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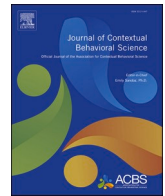
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Increasing workforce psychological flexibility through organization-wide training: Influence on stress resilience, job burnout, and performance^{☆,☆☆}

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ABSTRACT

There is growing interest in the role of psychological flexibility as a potential resilience factor in workplace settings for protecting employees against the risk of job burnout. This field study contributes to the literature by investigating the utility of delivering brief ACT-informed training to the entire regional workforce of an innovation and manufacturing organization. A total of 504 employees attended the training, 281 of whom completed study measures prior to the training and three months later. Across the 3-month timeframe, participants reported a statistically small and significant increase in work-related psychological flexibility. Increased psychological flexibility was associated with improved stress resilience, reduced exhaustion, and increased personal accomplishment. No change was observed on the depersonalization component of burnout or task performance. Moderation analyses revealed that residual change associations between work-related psychological flexibility and both exhaustion and resilience were stronger among participants with higher baseline exhaustion. By contrast, work-related psychological flexibility trended toward a stronger residual change relationship with personal accomplishment among participants with lower baseline exhaustion. We interpret these findings from the perspective of resource-based theories of workplace functioning, and highlight the potential of cultivating psychological flexibility as part of organization-wide personnel development initiatives.

1. Introduction

There is global concern about the personal, organizational, and societal consequences of burnout among working populations (Abdul Aziz & Ong, 2024; Schaufeli et al., 2009; Shirom, 2010). Job burnout is viewed as a psychosocial phenomenon that arises in response to prolonged exposure to chronic job stressors, and which is exacerbated by ineffective coping behavior and inadequate recovery from work demands during nonwork time (Bakker & de Vries, 2021; Bennett et al., 2018; Maslach et al., 2001). The most widely applied model conceptualizes job burnout as a syndrome comprised of three dimensions: over-depletion of energetic resources (*exhaustion*); a hardened, cynical, or indifferent attitude toward the recipients of one's work or the job

itself (*depersonalization/cynicism*); and a sense of ineffectiveness and reduced capability in one's job role (reduced *personal accomplishment/professional efficacy*; Maslach, 2003). Evidence indicates that burnout syndrome is associated with adverse consequences for employees and employers, including depression, risk of cardiovascular problems, sleep disturbance, absenteeism, and reduced work productivity (Salvagioni et al., 2017).

Among the intervention approaches identified as holding potential for reducing or preventing burnout, there is growing interest in worksite training derived from *acceptance and commitment therapy* (ACT). Similar to ACT applications in other contexts, workplace ACT programs seek to increase people's capacity to be psychologically flexible, broadly defined as an openness to experience difficult thoughts and feelings

* Study data were collected as part of the first author's doctoral thesis in occupational psychology at Kingston Business School. ** Data for this study are not publicly available, but are available upon reasonable request.

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while pursuing personally valued patterns of behavior (Ong et al., 2019). ACT's deployment as a burnout intervention is underpinned by an assumption that psychological flexibility functions as a resilience factor, potentially offering employees some protection against developing burnout syndrome in response to work stressors (Ruiz & Odriozola-González, 2017). A modest body of research has evaluated effects of workplace ACT programs on burnout. Reeve et al.'s (2018) meta-analysis failed to detect a pooled effect of ACT on burnout relative to control conditions among direct-care staff. Prudenzi et al.'s (2021) review concluded that ACT programs may be effective for reducing burnout among healthcare staff over longer timeframes (i.e., at follow-up assessments). Towey-Swift et al.'s (2023) synthesis of this literature concluded that ACT reduced at least some facets of burnout in a majority of trials.

Alongside the tentatively encouraging findings, there are signs that this strand of evidence would gain from greater breadth and diversity. First, evidence supporting ACT's efficacy for tackling burnout has mostly been derived from health and social care staff. Hence, it remains unclear whether ACT has similar utility when adapted for staff in other (e.g., corporate) organizational contexts. Second, ACT studies have often investigated change in burnout and psychological distress among employees with elevated baseline symptoms of stress or burnout (e.g., Brinkborg et al., 2011; Dahl et al., 2004; Flaxman & Bond, 2010; Hofer et al., 2018; Kinnunen et al., 2020; Puolakanaho et al., 2020; Waters et al., 2018). Deploying ACT to support at-risk individuals remains important, given the prevalence of mental health problems among working populations (Goetzel et al., 2018). Nonetheless, burnout *prevention* may also require initiatives that can be expanded in scale, for instance by utilizing ACT to bolster resilience skills in the wider workforce (Ahola et al., 2017; Biglan et al., 2008; Chong et al., 2023; Maricuțoiu et al., 2016). Third, workplace ACT research has exhibited inconsistency when operationalizing burnout, with some studies combining different dimensions into a single construct and others omitting personal accomplishment (Towey-Swift et al., 2023). Fourth, although it has been proposed that psychological flexibility represents a resilience factor against the impact of job stressors, the field lacks research investigating whether workplace ACT programs improve markers of stress resilience (Robertson et al., 2015).

An additional challenge concerns the length of workplace ACT programs, which often involve multiple training sessions delivered over several hours (e.g., 6 × 2 h sessions or 4 × 3 h sessions; Brinkborg et al., 2011; Frögéli et al., 2016). This training dose may be required when the aim is to reduce high levels of burnout or distress (Prudenzi et al., 2021). However, in some settings, the time commitment may hinder wider organizational implementation (Archer, 2018; Klatt et al., 2009). There could therefore be untapped potential in workplace applications of abbreviated versions of ACT, such as those developed for time-pressured clinical settings (Strosahl et al., 2012).

With these issues in mind, the current article evaluates a workforce-wide implementation of ACT. Specifically, we capitalize on a field opportunity to investigate the outcomes of targeting work-related psychological flexibility within a half-day resilience training program, which was adopted as an organization-wide initiative and delivered to the entire regional workforce of a product innovation and manufacturing company. The associated research has two primary goals. First, to assess the influence of this ACT-informed training on work-related psychological flexibility. Second, to investigate the extent to which any increase in the trained workforce's psychological flexibility is associated with improvements in resilience, burnout, and self-rated job performance over a three-month period.

At a theoretical level, our study draws from links between ACT's model of psychological flexibility and resource-based models of job burnout and employee functioning (Flaxman et al., 2023; Lloyd et al., 2013). Bond et al.'s (2006) goal-related context sensitivity hypothesis seeks to explain how psychologically flexible responses influence employees' work-related well-being and behavior. According to this

account, psychologically flexible employees are less likely to expend attentional, energetic, and self-regulatory resources on controlling, avoiding, or overanalyzing undesirable inner experiences that arise at work. These individuals should then be better able to transfer any conserved cognitive and energy resources toward noticing and pursuing goal-related opportunities that unfold (or are personally crafted) in the working environment. Moreover, due to their lowered propensity for avoiding actions, interactions, or performance situations that elicit personal discomfort, employees with greater flexibility may have access to a wider range of options for responding effectively to those opportunities (Bond et al., 2006, 2013; Flaxman et al., 2023).

Similar propositions are found in the conceptualization of psychological flexibility as a personal resource within the job demands-resources (JD-R) theory of burnout and work engagement (Biron & van Veldhoven, 2012; Flaxman et al., 2023; Novaes et al., 2018; Onwezen et al., 2014). The JD-R model is organized around two pathways, with some types of job demands (e.g., work overload, role conflict) linked primarily to increased risk of burnout (health impairment pathway), and job resources (e.g., autonomy, supervisory support) linked primarily to work engagement (motivational pathway; Bakker & Demerouti, 2017). Employees' personal resources are theorized to play a role in both pathways, by buffering the adverse impact of high demands on employee burnout and enhancing well-being benefits derived from job resources (Bakker & Demerouti, 2017). Personal resources refer to various adaptive individual characteristics that can influence how employees appraise work events, coping responses deployed when encountering stressors, and capacity for pursuing goals in the face of challenge (Flaxman et al., 2023; van den Heuvel et al., 2010).

A growing body of correlational evidence supports these resource-based conceptualizations of psychological flexibility. Biron and van Veldhoven's (2012) daily survey research revealed that psychological flexibility reduced the detrimental impact of job demands on service workers' exhaustion. A recent meta-analysis found a medium-sized pooled correlation between psychological flexibility and burnout across nine cross-sectional studies involving healthcare professionals (Garner & Golijani-Moghaddam, 2021). Given concerns about the acceptance and action questionnaire (AAQ-II), it is important that researchers have detected broadly similar effects when using different measures of psychological flexibility (Boatema et al., 2019; Chong et al., 2023; Holmberg et al., 2020; Kopperud et al., 2021; Novaes et al., 2018; Prudenzi et al., 2022; Ruiz & Odriozola-González, 2017; Vilar-daga et al., 2011). Consistent with the notion that psychologically flexible is a contextually sensitive capacity, Novaes et al. (2018) examined the degree to which *work-related* psychological flexibility operated as a personal resource among employees in Brazil. Psychological flexibility was found to reduce the detrimental influence of work overload on well-being, and enhanced the functional association between job autonomy and well-being.

While revealing functions of psychological flexibility among working populations, this body of correlational research has relied on naturally occurring variation in employees' levels of flexibility. The current study extends this research by investigating whether it is viable to manipulate work-related psychological flexibility on a broad (i.e., general workforce) scale, to establish whether any increase in flexibility is associated with improvements on markers of resilience, burnout, and performance. Aligning with a recent strand of workplace research, we operationalize work-related psychological flexibility as a contextually specific and unidimensional construct, capturing an individual's capacity to be effective in their work behavior while experiencing difficult or unhelpful thoughts and emotions (e.g., Holmberg et al., 2020; Novaes et al., 2018; Ruiz & Odriozola-González, 2017). To scrutinize psychological flexibility's status as a personal resilience resource within workplace contexts, we explore the degree to which work-related psychological flexibility is associated with (yet distinguishable from) stress resilience, defined as the personal ability to recover quickly (or "bounce back") from stressful events (Smith et al., 2008).

We test four hypotheses. First, we predicted that ACT-informed resilience training would increase work-related psychological flexibility over a 3-month period (hypothesis 1). Second, we hypothesized that increased psychological flexibility would be associated with improved resilience (hypothesis 2). Third, we predicted that increased psychological flexibility would be related to the three components of burnout syndrome, manifesting in decreased exhaustion (hypothesis 3a) and depersonalization (hypothesis 3b), and increased personal accomplishment (hypothesis 3c). Fourth, we hypothesized that increased psychological flexibility would be positively related to improved task performance (hypothesis 4). As an exploratory endeavor, we address the question of whether benefits of cultivating psychological flexibility are more or less prominent among employees with elevated stress symptoms. Specifically, we explored whether the predicted relationships between work-related psychological flexibility and the resilience, burnout, and performance outcomes would be moderated by employees' baseline level of exhaustion (i.e., the "stress-related" component of the tripartite model of burnout syndrome).

2. Method

2.1. Study context and design

This study provides a field investigation of a brief ACT-informed training program that was delivered to staff at worksites in four Scandinavian countries, constituting a regional operation of a product innovation and manufacturing company. The first author (RA) consulted with the organization's senior leaders around developing a resilience program that was tailored to challenges faced by staff in this context, including: improving personal awareness of stress, time management and task focus, helping employees improve recovery from job pressure, and communication. The leaders expressed interest in training that was suitable for delivery to its entire regional workforce (over 500 employees). All employees were expected to attend the half-day training, which was attended by groups of around 15 to 20 individuals at one time. During the study, 504 employees (>95% of the regional workforce) attended the training, which was delivered on the host organization's premises by the first author (RA) a total of 31 times between October 2017 and March 2018. The organization's business was predominantly conducted in English, and the training and research measures were administered in English.

Our initial research intention had been to apply a randomized controlled trial (RCT) design. However, the organization required all employees at each site to attend the training within a narrow time period. As a result, it was not feasible to maintain a waiting list control condition for more than approximately four weeks. We considered this timeframe insufficient for detecting meaningful change in work-related psychological flexibility or study outcomes. We therefore reverted to a single-arm research design, which included the entire sample of employees who (a) attended the ACT-informed training, and (b) responded to study measures at baseline (Time 1) and three months after attending the training (Time 2). Based on other workplace ACT studies (Flaxman & Bond, 2010; Waters et al., 2018), we reasoned that three months would provide an adequate timeframe for observing improvement in psychological flexibility, and for any change in psychological flexibility to exert an influence on employees' well-being and/or work effectiveness. The study obtained approval from the University of Kingston (UK) Ethics Committee.

2.2. Participants and procedure

Among the 504 employees who were registered as having attended the training, 47% ($n = 239$) were female. The training was mandatory for the workforce, while participation in the research was voluntary. Study measures were administered through SurveyMonkey software by a researcher who was not involved in the training delivery. A total of 422

individuals consented to participate in the research and completed baseline (Time 1) measures, 281 (67%) of whom responded again three months later (Time 2). Prior to attending their scheduled training session, employees received an e-mail from the researcher describing the purpose of the study, emphasizing data confidentiality and voluntary nature of the research, with a link to the Time 1 measurement battery. Participants received another e-mail three months after attending the training, containing a link to Time 2 measures. Due to a suspected administrative error, demographic variables (age, gender, education level) were not captured with the stored Time 1 dataset.

2.3. ACT-informed resilience training

Following consultation with senior members of the organization, the first author (an experienced workplace ACT practitioner), designed the half-day program to focus on challenges pertinent to the focal workforce (e.g., task focus, time management, recovery from job demands) in ways that sought to cultivate psychological flexibility. The training incorporated various ideas drawn from the ACT literature (e.g., toward and away moves, undermining experiential avoidance, willingness, and workability), and the Focused ACT (FACT) protocol (Strosahl et al., 2012).

Table 1 summarizes the ACT-informed training along with the targeted psychological flexibility processes. The training was split into three main sections, with approximately 1 h dedicated to each section, and a comfort break between sections. Sessions lasted 3.5–4 h overall. The theme of section 1 was "good vs bad stress". A key message was that stress is not inherently a problem, unless it becomes chronic due to absence of effective recovery behaviors. Participants were introduced to a metaphorical distinction between a "flat" and "wobbly" line to highlight the contribution of recovery to sustained energy and performance. The flat line portrayed the experience of rigid, relentless, mindless, and automatic effort expenditure at work (without effective recovery). Participants worked in small groups to clarify internal and external factors that drew them toward "flat line" behavior (e.g., not wanting to let others down, guilt, fear of being a failure). The flat line was compared to a wobbly line, in which periods of high effort expenditure at work are punctuated with deliberate recovery experiences outside of work, incorporating engagement in other personally valued pursuits, and in which performance at work has the potential to be focused, deliberate, vital, and sustained. Participants reflected on and shared their own recovery behaviors, and discussed inner experiences (e.g., guilt) that might interfere with such behavior.

The theme of section 2 was "the mind under pressure". Aims were to help participants become more aware of (stress-related) thoughts and emotions, and to convey that cultivating meta-awareness of inner experience can facilitate behavioral choice. Participants watched a 4-min video animation, showing an ACT adaptation of Peters' (2012) chimp model metaphor. The video presented humans as having "4 brains" ("the chimp", "the pilot", "the autopilot", and "the observer") [<https://www.youtube.com/watch?v=vkzF6NdTIHQ&t=32s>]. Participants discussed implications of the four brains metaphor, and reflected upon personal experiences linked to each. This section also included a "Mind Traps" exercise, which involved participants reflecting upon the process of becoming fused with stress-related thinking patterns. The trainer then introduced psychological flexibility as an alternative response. Participants watched and discussed a 3.5-min animated video on experiential avoidance and psychological flexibility [<https://www.youtube.com/watch?v=C-ZuqeyxULM>], which introduced the notion of toward and away moves and workability.

The section 3 theme was "applying marginal gains", adopting a popular idea linked to sports performance. This section conveyed how small and personally chosen daily actions can have a powerful influence over time. The trainer supported participants to generate their own marginal gains (framed as small behavioral experiments) in different areas of work and life. Participants were invited to embark on a "21-day

Table 1
Description of the ACT-informed resilience training program and targeted psychological flexibility processes.

Training section	Description	Targeted psychological flexibility processes
Section 1: good stress vs bad stress		
Understanding individual and group context	Discuss key contextual challenges in small groups and share examples with wider group (ensuring the training was contextually relevant).	
'Flat' vs 'wobbly' line metaphor Flat line = relentless work effort without effective recovery Wobbly line = high performance with effective recovery	Contrast between athletes' and office workers attitude toward recovery in performance and health. Flat line: Automaticity and rigidity in work behavior; lack of choice and sustainability (risk of burnout); getting hooked into flat line work behavior by inner and external experiences without realisation. Wobbly line: Intentionality in behavior; greater emphasis on focus and reduced distraction, reflection on specific recovery behaviors; variety of recovery behaviors, 'being where your feet are'. Challenge of recovery: Difficult thoughts and feelings associated with recovery behavior (e.g., guilt, 'recovery is something I do if I have time').	Behavioral awareness Present moment awareness (noticing lack of presence/distraction) Noticing how inner experience can influence chosen behavior Noticing how we can get drawn into automatic/unchosen patterns of behavior Taking small actions in the presence of difficult inner experience
'Stress signature' pairs exercise	Identifying emergent and later signs using a stress curve figure Noticing earlier when stress is becoming chronic/a problem.	Noticing inner experience
Section 2: The Mind under pressure		
The '4-brain' model	ACT adaptation of Peters' chimp brain model to include the observing brain. Chimp = instant/emotional reaction; Pilot = able to identify a longer term, valued direction; Autopilot = automatic, programmed responses; Observer = ability to notice all of the above (non-judgmentally). Noticing the characters' mind chatter/advice can be helpful and unhelpful, depending on context.	Noticing inner experience Defusion: Noticing that we have an inner voice that can be helpful and unhelpful. Reflection on what each character might say Defusion: giving names for different aspects of inner experience/ thinking Reducing judgments about inner experience (e.g., momentary emotional reactions of chimp brain) Present moment awareness: awaking from the autopilot; strengthening the 'Observer Brain' Values: Pilot brain can identify longer term (valued) direction Self-as-context:

Table 1 (continued)

Training section	Description	Targeted psychological flexibility processes
'Mind traps' exercise	Video animation	'Observer Brain'; 'you' are the one who notices Defusion: Giving names to different stories the Mind tells us; noticing how hooked behavior can be unhelpful in some contexts, helpful in others Workability Experiential avoidance and the importance of acceptance, values, workability
Psychological flexibility as an alternative approach	Video animation on away and towards moves	Workability Experiential avoidance and the importance of acceptance, values, workability
Section 3: Applying marginal gains to behavior change		
Areas of task focus/reducing distraction, communication, recovery (during work day and at home), general health	Move in the direction of something meaningful to you; little intentional change of behavior in the service of something that matters. Satisfaction with workability of behavior (on 1 to 10 scale). What are you already doing well? Where and how would you like to pursue a small increment in a score? Making such choices may come with difficult or distracting thoughts and feelings. Marginal gains – identifying small, specific, achievable behavioral changes that would make a small difference to that area (e.g., task focus, recovery).	Values and committed action Workability – what would increase your score, even by a point?
Commitment to 21-day behavioral challenge	Public commitment and reflection on internal and external obstacles.	Values and committed action

behavioral challenge”, which involved identifying and pursuing two marginal gains. Participants organized themselves into pairs to facilitate public commitment to the 21-day challenge. The trainer sent reminders of the marginal gains challenge in follow-up emails. Managers were invited to reference the challenge during team meetings.

2.4. Measures

We assessed psychological flexibility with the *Work-Related Acceptance and Action Questionnaire* (WAAQ; Bond et al., 2013), a 7-item scale capturing a person’s ability to function effectively at work while experiencing discomforting thoughts and feelings (Bond et al., 2013). The WAAQ has demonstrated incremental validity for predicting work-related outcomes beyond the Big 5, negative affectivity, locus of control, and job characteristics (Bond et al., 2013; Ruiz & Odriozola-González, 2014). Items include: “I am able to work effectively in spite of any personal worries that I have”. Participants responded on a 7-point scale ranging from never to everyday. Cronbach’s alphas: Time 1 = 0.89, Time 2 = 0.90.

We administered the *Brief Resilience Scale* (BRS; Smith et al., 2008) to capture stress resilience. The BRS assesses a person’s ability to bounce back, adapt to stress, or thrive in the face of adversity (de Holanda Coelho et al., 2016; Smith et al., 2008). The scale includes three positively worded items (e.g., “I tend to bounce back quickly after hard times”) and three negatively worded items (e.g., “It is hard for me to

snap back when something bad happens”). Responses were captured on a 5-point scale ranging from strongly disagree to strongly agree. Higher scores indicate greater resilience. Cronbach’s alphas: Time 1 = 0.82, Time 2 = 0.79.

We deployed the *Maslach Burnout Inventory* (MBI; Maslach et al., 1996) to assess job burnout. We administered the original 22-version and replaced the word “recipients” with “clients” to ensure relevance to the participating workforce (in this setting, “clients” refers to internal and external customers). The MBI is organized into three subscales: *exhaustion*, capturing feelings of being overly depleted by work (e.g., “I feel emotionally drained from my work”); *depersonalization*, capturing a hardened, impersonal, or distanced interpersonal attitude (e.g., “I’ve become more callous toward people since I took this job”); and *personal accomplishment*, assessing a sense of work-related efficacy and achievement (e.g., “I have accomplished many worthwhile things in this job”). MBI items were rated on a response scale ranging from 0 (never) to 6 (every day). We removed two frequently cross-loading items (items 12 and 16) prior to analysis (Loera et al., 2014). Cronbach’s alphas were as follows: exhaustion Time 1 = 0.87, Time 2 = 0.88; depersonalization Time 1 = 0.60, Time 2 = 0.69; personal accomplishment Time 1 = 0.72, Time 2 = 0.80.

We assessed task performance with items adapted from the *Individual Work Performance Questionnaire* (IW PQ; Koopmans et al.). This aspect of performance captures the proficiency with which individuals sense they are executing core job tasks. The administered scale had five items rated from 1 (seldom) to 5 (always). Items included: “In the past three months, I was able to plan my work so that I finished on time”. Cronbach’s alphas: Time 1 = 0.76, Time 2 = 0.77.

2.5. Data analysis

We analyzed the data in three stages. First, we performed confirmatory factor analysis (CFA) on the Time 1 dataset ($N = 422$) to establish whether the work-related psychological flexibility, resilience, burnout, and performance constructs were sufficiently distinct. The psychometric analyses were conducted in IBM® SPSS® Amos. Second, we applied a paired samples t -test, and calculated effect size (Cohen’s d for repeated measures), to test for change in the trained workforce’s level of work-related psychological flexibility from Time 1 to Time 2 (*hypothesis 1*). Third, we generated a path model using standardized residual change scores to examine whether Time 1 to Time 2 change in work-related psychological flexibility was associated with: enhanced resilience (*hypothesis 2*); decreased exhaustion and depersonalization (*hypotheses 3a and 3b*) and increased personal accomplishment (*hypothesis 3c*); and improvement in task performance (*hypothesis 4*). Standardized residuals were calculated using a linear regression model in which Time 1 scores predicted Time 2 scores. The residuals represent variance not linearly explained by baseline scores. Finally, we computed a series of moderated regression models (using the PROCESS macro for IBM® SPSS®; Hayes, 2013), to investigate whether residual change relationships between work-related psychological flexibility and the outcome variables were conditional upon Time 1 level of exhaustion.

A power analysis was conducted using G*Power 3.1.9.7 (Faul et al., 2007). First, we sought to determine the estimated sample size required to detect a small, medium, or large effect ($d = 0.2, 0.5, \text{ and } 0.8$ respectively; Cohen, 1988) with respect to Time 1 to Time 2 change in work-related psychological flexibility and the other study variables using paired samples t -tests. Based on an alpha level of 0.05, and desired power of 0.90, the analysis indicated that 265, 44, or 19 participants were needed to detect a small, medium, or large effect. A post-hoc power analysis revealed that actual power achieved was 0.92. Second, power analysis revealed that sample sizes of 528, 73, or 33 were required to detect a small, medium, or large effect ($f^2 = 0.02, 0.15, \text{ and } 0.35$ respectively) with respect to individual regression paths hypothesized in the path model (*hypotheses 2 to 4*). Based on these estimations, the study sample size of 281 was deemed adequate for the planned analyses.

3. Results

3.1. Psychometric analyses

Table 2 reports CFA results. Model 1, with items loading on to their respective constructs, yielded a satisfactory fit: $\chi^2(611) = 1145.84, p < .001, CFI = 0.91, TLI = 0.90, RMSEA = 0.05, SRMR = 0.06$. Model 2a, in which items measuring work-related psychological flexibility and resilience were loaded on a single construct, yielded significantly worse fit: $\Delta \chi^2(6) = 311.93, p < .001$. Model 2b, in which personal accomplishment and task performance items were loaded on a single factor also yielded inferior fit: $\Delta \chi^2(6) = 399.57, p < .001$. Finally, a comparative model (Model 3) with items from all study measures loading on the same factor produced the poorest fit: $\Delta \chi^2(21) = 2679.73, p < .001$. Collectively, these results indicate that the study’s variables were psychometrically distinguishable from each other.

3.2. Change in work-related psychological flexibility (hypothesis 1)

Table 3 reports descriptive statistics and results of the paired samples t -test assessing change in work-related psychological flexibility. There was a statistically small and significant increase in the trained workforce’s level of work-related psychological flexibility from Time 1 to Time 2: $t(280) = 3.39, p < .001, d = 0.20$. Alongside the change in psychological flexibility, results indicated a small and significant reduction in exhaustion ($d = -0.18$), and improvements in personal accomplishment ($d = 0.20$) and resilience ($d = 0.29$). No change was observed on the depersonalization or task performance variables. There were no significant baseline (Time 1) differences on any study variable between participants who completed Time 2 measures ($n = 281$) and those who did not ($n = 141$).

3.3. Residual change relationships between work-related psychological flexibility and study outcomes

Table 4 presents results of the path model analyses. Time 1 to Time 2 change in work-related psychological flexibility was associated with: increased resilience (*hypothesis 2*); decreased exhaustion and depersonalization (*hypotheses 3a and 3b*); improvement in personal accomplishment (*hypotheses 3c*) and task performance (*hypothesis 4*). Overall model fit was very good: $\chi^2(5) = 7.87, p = 0.164, CFI = 0.99, TLI = 0.97, RMSEA = 0.05, SRMR = 0.03$.

3.4. Moderating influence of baseline exhaustion

As reported in Table 5, the moderated regression models revealed

Table 2
Results of CFA on study variables at Time 1.

Comparison models	χ^2	df	TLI	CFI	RMSEA [90% CI]	SRMR
Model 1: All items loading on respective constructs	1145.84***	611	0.900	0.908	0.046 [0.042, 0.050]	0.060
Model 2a: WAAQ and BRS items loading on single factor	1457.77***	617	0.844	0.856	0.057 [0.053, 0.061]	0.067
Model 2b: MBI PA and IW PQ items loading on single factor	1545.41***	617	0.828	0.841	0.060 [0.056, 0.064]	0.092
Model 3: All items loading on single factor	3825.99***	632	0.423	0.452	0.110 [0.106, 0.113]	0.160

Note: $N = 422$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3
Descriptive statistics, paired samples *t*-test results, effect sizes, and bivariate correlations.

	Time 1		Time 2		<i>t</i>	<i>p</i>	<i>d</i>	1	2	3	4	5	6
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>									
1. Psych flexibility	34.33	5.97	35.41	5.78	3.39	<0.001	0.20	–	–0.28	–0.19	0.41	0.45	0.46
2. Exhaustion	16.90	9.34	15.36	8.89	–3.02	0.003	–0.18	–0.31	–	0.45	–0.01	–0.33	–0.30
3. Depersonalization	4.86	4.08	4.76	4.20	–0.45	0.653	–0.03	–0.21	0.52	–	–0.03	–0.18	–0.13
4. Pers accomplishment	30.39	6.55	31.65	6.56	3.37	<0.001	0.20	0.28	0.02	–0.04	–	0.25	0.25
5. Task performance	9.15	2.77	9.24	2.85	0.51	0.610	0.03	0.45	–0.46	–0.33	0.15	–	0.33
6. Resilience	20.80	3.80	21.71	3.41	4.85	<0.001	0.29	0.60	–0.46	–0.12	0.23	0.35	–

Note: Correlations for baseline data (Time 1) are below the diagonal; correlations for standardized residual change scores (i.e., change between Time 1 and Time 2) are above the diagonal. Bold correlation coefficients are statistically significant at $p < .05$.

Table 4
Standardized path coefficients for residual change relationships between work-related psychological flexibility and study outcomes.

Δ Outcome Variable	β	<i>p</i>	R^2	Hypothesis
Δ Resilience	0.46	<.001	0.21	H2
Δ Exhaustion	–0.29	<.001	0.08	H3a
Δ Depersonalization	–0.19	<.001	0.04	H3b
Δ Personal accomplishment	0.41	<.001	0.17	H3c
Δ Task performance	0.45	<.001	0.20	H4

Table 5
Moderated regression results.

Predictor	Outcome Variable				
	Δ Resilience	Δ Exh	Δ Depers.	Δ PA	Δ Task Perf.
Δ Psych flexibility	0.46***	–0.29***	–0.19***	0.40***	0.45***
T1 Exhaustion (EE)	–0.00	–0.00	0.00	–0.00	0.00
Δ Psych flexibility*T1 EE	0.01*	–0.01*	–0.00	–0.01†	0.01
Δ R^2 (interaction)	0.013*	0.015*	0.00	0.01	0.01
<i>F</i>	4.54	4.55	0.09	3.59	0.60

Note: † $p < .06$; * $p < .05$; ** $p < .01$; *** $p < .001$.

that baseline (Time 1) level of exhaustion moderated residual change relationships between work-related psychological flexibility and resilience and emotional exhaustion. The moderating effect of Time 1 exhaustion on the psychological flexibility-personal accomplishment relationship fell just outside of statistical significance ($p = .059$). The residual change association between work-related psychological flexibility and resilience was stronger among participants with higher Time 1 exhaustion when compared to participants lower in exhaustion: [+1SD] $\beta = 0.57$, 95% CI [0.41, 0.72], $p < .001$; [–1SD] $\beta = 0.35$, 95% CI [0.21, 0.49], $p < .001$. The Johnson-Neyman method revealed no statistical significance transition points within the observed range of the moderator, indicating that as Time 1 exhaustion scores decreased, the residual change association between psychological flexibility and resilience was decreasing yet remained statistically significant. A similar influence of Time 1 exhaustion was evident in the relationship between psychological flexibility and exhaustion: [+1SD] $\beta = –0.41$, 95% CI [–0.57, –0.25], $p < .001$; [–1SD] $\beta = –0.17$, 95% CI [–0.33, –0.02], $p = .027$. The Johnson-Neyman significance transition point was –0.10, with 11.39% of values falling into the non-significant region. Among participants with a very low level of Time 1 exhaustion, there was no significant residual change association between psychological flexibility and exhaustion. As illustrated in Figs. 1 and 2, participants attending the training with greater exhaustion generally reported steeper Time 1 to Time 2 improvements on these outcome variables as psychological flexibility increased.

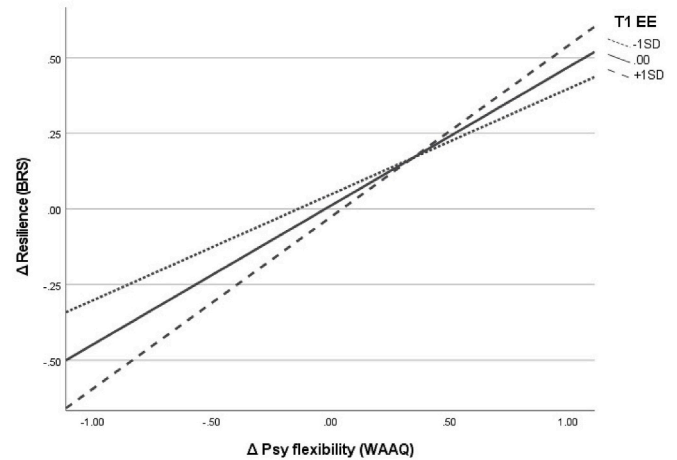


Fig. 1. Residual change relationship between work-related psychological flexibility and stress resilience as a function of Time 1 level of exhaustion.

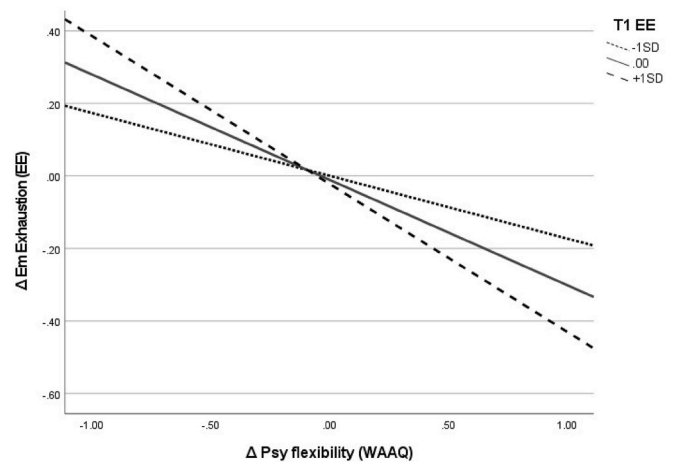


Fig. 2. Residual change relationship between work-related psychological flexibility and exhaustion as a function of Time 1 level of exhaustion.

The moderation test output also revealed a distinct trend in the data indicating a weaker residual change relationship between flexibility and personal accomplishment among employees with higher Time 1 exhaustion: [+1SD] $\beta = 0.30$, 95% CI [0.15, 0.46], $p < .001$; [–1SD] $\beta = 0.50$, 95% CI [0.35, 0.64], $p < .001$. The Johnson-Neyman significance transition point was 17.17, with 4.62% of values falling above this point. Among participants with very high Time 1 exhaustion, there was no residual change association between work-related psychological flexibility and personal accomplishment.

4. Discussion

The findings of this study align with the view that integrating ACT's processes into brief resilience training—and delivering that training to an entire workforce—has utility for enhancing work-related psychological flexibility. The increase in psychological flexibility across three months was associated with small yet significant concomitant improvements in resilience and two aspects of burnout (exhaustion and personal accomplishment). The moderation analyses revealed stronger associations between increased psychological flexibility and change in resilience and exhaustion among participants attending the training with higher exhaustion. By contrast, findings trended toward a stronger residual change relationship between flexibility and personal accomplishment among participants who attended the training with lower exhaustion.

Although psychological flexibility is increasingly proposed as a contributor to stress resilience in workplace settings, few correlational or intervention studies have explicitly tested this assumption. In a review of workplace resilience training research, only one ACT study met the inclusion criteria, suggesting that resilience scales have been overlooked in evaluations of ACT among working populations (Roberston et al., 2015). The current study addressed this issue, by showing that an increase in work-related psychological flexibility was distinct from, and associated with, positive change on a resilience measure. This finding offers a contribution to research on psychological flexibility and burnout, given that speed and ease of recovery from job stressors is viewed as an influential factor in burnout prevention (Soer et al., 2019; Sonnentag et al., 2022).

The association between increased work-related psychological flexibility and reduced exhaustion lends further weight to the notion that psychological flexibility functions as a protective factor against development of burnout (Ruiz & Odriozola-González, 2017). JD-R theory offers insight into the mechanisms through which greater flexibility might prevent (or slow) the emergence of exhaustion. When faced with job stressors, employees higher in psychological flexibility may adopt healthier (e.g., acceptance-based) self-regulation strategies, which require less internal vigilance and cognitive-affective reactivity, thereby imposing fewer attentional and energetic resource costs (Bakker & de Vries, 2021; Kashdan & Rottenberg, 2010). Another possibility is that psychological flexibility improves people's ability to recover from job demands during nonwork time, for example by reducing entanglement in worry and rumination about work issues (Flaxman et al., 2018; Ruiz et al., 2018).

Among the three components of burnout, we observed the strongest residual change association between work-related psychological flexibility and personal accomplishment. This observation corresponds with cross-sectional research, in which work-related flexibility exhibited stronger relationships with performance-oriented variables compared to its relationship with exhaustion or distress (Bond et al., 2013; Ortiz-Fune et al., 2020; Ruiz & Odriozola-González, 2014; Xu et al., 2018). This finding implies that enhancing employees' psychological flexibility can be accompanied by an improved sense of being effective and making a worthwhile contribution in the work domain. Inconclusive findings have surrounded ACT's influence on this component of burnout, with favorable effects found mainly among therapeutic professionals (Towey-Swift et al., 2023). However, trials of ACT for burnout have tended to rely on modest sample sizes, and may have been underpowered to detect small changes in work-related efficacy appraisals. The statistically significant change in personal accomplishment in this larger workforce sample, along with its residual change association with work-related psychological flexibility, raises questions about omitting this MBI dimension when investigating ACT's effects on burnout (see Towey-Swift et al., 2023). Person-centered analysis has shown that lowered accomplishment/inefficacy is a distinct characteristic of the burned-out worker profile, and is an aspect of suboptimal functioning apparently experienced by a substantial proportion of the working population (Leiter & Maslach, 2016).

Contrary to prediction, depersonalization did not change significantly after the training, and work-related flexibility exhibited a weak residual change association with this burnout dimension. This may be attributable to study context. Depersonalization scale items (e.g., "I feel clients blame me for some of their problems") indicate an unhelpfully impersonal attitude in healthcare and psychotherapeutic settings, but might not carry the same connotation in this corporate setting. Alternatively, flexibility may exert a nuanced function in relation to this feature of burnout, by reducing the link between exhaustion and depersonalization (Ruiz & Odriozola-González, 2017), or indirectly influencing depersonalization over time via a reduction in exhaustion (Lloyd et al., 2013). As noted by a reviewer, our participants reported low depersonalization at Time 1, and the absence of change on this dimension could be due to a floor effect. More broadly, a range of other intervention approaches have failed to modify depersonalization (Maricuțoiu et al., 2016). Given that an indifferent, distanced, or cynical attitude is viewed as a core feature of burnout syndrome, it would be useful to see future work clarifying how improving psychological flexibility might influence this experience.

The moderation tests shed new light on who may benefit most from increased psychological flexibility at work. Results revealed the strongest relationship between improved flexibility and reduced exhaustion among a subset of the sample that joined the training with higher exhaustion. This moderated residual change relationship (which was also observed on the resilience variable) implies that exhausted employees gained particular benefit (in terms of reduced exhaustion and ability to bounce back from stressful events) from reflecting on psychologically flexible responses to inner experience and work pressure that was promoted in the training.

When performing the same moderation test on personal accomplishment, we found a broadly reversed pattern of influence exerted by Time 1 exhaustion. Although the moderation effect in this case was not statistically significant, inspection of coefficients at different levels of Time 1 exhaustion revealed a pattern of stronger association between psychological flexibility and personal accomplishment among participants with lower exhaustion. We believe this trend in the data warrants mention, as it appears consistent with Onwezen et al.'s (2014) study, in which work performance benefits linked to psychological flexibility were diminished among employees who were experiencing exhaustion. Employees who are overly depleted in cognitive, emotional, and/or physical energies may lack resources to make effective use of psychologically flexible responses, such as noticing and engaging in actions aligned with personally valued work goals (Onwezen et al., 2014).

Taken together, exhaustion's influence on the observed associations suggest that both exhausted and less exhausted employees may benefit from exposure to ACT-informed training, but possibly in different ways. These observations hold potential practical implications for anticipated outcomes of ACT programs among different employee subgroups. Our findings support the proposition that ACT-informed training can prove effective for addressing exhaustion and stress management difficulties among individuals who feel overextended by the demands and stressors of their work. This brief training format may provide depleted employees with some useful self-awareness for recognizing and breaking out of inflexible patterns of work behavior, and motivation for enhancing recovery-oriented behavioral repertoires. Given the small increase in work-related flexibility observed over 3-months following the single training session, there are arguments for offering exhausted employees additional sessions, aimed at bolstering these modest improvements (Flaxman et al., 2023; Prudenzi et al., 2021). Assuming that work-related psychological flexibility and exhaustion could be further improved by additional sessions, these individuals might then experience increased personal accomplishment, thereby gaining additional protection against risk of burnout syndrome (Leiter & Maslach, 2016). For members of the workforce with lower exhaustion, a briefer (e.g., half-day) training format may suffice, delivering psychological flexibility-related benefits in the form of a renewed sense of efficacy and

contribution at work (i.e., increased personal accomplishment).

These practical reflections highlight avenues for future evaluations of workplace ACT programs. For example, given the variability in workplace ACT delivery formats, there is a need for trials that directly compare programs of different lengths. Such research could address unresolved questions surrounding whether programs of different lengths vary in their effects on different burnout facets, or on other psychosocial outcomes (e.g., work engagement, psychological well-being, perceived stress), and whether employees at risk of burnout receive additional benefit from longer ACT-informed training.

We believe our field study exhibits some strengths. First, the participating corporate workforce had a balanced gender profile, addressing concern about overrepresentation of female health and social care professionals in workplace ACT research. Second, the analyzed sample ($n = 281$) is more than five times larger than the average number of participants in ACT groups in previous workplace trials (average $n = 50.6$, range = 11 to 177; Unruh et al., 2022). Third, the training was conducted across three Scandinavian countries, potentially increasing generalizability and making it less likely that results were due to an unknown idiosyncrasy within one unit of the organization. Fourth, the delivery of ACT-informed training to an entire workforce is consistent with 1) calls for organization-wide initiatives that are oriented toward burnout prevention (Ahola et al., 2017), and 2) the contextual behavioral science mission of promulgating psychological flexibility processes to benefit more substantial numbers of people beyond the clinical consultation room (Biglan et al., 2008; Hayes et al., 2021).

A set of study limitations should also be considered. First, due to organizational constraints, we were unable to maintain a control condition across the 3-month study period. This represents a threat to internal validity (i.e., whether it was the training or some other change at the company that increased psychological flexibility). To help address this concern, we refer to findings suggesting that employees' psychological flexibility does not typically change significantly or spontaneously over this timeframe, in the absence of a targeted intervention (e.g., Gillanders et al., 2014; Hofer et al., 2018; Macías et al., 2019; Puolakanaho et al., 2020). Similarly, reviews of the intervention literature reveal that even deliberate efforts to reduce burnout syndrome can in many instances have limited success, undermining the likelihood that the observed improvements in exhaustion and personal accomplishment were linked to other organizational initiatives (Ahola et al., 2017; Maricuțoiu et al., 2016). Nonetheless, these alternative explanations remain possibilities, and the logical next step is to evaluate similarly brief workforce-wide ACT-informed training against a control group.

Second, we did not perform a fidelity assessment to demonstrate adherence to the ACT approach. However, the training was delivered by an experienced ACT practitioner, who deliberately designed and delivered the training to target psychological flexibility processes. Third, an administrative error meant that individual participants' demographic characteristics (age, gender, educational level) were not recorded with the stored dataset.

A final potential limitation stems from assessment of (work-related) psychological flexibility as a unidimensional construct. Recent years have seen validation of multidimensional instruments, allowing for finer-grained examination of psychological flexibility processes activated by ACT interventions (e.g., Rogge & Daks, 2021; Roloffs et al., 2018). Nonetheless, the WAAQ was specifically created for workplace contexts, and has been shown to be psychometrically distinct from various other measures of psychosocial functioning (Bond et al., 2013). By deploying the WAAQ, our study extends a strand of global research investigating psychological flexibility as a personal resource in workplace settings (Holmberg et al., 2020; Novaes et al., 2018; Ruiz & Odriozola-González, 2017; Xu et al., 2018).

CRedit authorship contribution statement

Rob Archer: Writing – review & editing, Project administration,

Conceptualization. **Rachel Lewis:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Joanna Yarker:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Lucie Zernerova:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Paul E. Flaxman:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Rob Archer reports financial support was provided by the participating company. Within the last three years, Rob Archer earned consultancy fees for programs offered to other organizations, often influenced by the ACT approach. Within the last three years, Paul E. Flaxman received royalties from New Harbinger for a book focused on ACT in workplace settings. All other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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