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UNIVERSITÀ EDITRICE

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E-ISSN 2724-2943
ISSN 2723-973X

Psychology Hub (2022)
XXXIX, 2, 31-44

Article info

Submitted: 10 January 2022
Accepted: 27 February 2022
DOI: 10.13133/2724-2943/17662

Writing about stressful workplace experiences: A systematic review with meta-analysis of the effectiveness of written emotional disclosure (WED) interventions in working adults

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Abstract

The need for effective preventive strategies at the workplace is largely advocated to reduce workers' perceived stress and overall improve their well-being. Written emotional disclosure (WED) has been proposed as an experimental paradigm in samples faced with particular stressors, leading to several benefits for physical and psychological health. The current systematic review with meta-analysis aimed at addressing the questions of whether WED interventions applied to stressful workplace experiences can be effective for working adults and what types of outcomes are mostly affected by such interventions. The selection procedure resulted in 4 eligible studies out of 324 examined articles. The results indicated, on average, a not significant effect of WED interventions (weighted ES = 0.15; 95% CI = -0.40, 0.71). However, a significant small-sized impact was found on psychological well-being (weighted ES = 0.40; 95% CI = 0.26, 0.53) and emotional outcomes (weighted ES = 0.43; 95% CI = 0.24, 0.61). It is concluded that, if considering that WED represents a low-cost, easy-to-use, and brief intervention, even small improvements could be clinically relevant in reducing work-related stress. The application of WED as a method of coping with work stressors should be further expanded in future research as to provide greater empirical evidence.

Keywords: occupational stress; written emotional disclosure; systematic review; meta-analysis; occupational groups.

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Introduction

As reported by the European Agency for Safety and Health at Work, work-related stress is increasingly becoming a public issue with relevant consequences in terms of occupational safety, economic burden, and healthcare assistance (Hassard et al., 2014). Work-related stress refers to a condition arising from the challenges encountered within the work environment and the consequent feeling of not being able to cope with them, thus leading to physical, psychological, or social suffering (Leka et al., 2003). When chronic stress at work is not effectively managed, a burnout syndrome may emerge as a pathology featured by emotional exhaustion, negativism, and reduced professional efficacy, which has been recently included in the 11th Revision of the International Classification of Diseases (ICD-11) (World Health Organization, 2019).

Along with work-related negative outcomes (e.g., reduced productivity and job satisfaction, absenteeism, job quitting, increased risk of injuries and malpractice at work), job strain has been demonstrated to have detrimental effects on a physical and mental level (De Sio et al., 2020). A lot of research evidence shows that work-related stress may negatively impact physiological functions, resulting in cardiovascular, musculoskeletal, gastrointestinal, dermatological, and sleep disturbances (Hämmig, 2020; Kwak & Kim, 2017; Mokarami et al., 2020; Nasarian et al., 2020). As well, it has a relevant role in the onset of several mental health problems, including anxiety, depression, substance/alcohol abuse, suicide attempts, cognitive impairments, and poor psychological well-being (De Sio et al., 2020; Giorgi et al., 2020). Besides, several studies have found a negative relationship between work-related stress and psychological skills/coping strategies (e.g., resilience, self-efficacy, emotion regulation), suggesting that perceived job strain contributes to reducing those emotional and cognitive resources that in turn may buffer its negative effects (Gärtner et al., 2019; Geisler et al., 2019; Salvarani et al., 2019).

Based on this premise, the need for effective preventive strategies at the workplace is largely advocated in order to reduce workers' perceived stress and overall improve their well-being (De Castro et al., 2021; Sorrentino et al., 2016). The synthesis of the available evidence suggests that a wide variety of interventions exist, which are targeted to both the individual and the collective level (De Sio et al., 2020) and combine psychosocial and occupational approaches (Ahola et al., 2017). Some examples of the most widespread interventions include support groups, mindfulness, wellness programs, and yoga, which have shown promising results in terms of reductions in anxiety, depression, and burnout (De Sio et al., 2020; Della Valle et al., 2020; Restrepo & Lemos, 2021). However, the evaluation of such programs would benefit from more systematic intervention development and level of evidence, especially because of the lack of specific stress models they are based on and the high heterogeneity in their design and structure, which make it challenging to compare them and draw theoretically-consistent conclusions (Ahola et al., 2017; Della Valle et al., 2020; Restrepo & Lemos, 2021).

Written emotional disclosure and work-related stress

Among the interventions aimed at reducing distress, writing-based programs have shown interesting findings regarding

the improvement of health and psychological outcomes (Seligman et al., 2005; Sin & Lyubomirsky, 2009). Specifically, written emotional disclosure (WED) has been proposed as an experimental paradigm in samples faced with particular stressors (Acar & Dirik, 2019; Pennebaker & Beall, 1986; Pennebaker & Francis, 1996). WED represents a well-structured intervention where treated participants are asked to write privately about their deep thoughts and feelings concerning stressful or traumatic life experiences, usually for 15–20min on 3–4 consecutive days. Instead, participants assigned to the control condition write for the same duration about factual or trivial topics.

Meta-analytic studies have highlighted the positive effects of WED interventions in terms of reported health status, cognitive functioning, and both psychological and physical health (Frattaroli, 2006; Harris, 2006; Smyth, 1998). Multiple mediation models have been proposed to conceptualise the underlying mechanisms explaining the effects of WED (Smyth & Pennebaker, 2008). The inhibition theory assumes that stress arises when emotions and thoughts are suppressed; therefore, writing about an upsetting experience allows emotional disinhibition and the consequent ability to acknowledge it (Greenberg et al., 1996; Pennebaker, 1997; Pennebaker & Beall, 1986). According to the self-regulation theory, stress is further enhanced by deficit coping strategies to solve the conflict associated with a stressful situation. Consistently, expressive writing enables people to get mastery, plan appropriate reactions, and find possible concrete solutions to problematic experiences (Lepore & Greenberg, 2002; Pennebaker, 1993; Pennebaker & Francis, 1996). In line with a cognitive perspective, stressful events are more traumatic when they are perceived as overwhelming or disorganised, whereas writing helps people get insights, make sense, and assign coherence to them through a positive cognitive reappraisal (Barclay & Skarlicki, 2009; Pennebaker et al., 1997). The exposure theory (Greenberg et al., 1996; Sloan et al., 2005) argues that prolonged stress is due to the tendency to avoid painful and anxiety feelings associated with trauma. In this sense, expressive writing can lead to progressive desensitisation and extinction of such negative memories. Then, since stress increases in case of reduced support from others, a social perspective considers writing about negative experiences as a means to share deep emotions with others and foster the social integration with one's social network (Pennebaker et al., 1989; Pennebaker & Graybeal, 2001).

Current research about the beneficial effects of WED has mostly included student and patient samples (Frattaroli, 2006; Pennebaker et al., 1988; Sassu et al., 2020; Warner et al., 2006; Willmott et al., 2011). Despite the usefulness of occupational stress diary methods as a simple but powerful self-reflective tool (Clarkson & Hodgkinson, 2007), only a few studies have examined WED interventions with working adults, such as employees (Francis & Pennebaker, 1992; Kirk et al., 2011), services officers (Alford et al., 2005), and military personnel (Baddeley & Pennebaker, 2011; Sayer et al., 2015). Several benefits have been highlighted, including a reduction in distress, physical complaints, and absenteeism (Alford et al., 2005; Francis & Pennebaker, 1992; Sayer et al., 2015), as well as improved positive affect, self-efficacy, and satisfaction levels

(Alford et al., 2005; Baddeley & Pennebaker, 2011; Kirk et al., 2011). However, these studies adopted Pennebaker's standard instructions, more widely focusing on traumatic or negative life experiences, whereas it remains unclear whether WED can be applied to stressful workplace experiences.

In order to fill this gap, the aim of the present systematic review is to provide updated insights on the effectiveness of WED interventions primarily focused on work-related stress. Indeed, current published meta-analytic studies have summarized previous research evidence about the use of WED in nonspecific stressful life experiences across different participant types. Instead, this study aims at contributing to widening the scientific literature on emotional disclosure as a method of coping with work stressors. As well, it can help practitioners better understand whether expressive writing can be a useful preventative strategy to manage workers' psychological wellbeing at an organisational level. Specifically, two main research questions were addressed.

Research Question 1: Are WED interventions applied to stressful workplace experiences effective for working adults?

Research Question 2: Which types of outcomes are mostly affected by WED interventions applied to stressful workplace experiences?

Materials and methods

Data Source and Search Strategy

The review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Liberati et al., 2009; Moher et al., 2009). In October 2021, PubMed, PsycInfo/PsycArticles, Scopus, and Web of Science databases were explored for eligible studies, without time restrictions. The following terms were used: ("work related stress" OR "job related stress" OR "work stress" OR "job stress" OR "work strain" OR "job strain" OR "occupational stress" OR "occupational strain") AND ("journal writing" OR "written emotional disclosure" OR "expressive writing") [All Fields].

Publication screening and eligibility criteria

After leading the first selection of the search, duplicates were eliminated. During the second selection, all titles and abstracts were screened and potential pertinent studies were identified for eligibility based on full-text review. Articles were included in the review if they: (a) had workers as the target population, (b) pertained to the evaluation of WED interventions focused on stressful workplace experiences, and (c) were experimental or quasi-experimental with treatment and comparison groups.

Data extraction and coding

The following information was coded from each study: study design, sample description (in terms of population type, sample size, age and gender composition), treatment and control conditions, treatment intensity, examined outcomes,

post-intervention assessment time points, dropout and attrition rates. Data extraction and coding were conducted by two researchers independently and disagreements were solved by consensus.

Methodological quality assessment

Methodological quality was assessed through the criteria adopted by Zachariae and O'Toole (2015) in a previous meta-analysis about WED interventions. A total quality score (ranging from 0 to 15) was computed based on: 1) randomised design, 2) clear description of randomisation, 3) experiment condition blinded to the participants, 4) allocation concealment for the researchers, 5) clear description of dropouts and withdrawals, 6) clear description of study objectives, 7) clear description of outcome measures, 8) clear description of inclusion and exclusion criteria, 9) sample size justification (e.g., power calculation), 10) clear description of the intervention(s), 11) presence of at least one control group, 12) clear description of statistical methods, 13) no selective outcome reporting, 14) inclusion of manipulation check of writing instruction adherence, and 15) inclusion of an active control condition (e.g., neutral or factual writing). The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system was also used to assess the quality of evidence (rated as high, moderate, low, or very low) of the metaanalytic results for each outcome, based on the following criteria: risk of bias, inconsistency, indirectness, imprecision, and publication bias. The quality ratings were conducted by two researchers independently and disagreements were solved by consensus.

Description of systematic review procedure

For the systematic review, a qualitative analysis was performed through a distribution of the frequencies of the studies with significant improvements and not significant changes per post-(follow-up-) vs. pre- comparisons between the treatment and control groups.

Description of meta-analysis procedure

For the meta-analysis, only randomised control trials (RCTs) were considered. Effect size (ES) was calculated as a standardised mean difference between the treatment and control groups, divided by the pooled standard deviation (SD) of the two groups. Comparisons between treatment and control groups were calculated using the standardised ES (g), by adjusting the calculation of the pooled standard deviation with weights for the sample sizes (Hedges & Olkin, 1985). For calculating ES for mean differences of groups within a pre-post-control design, the pooled pretest standard deviation for weighting the differences of the pre-post-means was used (Morris, 2008). Treatment effects were calculated separately for each outcome at different time points. However, in order to achieve an average ES, the mean of the outcomes for each study was computed and this synthetic score was used as the

unit of analysis. As well, ES was averaged by types of outcome across studies to inspect potential differential effects. The resultant ES gives the magnitude of the treatment effect, with a value of .20 considered small, .50 in the moderate range, and .80 large (Cohen, 1988).

Heterogeneity

For the studies included in the meta-analysis, the *Q*within and *I*² statistics were computed through *Meta-Essentials* tool (Suurmond et al., 2017) to assess their heterogeneity, as indicated by a significant *Q*within value and *P*>25% (Higgins et al., 2003).

Results

Search result

Figure 1 shows our search and screening results according to PRISMA. Our search identified 324 records. Four publications were duplicates leaving our search with 320 records for the title and abstract review. After this review process, 28 publications were overall identified for a full review. The excluded publications did not fulfil the inclusion criteria as 278 were out of scope, 11 did not deal with working populations, and 3 were systematic reviews on a wide range of interventions in the workplace. Thus, the remaining 28 records were full text reviewed and 24 of them were removed for the following reasons: 12 were theoretical articles about WED not providing empirical data, 6 dealt with the use of WED in clinical or student samples, 4 used journal or expressive writing as a manipulation task or part of a wider intervention program, whereas 2 did not provide English full-text. We concluded

that 4 studies could be included in our systematic review based on the inclusion criteria, and 3 of them were included in the meta-analysis given their RCT design.

Characteristics and outcomes of the studies included in the systematic review

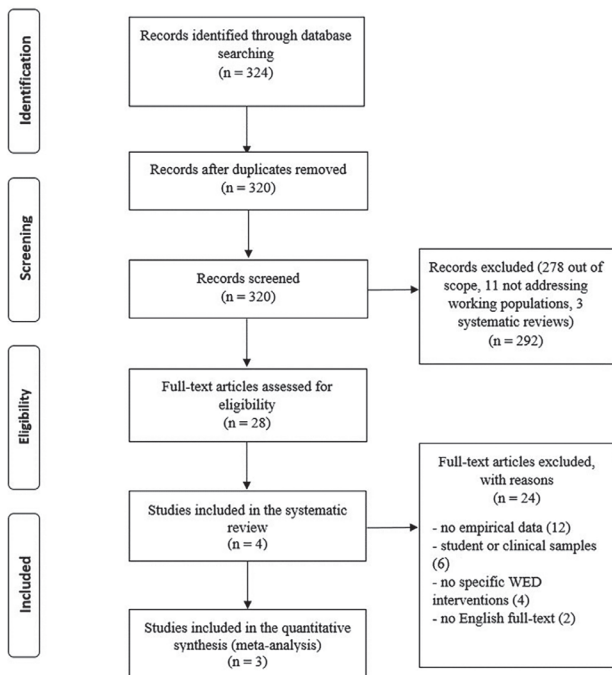
The search procedure resulted in 4 studies dealing with the effectiveness of WED interventions applied to stressful workplace experiences, which were conducted between 2009 and 2019. The main characteristics of the studies are reported in Table 1.

We found that half of the included studies were conducted on adult working populations from a wide range of occupations (Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), whereas the remaining ones were addressed to school teachers (Ashley et al., 2013) and public employees of a tourist promotion service (Tarquini et al., 2016), respectively. The sample selection was based on different inclusion criteria that pertained to doing a job at risk for occupational stress (e.g., teaching) (Ashley et al., 2013) or being subjected to stressful situations in the workplace, such as receiving unfair treatment (Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019) or facing work relocation (Tarquini et al., 2016). Not suffering from psychiatric problems (Ashley et al., 2013) and not receiving any other form of psychological treatment (Michailidis & Cropley, 2019) were further specified. Three of these intervention assessments were categorised as RCTs with treated and control groups created through random assignment (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), whereas 1 study was a control trial (CT) with a comparison group from a different worksite without randomisation at the individual level (Tarquini et al., 2016).

Considering the type of intervention, 2 studies evaluated a single WED treatment (Michailidis & Cropley, 2019; Tarquini et al., 2016), whereas the remaining ones tested different writing conditions that varied the topic (emotions, thoughts, and emotions and thoughts; Barclay & Skarlicki, 2009) or the number/type of experiences (single, multiple and work-related experiences; Ashley et al., 2013) the participants were asked to write about. Besides, in 3 cases, control conditions included writing about a factual topic as an active condition (e.g., description of daily routine) (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), whereas not being assigned any writing task was present in only one study (Tarquini et al., 2016). Despite some degree of variability in the study hypotheses and objectives, the WED task and treatment intensity can be considered substantially comparable across the examined assessments. Indeed, in all the studies, writing about thoughts and feelings regarding work-related stressful experiences was tested an experiment condition by adapting Pennebaker’s standard instructions. As well, the interventions lasted from three to four sessions where participants wrote for 20 min each.

The total number of study participants for each study ranged from 35 to 100 (*M* = 64; *SD* = 30.03), with a mean age of 38 years (from 22.74 to 49.94) and a greater proportion of women equal to 65.5% (from 50% to 86%). The treated

Fig. 1. PRISMA Flow Diagram



Tab. 1. Characteristics of the included studies

Study	Study design	Sample description	Experiment conditions	Treatment intensity	Outcome (measure)	Post-intervention assessment time points	Dropout and attrition (%)	Effect size (Hedges's g) at time points
Michailidis and Croyley (2019)	Randomised control trial	Heterogeneous workers (N = 44) Age (M±SD): 34.22±11.39 Female: 50%	Treatment: Writing about work-related stress (n = 23)	20 min per day over three consecutive days	Sleep quality (ISI)	1 and 3 months	27.7 and 4.6	-0.13, -0.07
			Control: Factual writing (n = 21)		Embitterment at work (PTED)			-0.02, 0.15
					Affective rumination at work (WRPQ)			0.20, 0.24
					Detachment at work (WRPQ)			0.22, 0.22
Tarquini et al. (2016)	Control trial	Public employees (N = 35) Age (M±SD): 49.94±10.20 Female: 51%	Treatment: Writing about work relocation (n = 18)	20 min per week over three consecutive weeks	Psychological well-being (PWB)	1 and 7 months	0 and 0	0.55, 0.85
			Control: No writing task (n = 17)		Alexithymia (TAS-20)			0.87, 1.42
					Occupational burnout (MBI-GS)			0.53, 0.74
Ashley et al. (2013)	Randomised control trial	School teachers (N = 77) Age (M±SD): 43.62±11.19 Female: 86%	Treatment: Writing about work-related stress (n = 18)	20 min per day over three consecutive days	Psychological health (BSI)	2 weeks, 2 and 6 months	31 and 7.9	-0.02, -0.09, 0.17
			Control: Factual writing (n = 19)		Physical health (PILL)			-0.06, -0.08, -0.22
					Job satisfaction (WJSAT)			0.18, 0.19, 0.18
Barclay and Skarlicki (2009)	Randomised control trial	Heterogeneous workers (N = 100) Age (M±SD): 22.74±6.29 Female: 75%	Treatment: Writing about an unfair work experience (n = 25)	20 min per day over 4 consecutive days	Psychological well-being (SWLS)	At the treatment completion	1 and 0	0.81
			Control: Factual writing (n = 25)		Physical symptoms (SMU-HQ)			0.24
					Anger (STAXI)			0.25
					Retaliation intentions (TRIM)			0.50
		Perceived resolution (single item)			0.53			

Note. Effect size by outcome is computed as difference between the treatment and control conditions, by reversing the sign for negative outcomes to ensure that the convention is applied consistently. ISI, Insomnia Severity Index; PTED, Post-traumatic Embitterment Disorder Scale; WRPQ, Work-related rumination questionnaire; PWB, Ryff Psychological Well-Being Scales; TAS-20, Toronto Alexithymia Scale; MBI-GS, Maslach Burnout Inventory-General Survey; BSI, Brief Symptom Inventory; PILL, Pennebaker's Inventory of Limbic Languidness; WJSAT, Warr's Job Satisfaction Scale; SWLS, Satisfaction With Life Scale; SMU-HQ, SMU Health Questionnaire; STAXI, State-Trait Anger Expression Inventory; TRIM, Transgression-Related Interpersonal Motivations Inventory.

group receiving the WED task adapted to work ranged from 18 to 25 ($M = 21$; $SD = 3.56$) and the control group from 17 to 25 ($M = 20.50$; $SD = 3.42$) participants, respectively. The number of examined outcomes ranged from three to five per study, which can be grouped into four main types referred to: (1) self-reported physical health in terms of physical symptoms and sleep quality (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), (2) psychological health and well-being (Ashley et al., 2013; Barclay & Skarlicki, 2009; Tarquini et al., 2016), (3) work-related outcomes including occupational burnout (Tarquini et al., 2016), job satisfaction (Ashley et al., 2013), and positive affect at work (i.e. embitterment, affective rumination, and detachment) (Michailidis & Cropley, 2019), and (4) further emotional variables including alexithymia (Tarquini et al., 2016) as well as anger, retaliation intentions, and perceived resolution (Barclay & Skarlicki, 2009). Overall, physical health, psychological well-being, and work outcomes were inspected by 3 studies, whereas emotional functioning was examined by 2 studies.

Tab. 2. Quality ratings of the studies included in the systematic review

	Study			
	Michailidis & Cropley (2019)	Tarquini et al. (2016)	Ashley et al. (2013)	Barclay & Skarlicki (2009)
Randomised design	Yes	No	Yes	Yes
Clear description of randomisation	Yes	No	Yes	Yes
Experiment condition blinded to the participants	Yes	Yes	Yes	Yes
Allocation concealment for the researchers	Yes	No	No	No
Clear description of dropouts and withdrawals	Yes	Yes	Yes	Yes
Clear description of study objectives	Yes	Yes	Yes	Yes
Clear description of outcome measures	Yes	Yes	Yes	Yes
Clear description of inclusion and exclusion criteria	Yes	No	Yes	No
Sample size justification	Yes	No	No	No
Clear description of the intervention(s)	Yes	Yes	Yes	Yes
Presence of at least one control group	Yes	Yes	Yes	Yes
Clear description of statistical methods	Yes	Yes	Yes	Yes
No selective outcome reporting	Yes	Yes	Yes	Yes
Manipulation check of writing instruction adherence	Yes	No	Yes	Yes
Active control condition	Yes	No	Yes	Yes
Quality rating	15	8	13	12

Pre-post measures were available in all the studies, with post-tests conducted at the intervention completion up to one month later. Besides, 3 studies also reported the presence of follow-up measures assessed from two to seven months after the treatment completion (Ashley et al., 2013; Michailidis & Cropley, 2019; Tarquini et al., 2016). On average, dropout and attrition rates were 14.91% (from 0% to 30.95%) and 3.14% (from 0% to 7.94%), respectively.

The quality rating was on average equal to 12 ($SD = 2.94$; range: 8–15). The primary methodological limitations included the lack of allocation concealment for the researchers during the intervention ($n = 3$), statistical power calculations for determining sample size ($n = 3$), and clearly described inclusion and exclusion criteria ($n = 2$) (see Table 2). The summary of the qualitative analysis of the study findings (see Table 3) shows that physical health outcomes were not affected to a statistically significant extent in 3/3 studies, in both post-tests and follow-ups. Instead, psychological well-being improved in 2/3 studies in post- vs pre- comparisons and in 1/2 study at follow-ups. WED produced improvements on work-related outcomes in 1/3 study and was limited to a reduction in occupational burnout at both treatment completion and follow-up. Emotional outcomes improved in 1/2 study at both post-test and follow-up, with alexithymia being the only affected variable. There were not studies that showed a worsening on any outcome.

Characteristics and outcomes of the studies included in the meta-analysis

The meta-analysis included 3 RCT studies (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), with the exclusion of the study by Tarquini et al. (2016) that adopted an observational design without randomization at individual level. The total number of study participants for each study ranged from 44 to 100 ($M = 73.67$; $SD = 28.15$), with a mean age of 33.5 years (from 22.74 to 43.62) and a greater proportion of women equal to 70.3% (from 50% to 86%). The treated group receiving the WED task adapted to work ranged from 18 to 25 ($M = 22$; $SD = 3.61$) and the control group using factual writing from 19 to 25 ($M = 21.67$; $SD = 3.06$) participants, respectively. The number of examined outcomes ranged from three to five per study, which can be grouped into four main types referred to: (1) self-reported physical health in terms of physical symptoms and sleep quality (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019), (2) psychological health and well-being (Ashley et al., 2013; Barclay & Skarlicki, 2009), (3) work-related outcomes including job satisfaction (Ashley et al., 2013), and positive affect at work (i.e. embitterment, affective rumination, and detachment) (Michailidis & Cropley, 2019), and (4) further emotional variables including anger, retaliation intentions, and perceived resolution (Barclay & Skarlicki, 2009). Overall, physical health was inspected by 3 studies, psychological well-being and work outcomes were inspected by 2 studies, whereas emotional functioning was examined

Tab. 3. Distribution of the studies included in the systematic review: categories of study outcomes (physical health, psychological well-being, work-related outcomes, and emotional outcomes) per post- (follow-up-) vs. pre- comparisons (improvement or not significant)

Study outcome	Studies (n)	Post vs pre comparison		First follow-up vs pre comparison		Second follow-up vs pre comparison	
		Improvement	Not significant	Improvement	Not significant	Improvement	Not significant
Physical health	3 (Ashley et al., 2013; Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019)		3/3		2/2		1/1
Sleep quality (ISI)		-	Michailidis & Cropley, 2019	-	Michailidis & Cropley, 2019	-	-
Physical health (PILL)		-	Ashley et al., 2013	-	Ashley et al., 2013	-	Ashley et al., 2013
Physical symptoms (SMU-HQ)		-	Barclay & Skarlicki, 2009	-	-	-	-
Psychological well-being	3 (Ashley et al., 2013; Barclay & Skarlicki, 2009; Tarquini et al., 2016)	2/3	1/3	1/2	1/2		1/1
Psychological well-being (PWB)		Tarquini et al., 2016	-	Tarquini et al., 2016	-	-	-
Psychological health (BSI)		-	Ashley et al., 2013	-	Ashley et al., 2013	-	Ashley et al., 2013
Psychological well-being (SWLS)		Barclay & Skarlicki, 2009	-	-	-	-	-
Work-related outcomes	3 (Ashley et al., 2013; Michailidis & Cropley, 2019; Tarquini et al., 2016)	1/3	2/3	1/3	2/3		1/1
Embitterment at work (PTED)		-	Michailidis & Cropley, 2019	-	Michailidis & Cropley, 2019	-	-
Affective rumination at work (WRPQ)		-	Michailidis & Cropley, 2019	-	Michailidis & Cropley, 2019	-	-
Detachment at work (WRPQ)		-	Michailidis & Cropley, 2019	-	Michailidis & Cropley, 2019	-	-
Occupational burnout (MBI-GS)		Tarquini et al., 2016	-	Tarquini et al., 2016	-	-	-
Job satisfaction (WJSAT)		-	Ashley et al., 2013	-	Ashley et al., 2013	-	Ashley et al., 2013
Emotional outcomes	2 (Barclay & Skarlicki, 2009; Tarquini et al., 2016)	1/2	1/2	1/1			
Alexithymia (TAS-20)		Tarquini et al., 2016	-	Tarquini et al., 2016	-	-	-
Anger (STAXI)		-	Barclay & Skarlicki, 2009	-	-	-	-
Retaliation intentions (TRIM)		-	-	-	-	-	-
Perceived resolution (single item)		-	Barclay & Skarlicki, 2009	-	-	-	-

by 1 study. Regarding the quality of provided evidence for each outcome type, as reported in Table 4, GRADE ranged from very low to moderate. Since high levels of heterogeneity were found between the studies ($Q_{within} = 18.97$; $p < .001$; $I^2 = 89.46$), a random effects model was used to estimate the pooled mean ES (Borenstein et al., 2007). The average pre-post ES per study was 0.19 ($SD = 0.24$) with a range from 0.03 to 0.47 and a sample size weighted ES of 0.15 (95% CI = -0.40, 0.71) (see Figure 2). In detail, 2 studies had a null effect (< 0.2) (Ashley et al., 2013; Michailidis & Cropley, 2019), whereas 1 study a small ES (from 0.2 to 0.5) (Barclay

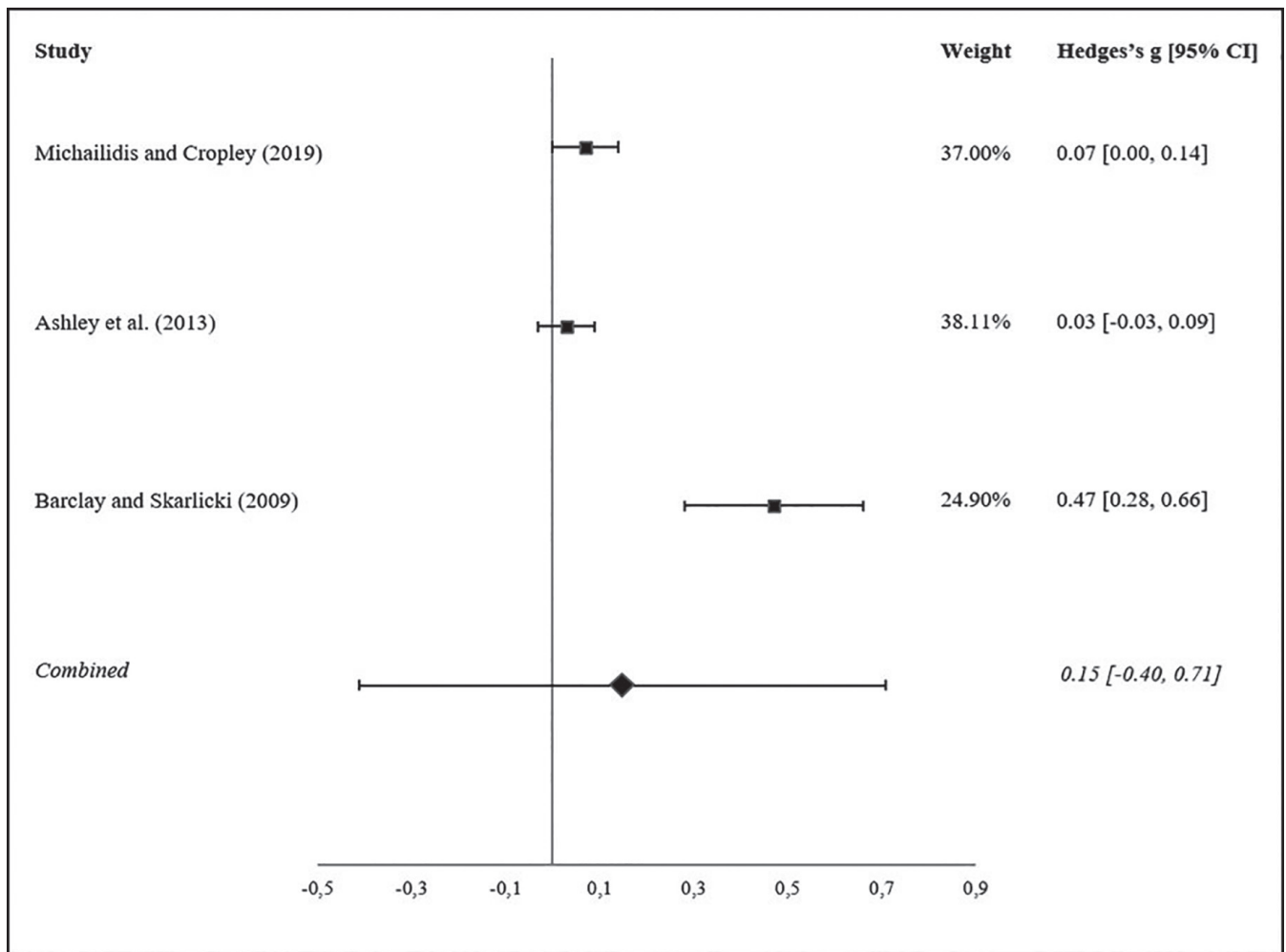
& Skarlicki, 2009). Looking at the main examined outcomes (see Figure 3), emotional variables (weighted ES = 0.43; 95% CI = 0.24, 0.61) and psychological health/well-being (weighted ES = 0.40; 95% CI = 0.26, 0.53) were affected with a small-sized effect. Instead, the effect on work-related outcomes (weighted ES = 0.15; 95% CI = 0.06, 0.23) and physical health was on average substantially null (weighted ES = 0.01; 95% CI = -0.01, 0.03). At follow-ups, the effect remained quite stable over time ($M = 0.16$; $SD = 0.35$), with a weighted ES of 0.16 (95% CI = -0.07, 0.26).

Tab. 4. Result of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) of the outcomes considered in the meta-analysis

Outcome	Studies (n)	Study design	Risk of bias	Certainty assessment				Participants (n)		Effect SMD (95% CI)	Certainty
				Inconsistency ^a	Indirectness ^d	Imprecision ^c	Publication bias ^b	Treatment Group	Control Group		
Physical health	3	RCT	Serious	Very serious	Not serious	Serious	Undetected	66	65	0.01 (-0.01, 0.03)	○○○○ VERY LOW
Psychological well-being	2	RCT	Serious	Very serious	Not serious	Serious	Undetected	43	44	0.40 (0.26, 0.53)	○○○○ VERY LOW
Work-related outcomes	2	RCT	Serious	Not serious	Not serious	Serious	Undetected	41	40	0.15 (0.06, 0.23)	⊕⊕○○ LOW
Emotional outcomes	1	RCT	Not serious	Not serious	Not serious	Serious	Undetected	25	25	0.43 (0.24, 0.61)	⊕⊕⊕○ MODERATE

Note. CI: Confidence interval; SMD: Standardised mean difference; ^a Substantial heterogeneity I² > 60% (serious) or >90% (very serious); ^b Strongly suspected if funnel plot suggestive of publication bias or lack of small studies and negative effects; ^c serious if total number of events is less than 300, CIs overlap or non clinically significant effect; ^d Serious indirectness refer to variation of outcome measure or definition across studies.

Fig. 2. Forest plot from the meta-analysis results on the effectiveness of the examined interventions

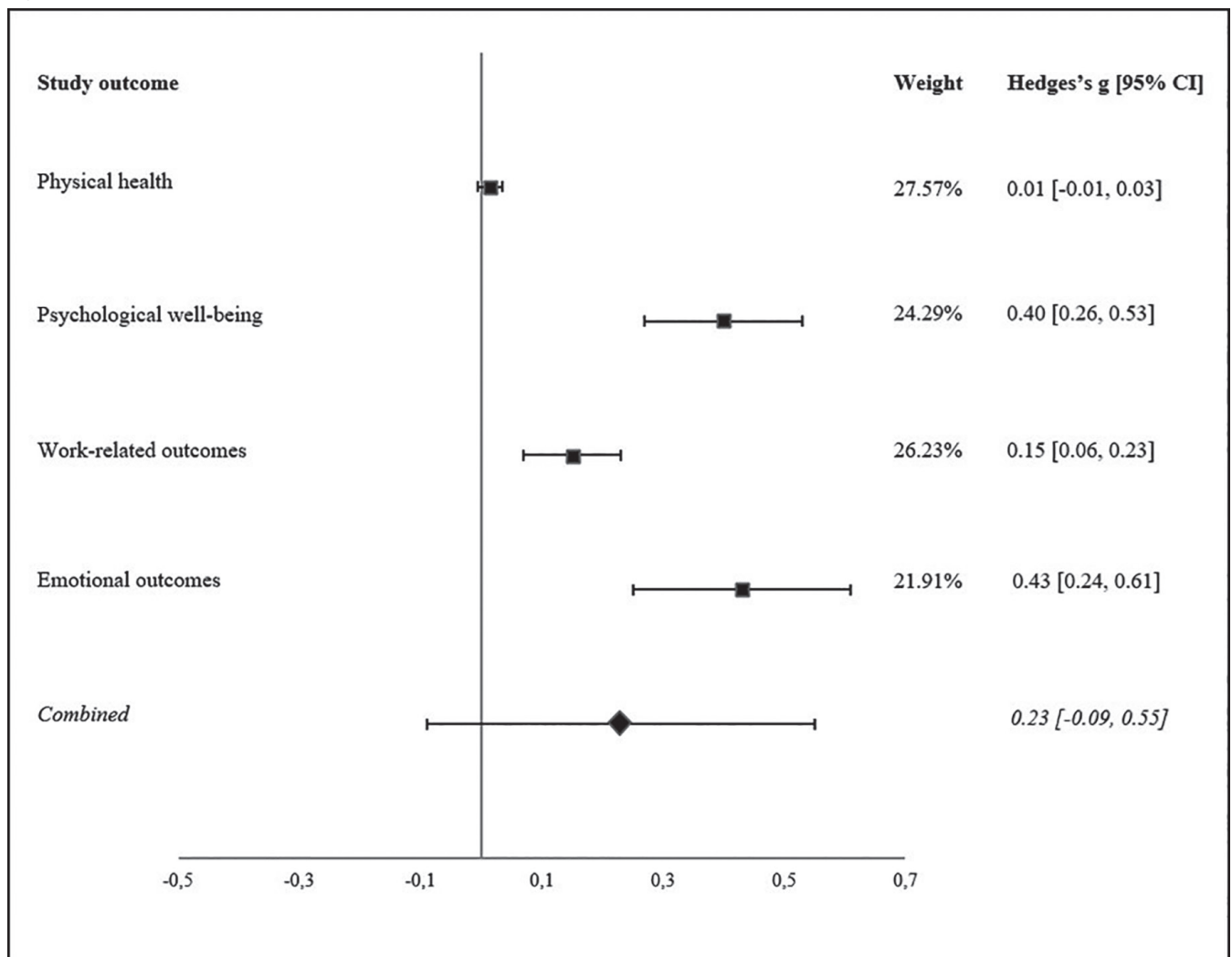


Discussion

The present meta-analysis aimed at addressing the questions of whether WED interventions applied to stressful workplace experiences can be effective for working adults and what types of outcomes are mostly affected by such interventions. Our findings suggest that only a few studies evaluated WED as a potential method of coping with job strain, despite the high prevalence of work-related stress and its strong association with

poor health outcomes (De Sio et al., 2020; Giorgi et al., 2020). Specifically, WED has been employed with school teachers as an occupation at high risk for burnout (see the study by Ashley et al., 2013), since they are faced with high workload, work-life balance difficulties, and multiple occupational stressors in terms of student misbehaviour, required collaboration with colleagues, and parents' expectations (Kabito & Wami, 2020; Tuerktorun et al., 2020). Besides, 2 studies (Barclay & Skarlicki, 2009; Michailidis & Cropley, 2019)

Fig. 3. Forest plot from the meta-analysis results by outcome



adopted WED as a victim-centred intervention to deal with organisational injustice and consequent embitterment in the workplace. Indeed, unfair treatment at work can be intended as a traumatic experience engendering negative emotions (e.g., anger, rage, shame, guilt), ruminations, hypervigilance, and increased detachment similarly to PTSD (Kühn et al., 2018; Michailidis & Cropley, 2016). Then, in the study by Tarquini et al. (2016), WED has been proposed as a means to foster a sense of predictability and resolution in facing work relocation. Indeed, organisational changes and work transitions trigger feelings of job insecurity that may negatively affect workers' health and well-being, resulting in a heightened occupational risk (Chirumbolo et al., 2017; De Witte et al., 2015).

Regarding the first research question, our findings suggest a not significant effect of WED interventions, in line with most of the previous meta-analytic studies in both clinical and healthy populations that have yielded an estimated ES generally ranging from 0.15 to 0.47 (Frattaroli, 2006; Frisina et al., 2004; Harris, 2006; Smyth, 1998). Indeed, as stated by Harris (2006), writing about stressful experiences could show limited effectiveness in samples defined by exposure to specific stressors as in our case. At follow-ups occurred from two to seven months after experimental disclosure, we found that ES did not substantially improve, in agreement with what

was concluded by Frattaroli (2006) about the studies that followed participants for at least a month. Indeed, WED may have short-term effects on subjective well-being that need to be sustained over time, given the tendency to return to baseline shortly consistent with the idea of hedonic adaptation (Suh et al., 1996).

About the second research question, psychological well-being as well as emotional variables including personal resolution and conflict management (i.e. anger, retaliation intentions) were found to be the most affected outcomes with a medium-sized effect, despite the quality of evidence being moderately robust only for emotional outcomes. This appears consistent with previous evidence showing that experimental disclosure can be helpful for psychological health (Frattaroli, 2006; Smith, 1998). Besides, the promising effects on the capacity to regulate emotions, instead of suppressing or acting out them, seem to support the inhibition theory underlying the WED mechanisms (Greenberg et al., 1996; Pennebaker, 1997; Pennebaker & Beall, 1986). Indeed, when confronting themselves with potentially traumatic events, people can achieve a sense of closure and resolution about upsetting experiences that, if not disclosed and elaborated on, can lead to negative emotions and continued ruminations serving as cumulative stressors (Pennebaker, 1997; Spera et al., 1994).

Besides, not significant effects were confirmed with regard to work-related outcomes (i.e. job satisfaction and positive affect at work), despite previous evidence having showed that experimental disclosure is helpful for work functioning including reduced job absenteeism (Francis & Pennebaker, 1992), faster re-employment (Spera et al., 1994), self-efficacy (Kirk et al., 2011), and job satisfaction (Alford et al., 2005). Then, a null effect emerged about reported physical health status, consistent with the meta-analysis results by Frattaroli (2006) and Wislocki (2018). This can be explained by the variability in the baseline health of participants and adopted scales to measure symptoms across the examined studies (Frattaroli, 2006). As well, the reduced relevance of physical functioning as an outcome for people without physical illness compared to clinical populations should be also considered (Frisina et al., 2004; Zachariae & O'Toole, 2015).

Strengths and limitations

The current meta-analytic review represents the first attempt to summarise the existing knowledge about the effects of WED interventions at the workplace in employed adults. It included studies from peer-reviewed literature, with pre-post control designs and follow-ups, which were featured by an adequate methodological quality. Besides, the examined studies were homogeneous in terms of WED intervention (i.e. writing about stressful workplace experiences) and treatment intensity (3/4 sessions of 20 min each) thus making our conclusions consistent. However, some limitations have to be acknowledged such as the limited number of the examined studies that prevented from performing possible moderation analyses, the low used sample size that negatively affected the quality of the provided scientific evidence, and the heterogeneity of adopted measures. As well, a common methodological concern refers to the lack of accurate estimation models taking into account the dropout and attrition rates that may negatively affect internal validity.

Conclusion

Our findings only partially support the relevance of WED interventions focusing on stressful workplace experiences in employed adults, which seem mostly impact the emotional functioning with small-sized effects. However, if considering that WED represents a low-cost, easy-to-use, and brief intervention, even small improvements could be clinically relevant in reducing work-related stress on a practical level (Frattaroli, 2006; Wislocki, 2018). This is consistent with the increasing relevance of narrative exposition therapies in reducing mental health distress (Sambucini et al., 2020). As well, the use of narratives and textual data can be very fruitful for further research and intervention purposes based on the recent developments of psychological textual analysis techniques (Caputo et al., 2016; Lai et al., 2021; Langher et al., 2019). About future research directions, the application

of WED as a method of coping with work stressors should be further expanded as to provide a greater basis for research evidence. As well, it could be interesting to test the potential role of different WED instructions addressing generic or more specific (e.g., organisational injustice, work relocation, injuries) stressful workplace experiences, respectively. As suggested by Zachariae and O'Toole (2015), further moderators could be also considered, including pre-intervention distress levels and context-dependent factors to better understand if WED could be more suitable for specific subgroups of workers.

Author Contributions

The authors contributed equally to this manuscript.

Compliance with Ethical Standards

Conflict of interest

The authors declare that they do not have competing interests.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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