reeve et al., 2018; Unruh et al., 2022). This discrepancy can be attributed to methodological challenges. When reviewing findings within individual trials, we discovered examples of significant effects being found on one measure of a psychological flexibility subprocess (e.g., FFMQ observing) but not on another measure of the same subprocess (e.g., FFMQ acting with awareness). Similarly, we unearthed multiple examples of improvements being reported in one domain of psychological flexibility (e.g., defusion) but not in another (e.g., values-based action). When pooling effect sizes across all these measures, such patterns may ultimately cancel each other out. This helps to explain why meta-analytic reviews have consistently found significant pooled effects of workplace ACT interventions on outcomes that are more homogenously assessed (e.g., psychological distress and/or burnout; Prudenzi et al., 2021; Reeve et al., 2018; Unruh et al., 2022). In making these observations, we do not intend to be critical of the meta-analytic approach. Rather, our intention is to present these systematic review findings to reveal which specific effects of staff-focused ACT interventions have been obscured.

The findings gathered for this review also revealed some potentially informative patterns of change among psychological flexibility's discrete subprocesses. A subset of the reviewed trials indicated that staff-focused ACT programs had positive effects on defusion over and above concurrent change on other psychological processes; and several trials found that increased defusion played an influential mediating role in ACT's impact on mental health outcomes (see Table 4). For instance, Waters et al. (2018) detected a specific indirect effect of ACT on nurses' mental health via defusion (lowered reactivity to negative thoughts) over a 3-month period, even while accounting for concurrent change in negative thought frequency. Similarly, Varra et al. (2008) found that a workplace ACT workshop helped addiction counselors to become less fused with internal barriers to implementing new treatments, even while they reported increased acknowledgment of the presence of those barriers. Such patterns are congruent with the assumption that ACT prioritizes modifying the function of discouraging thoughts over their form or frequency.

When inspecting changes on markers of contact with the present moment, we discovered that workplace ACT programs have demonstrated differential effects on two distinct aspects of mindful awareness: 1) an increased capacity to notice and awaken from "automatic pilot" mode, and reduce attentional distractions due to mind wandering, daydreaming, or worrying (assessed by the MAAS and KIMS/FFMQ acting with awareness); and 2) awareness of current bodily sensations, sights and sounds, and emotions (assessed by KIMS/FFMQ observing). On balance, there appear to have been more robust effects of staff-focused ACT interventions on observing skills, with a group of studies reporting significant effects of ACT on FFMQ observing and not on acting with awareness (Biglan et al., 2013; Lu et al., 2023; Waters et al., 2018). Moreover, observing was the only marker of contact with the present moment that demonstrated a mediational influence in ACT's longer-term impacts on staff mental health (Kinnunen et al., 2020; Waters et al., 2018). It is noteworthy that observing was found to be an important subprocess only when it emerged alongside significant improvements on one of ACT's "open" processes (i.e., acceptance or defusion). This concomitant pattern aligns with the notion that monitoring one's physical and emotional sensations is not inherently adaptive and becomes adaptive when accompanied by an accepting attitudinal stance toward what is being observed (Lindsay & Creswell, 2017). These nuanced patterns of change suggest that future evaluations of staff-focused ACT programs would benefit from including assessments capable of capturing different characteristics of mindful awareness. Supporting the utility of this approach, Rogge and Daks (2021) demonstrated that additional information can be gained by adding a mindful observing facet to existing multidimensional psychological flexibility instruments.

Another noteworthy finding is the way that the acceptance subprocess tended to unfold in response to ACT-based training. For this

subprocess, the patterns of change imply that it can take time for effects of workplace ACT programs on acceptance to emerge and influence staff mental health. This was evident among studies that detected effects on acceptance measures only at follow-up assessments, and not immediately after the ACT program (Hofer et al., 2018; McConachie et al., 2014). In addition, Kinnunen et al. (2020) found that ACT's beneficial effects across three burnout dimensions over a 10-month follow-up period were mediated via an improvement in acceptance (i.e., change on FFMQ nonjudging).

The mixed evidence surrounding the influence of workplace ACT interventions on values and committed action subprocesses appears to reflect challenges discussed in the wider ACT literature. In particular, reviews of ACT's valuing concept and measurement tools have highlighted limitations with the VLQ (e.g., Barney et al., 2019; Barrett et al., 2019; Rahal & Gon, 2020; Reilly et al., 2019). While the VLQ has been recognized for its clinical utility (e.g., for values-oriented conversations with therapy clients), it tends to perform poorly when used solely as an empirical instrument. The mixed findings on the VLQ led us to downgrade our overall weighting of the evidence to "weak" for workplace ACT intervention effects on values and committed action. To offer some balance to this critical appraisal, we highlight more encouraging and consistent findings reported across three recent trials of ACT for healthcare staff, all of which adopted the VQ (Christodoulou et al., 2024; Lu et al., 2023; Prudenzi et al., 2022). Among these studies, an increased capacity for engaging in values-consistent behavior mediated ACT's positive impacts on anxiety, depression, one aspect of burnout, and general psychological distress (Lu et al., 2023; Prudenzi et al., 2022); and ACT was reported to be slightly superior to an equivalent dose of mindful meditation training for cultivating valuing skills in healthcare staff (Christodoulou et al., 2024).

We believe that collating these findings offers useful contributions to this area of ACT research and practice. First, the findings extracted from these studies validate the view that aggregating effects across an array of psychological flexibility, mindfulness, cognitive fusion, and values-based action variables has obscured more specific processes that have been successfully modified by staff-focused ACT programs.

Second, adopting a theoretical perspective, the subprocess patterns of change exhibit preliminary alignment with Rogge and Daks' (2021) unified theory of flexibility and mindfulness processes. Specifically, among the reviewed trials, there is evidence of mindful awareness functioning as a "Stage 1" process, by contributing to mental health soon after a workplace ACT program (Frögéli et al., 2016); whereas acceptance and defusion appeared to function in some trials as "Stage 2" processes, primarily influencing ACT's longer-term effects on mental health outcomes (Frögéli et al., 2019; Kinnunen et al., 2020; Waters et al., 2018). It is yet to be determined whether these subprocesses ultimately lead to improved mental health and work-related functioning because they support the capacity for values-consistent behaviors (i.e., through "Stage 3" subprocesses; Rogge & Daks, 2021).

Third, in terms of program design, a general recommendation would be to ensure that workplace ACT protocols include practices that go beyond training present moment awareness skills, to help participants cultivate a defused and open relationship with difficult thoughts and feelings. The evidence we have presented indicates that these latter two psychological flexibility subprocesses have made important contributions to sustained improvements in burnout and mental health gained by workplace ACT participants. The unexpectedly consistent effects across defusion measures imply that cognitive defusion practices have high utility among staff groups. Among the evaluated ACT protocols, specific defusion techniques have included: routinely referring to "The Mind" as if it were a separate entity; encouraging staff to adopt language practices that facilitate a psychological "step back" from inner content (e.g., "I notice that I'm having the thought that …."); and role playing defusive metaphors in the group training setting (e.g., passengers on the bus; Christodoulou et al., 2024; Flaxman et al., 2013; Lu et al., 2023; Prudenzi et al., 2022). Workplace training designers could also look to the wider ACT literature, where protocols have been organized around modules focusing on cultivating interwoven aware, open, and engaged skills (Levin et al., 2020; Petersen et al., 2021). The ACT Matrix (Polk et al., 2016) offers a way for trainers to integrate all these strategies into a single training tool, and has recently been recognized for its utility in workplace settings (Díaz et al., 2025; Flaxman et al., 2023).

The question remains about how long workplace ACT programs should be to ensure successful cultivation of the full set of psychological flexibility subprocesses. There were few indications in this strand of literature to offer concrete advice on program duration. Studies that have documented longer-term benefits of ACT tended to evaluate lengthier programs. This includes Kinnunen's and Puolakanaho's 8-week MAV program (with gains sustained over 10- and 12-month follow-ups); and the 6 × 2 h sessions of ACT delivered to nursing trainees by Frögéli et al. (2016, 2019), with positive effects detected at 1-year follow-up. For the group training format, averaged study characteristics suggest that programs of around 8–10 h, spread over 3 to 5 sessions, should be expected to cultivate a range of psychological flexibility skills (Christodoulou et al., 2024; Flaxman et al., 2023; Gillanders et al., 2014; Prudenzi et al., 2022). A growing number of trials suggest that automated web-based sessions can be briefer, while still helping to improve psychological flexibility subprocesses (e.g., Finucane et al., 2023; Gunn et al., 2023; Lu et al., 2023).

Although this finer-grained review of workplace ACT programs has shed light on previously obscured subprocess findings, several limitations should be noted. First, due to our interest in psychological flexibility's subprocesses, we deliberately omitted worksite ACT intervention trials that only administered the AAQ-II, the WAAQ, or reported only an overall mindfulness score. Also, among the reviewed studies, we did not extract additional findings reported on measures that were difficult to map onto a distinct subprocess in ACT's model (e.g., self-compassion scales). Hence, our synthesis captures only a portion of the literature on ACT in workplace settings.

A second limitation stems from variability among the instruments adopted to assess change in psychological flexibility's subprocesses, including alternative ways of mapping some subscales in relation to ACT's hexaflex model. For instance, ACT's values measures have generally exhibited weak convergent validity (Barrett et al., 2019). This suggests that the VLQ and VQ may not assess the same components of the valuing process (Barney et al., 2019). Also, we mapped the FFMQ nonjudging subscale onto acceptance, reflecting its inclusion in McAndrews et al.'s (2019) review of acceptance measures, and the way that nonjudging has been conceptualized in the mindfulness literature (Lindsay & Creswell, 2017). However, the FFMQ's negatively phrased nonjudging items load on to *self-as-content* in the MPFI (i.e., a subdimension of psychological inflexibility). Going forward, investigations of ACT's subprocesses will likely gain precision by measuring psychological flexibility and inflexibility as distinct constructs, rather than reverse scoring negatively worded item sets to assess psychologically flexible responses (Rogge & Daks, 2021; Rolffs et al., 2018).

Third, we restricted our study to a systematic review of this strand of workplace intervention research, rather than performing a quantitative meta-analysis. This decision was based on the small number of controlled workplace trials spread across the five assessed subprocess categories, and heterogeneity among the measures mapped onto each subprocess. Due to the heterogeneity in workplace ACT research, Towey-Swift et al. (2023) cautioned against conducting premature meta-analyses, which may produce biased estimates of pooled effects.

Fourth, although we were able to review a set of RCTs, informative findings (including mediation effects) were gathered from non-randomized intervention trials. While this may be viewed as a limitation, it is important to recognize that conventional RCTs are not always viable in workplace settings, particularly if participants are recruited from the same organization or work teams.

Fifth, based on the RoB 2 and POMRF ratings, this field would clearly benefit from an improvement in methodological quality. Studies that

exhibited methodological strengths included information on randomization procedure, power analysis, active control conditions, and follow-up assessments. However, numerous studies had small sample sizes and/or limited evaluation timeframes, and the ACT intervention protocols were rarely described in detail or subject to fidelity checks. The next generation of workplace ACT research should be designed to address these methodological shortcomings.

Sixth, our summary judgements on the weight of evidence (reported in Table 2) were presented as a heuristic, to give readers a "take-away" message regarding reported effects of workplace ACT interventions on the assessed subprocesses. As such, these judgements should be viewed alongside the more formal quality assessments that indicate this body of research exhibits fair methodological quality overall (i.e., not poor but not strong).

These limitations illuminate avenues for future evaluations of these interventions. Workplace ACT researchers should now utilize one of the recently developed multidimensional psychological flexibility/inflexibility instruments to assess change simultaneously across different subprocesses (Francis et al., 2016; Gillanders et al., 2024; Gloster et al., 2021; Kashdan et al., 2020; Rogge & Daks, 2021; Rolffs et al., 2018). Researchers can utilize such measures to test whether some subprocesses function as particularly influential (e.g., unique) mediators of ACT's effects on staff well-being. Another recommendation is to increase the number of measurement occasions. This would enable researchers to model patterns of subprocess change unfolding (for example) across several consecutive weeks or months during and after a staff-focused ACT program, and test associations between subprocess change trajectories and parallel or more distal improvements on outcome variables.

The theoretical and methodological yield of this research area would be further enhanced by comparing ACT with other empirically established worksite intervention approaches, such as CBT, positive psychology, or mindfulness-based stress reduction programs, to investigate whether workplace versions of ACT exhibit specificity in targeting psychological flexibility's subprocesses (Christodoulou et al., 2024). Given that evaluations of these programs can attract heterogeneous samples of staff, future research should investigate whether changes on subprocesses differ between individuals attending with a mental health difficulty and those who are (relatively) psychologically healthy. Finally, researchers could build on the emerging interest in single case designs for evaluating ACT's applications with staff groups (Reeve et al., 2021; also see Diaz et al., 2025; Paliliunas et al., 2022).

To conclude, this more focused review of the workplace ACT literature has revealed that these interventions have successfully targeted a subset of psychological flexibility processes in a range of staff groups. We hope that our narrative summary of these findings will help to inform future research into these programs, while also providing guidance to practitioners looking to utilize the ACT approach for improving mental health among working populations.

CRediT authorship contribution statement

Yass Rad: Writing – original draft, Visualization, Project administration, Methodology, Conceptualization. **Arianna Prudenzi:** Writing – review & editing, Conceptualization. **Lucie Zernerova:** Writing – review & editing, Validation, Methodology, Conceptualization. **Jennifer Gerson:** Writing – review & editing. **Paul E. Flaxman:** Writing – original draft, Validation, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The second author was co-author on one of the reviewed studies. The fifth author was co-author on two of the reviewed studies. The fifth author receives royalties for a book on ACT in the workplace.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcbs.2025.100915.

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