

# Effects of expressive writing on depressive symptoms—A meta-analysis

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This meta-analysis addresses the question of whether expressive writing shows an effect on reducing depressive symptoms. It focuses on samples of physically healthy adults with varying degrees of stress but without posttraumatic stress disorder. A total of 39 randomized controlled trials with 64 intervention–control group comparisons were obtained through keyword search in databases and backward search. Expressive writing did not yield significant long-term effects on depressive symptoms. However, effects were larger when the number of sessions was higher and when the writing topic was more specific. The results of this meta-analysis did not support the effectiveness of brief, self-directed expressive writing as an intervention that decreases depressive symptoms in physically healthy adults with varying degrees of psychological stress. Future research should examine whether longer, more directed writing interventions with additional therapeutic support would lead to different results.

## KEYWORDS

depressive symptoms, emotional disclosure, expressive writing, meta-analysis, scriptotherapy

## 1 | THEORETICAL BACKGROUND

### 1.1 | Expressive writing as a therapeutic intervention

The use of writing as a therapeutic intervention is anything but new; its capacity to reduce tension in patients was described as early as the 18th century (McKinney, 1976), and it has been commonly used in combination with spoken psychotherapy within the past century (Riordan, 1996). In the current literature, this intervention is known under a variety of names, such as *expressive writing* (e.g., Smyth & Pennebaker, 2008), *written emotional disclosure* (e.g., Frisina, Borod, & Lepore, 2004), *scriptotherapy* (e.g., Riordan, 1996), or *therapeutic writing* (e.g., Wright & Chung, 2001). Despite different names, each of these terms refers to the procedure of writing freely and emotionally about a

personal topic or event without paying attention to grammar or spelling.

A growing body of literature and empirical research reflects excitement about expressive writing as a therapeutic intervention. By 2009, over 200 studies on expressive writing had been published in English-language journals (Pennebaker & Chung, 2011). This attention can be explained by the notion that expressive writing has several possible advantages in comparison with traditional spoken therapy. First, expressive writing is a highly time-efficient, low-cost intervention because a therapist is usually not directly involved (Smyth & Helm, 2003). Second, expressive writing is a promising intervention in the growing field of online therapy (Wright, 2002). Third, expressive writing can be offered in combination with traditional therapy, for example, as a written reflection of therapy sessions at home (Riordan, 1996). Finally, the written essays offer

rich information to track mechanisms of therapeutic change (Cummings, Hayes, Saint, & Park, 2014). Expressive writing appears to be a low-threshold intervention, which may allow insights into therapeutic change mechanisms. It has found application in posttraumatic stress disorder (PTSD) treatment as written exposure therapy (WET; Sloan, Marx, Bovin, Feinstein, & Gailagher, 2012), which is composed of psychoeducation and repeated confrontational writing about a traumatic event.

Despite the enthusiasm for expressive writing, the literature is somewhat mixed on whether this intervention leads to long-term changes in mental and physical health. The following sections summarize the current state of research on the effectiveness of expressive writing by describing the commonly used experimental paradigms and meta-analytic results.

## 1.2 | Original expressive writing paradigm and variations

Within the past three decades, hundreds of controlled studies addressed the question of whether expressive writing is beneficial for mental and physical health. In the first empirical study by Pennebaker and Beall (1986), college students participated in three writing sessions and were instructed to write about either a personally traumatic life event or a neutral control topic. Results showed that those in the expressive writing condition reported fewer doctor visits and fewer physical complaints as compared to those in the control writing condition. A subsequent study replicated the beneficial outcomes and demonstrated additional positive effects on mental health (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). These early empirical findings sparked an interest in expressive writing, and more randomized controlled trials (RCTs) followed, applying Pennebaker's original paradigm (1986) to a large variety of samples and outcome measures (e.g., Booth, Petrie, & Pennebaker, 1997; Francis & Pennebaker, 1992; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995; Smyth, Stone, Hurewitz, & Kaell, 1999). In most of the studies, participants wrote for 20 min on 3 consecutive days. Participants in the intervention group were instructed to write about an important personal and emotional topic. Participants in the control group were asked to write about a neutral topic (e.g., a description of the room they were sitting in while writing; Pennebaker & Beall, 1986). Typical instructions for expressive writing were as follows:

*For the next 3 days, I would like you to write your very deepest thoughts and feelings about an extremely important emotional issue that has affected you and your life. In your writing, I'd like you to really let go and explore your deepest emotions and thoughts. You might tie*

*your topic to your relationships with others, including parents, lovers, friends or relatives; to your past, your present or your future; or to who you have been, who you would like to be or who you are now. You may write about the same general issues or experiences on all days of writing or about different topics each day. All of your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure. The only rule is that once you begin writing, you continue until the time is up. (Pennebaker, 1997, p. 162)*

Whereas the first studies had very broad instructions, allowing participants to determine which kind of traumatic or emotional event to write about, some of the later studies addressed more focused topics, like participants' cancer (Low, Stanton, Bower, & Gyllenhammer, 2010) or divorce (Sbarra, Boals, Mason, Larson, & Mehl, 2013). In some studies, the traditional writing procedure was altered by changing the spacing between writing sessions to longer intervals, for example, 1 week (e.g., Chung & Pennebaker, 2008), or by limiting writing time to 2 min (e.g., Burton & King, 2008). The use of additional sessions has also been tested (e.g., van der Houwen, Schut, van den Bout, Stroebe, & Stroebe, 2010). Given a large number of studies and moderating variables, a review of the available meta-analytic findings is helpful in identifying larger trends in this complex literature.

## 1.3 | Meta-analytic results on expressive writing

Several meta-analyses have examined the effects of expressive writing (Frattaroli, 2006; Frisina et al., 2004; Meads & Nouwen, 2005; Mogk, Otte, Reinhold-Hurley, & Kröner-Herwig, 2006; Smyth, 1998), which have included a broad variety of samples and outcome measures. Importantly, these meta-analyses have come to different conclusions regarding the effectiveness of expressive writing as an intervention. In an early meta-analysis, Smyth (1998) synthesized 13 studies with healthy samples and found an overall effect of expressive writing of  $d = 0.49$ . The author concludes that the effects found for expressive writing are comparable to other psychological treatments. Frisina et al. (2004) extended these findings by focusing on samples with physical and mental health problems in a meta-analysis of nine studies and found a small, significant effect for physical health outcomes ( $d = 0.21$ ), but no significant effect for psychological health outcomes.

Two following meta-analyses included healthy as well as psychiatric or medical samples (Meads & Nouwen,

2005; Mogk et al., 2006). Even though these studies had different inclusion criteria, their findings were very similar: As opposed to previous analyses (Frisina et al., 2004; Smyth, 1998), these studies did not find any effects for expressive writing with regard to improving most physical and psychological health outcomes.

The largest and most recent meta-analysis examining the effects of expressive writing included 146 studies, including a large number of dissertations (Frattaroli, 2006). This meta-analysis consisted of broad inclusion criteria concerning samples and writing interventions, and results yielded a small but significant overall effect of  $d = 0.15$ . Frattaroli (2006) emphasized the practical relevance of her findings, outlining that expressive writing is a no-cost, non-invasive, independent activity.

Since the last meta-analysis by Frattaroli (2006), additional studies on expressive writing have been published, making new meta-analytic research necessary. Moreover, the somewhat contradictory results of the available meta-analyses indicate that it is increasingly important to investigate more specifically for which populations and under which conditions expressive writing works, and which outcome variables are affected.

#### 1.4 | Investigations of specific populations, writing conditions, and outcomes

People with a history of trauma and/or PTSD have been of special interest in research on expressive writing (Pennebaker & Chung, 2011), likely due to the writing paradigm's origin as an intervention to process traumatic events (Pennebaker & Beall, 1986). When examining trauma as a potential moderator, Frattaroli (2006) failed to find a significant moderation effect, indicating that expressive writing is equally effective for trauma samples as for other samples, with small effects in both groups. Nevertheless, a recent meta-analysis by van Emmerik, Reijntjes, and Kamphuis (2013) examined nine studies with a writing intervention for PTSD samples conducted by trained therapists and found a large effect of Hedges'  $g = 0.81$ . These findings suggested that expressive writing is a helpful component in PTSD treatment but is more effective when combined with other components, like professional therapeutic feedback.

Recent systematic reviews of expressive writing studies have focused on specific populations with physical health problems, like cancer (Merz, Fox, & Malcarne, 2014) or asthma (Paudyal et al., 2014). In spite of a high number of studies examining expressive writing in specific populations with psychological problems other than PTSD, meta-analytic research has not been conducted.

The meta-analysis by Frattaroli (2006) addressed the question of potential moderators that could help explain

under which conditions expressive writing is most effective, by conducting a number of moderator analyses based on theoretical reflections. Among other results, expressive writing was found to be more effective when the number of writing sessions was higher, when sessions were longer, and when instructions were more directive. Variables without a significant impact on the effect size were the spacing between writing sessions, the valence of writing topics, and the focus of disclosure instructions (general versus specific). The findings suggest that a more intense and specific intervention is favorable (see Frattaroli, 2006, for more details).

With respect to a more specific investigation of different outcomes, existing meta-analyses distinguished between physical and mental health outcomes, calculating effect sizes for both categories (Frattaroli, 2006; Frisina et al., 2004; Meads & Nouwen, 2005; Mogk et al., 2006; Smyth, 1998). Most of these analyses found a trend toward stronger effects for physical health outcomes (Frattaroli, 2006; Frisina et al., 2004; Mogk et al., 2006). Yet, Frattaroli (2006) also found a number of mental health subcategories to be significant. Depression, which is the essential outcome variable for the present meta-analysis, revealed a small but significant effect ( $r = .073$ ).

#### 1.5 | Underlying mechanisms

Several theories attempt to explain the underlying mechanisms of expressive writing that lead to the beneficial effects. Three of the most commonly described theories are inhibition theory, exposure theory, and cognitive processing accounts.

##### 1.5.1 | Inhibition theory

Early studies on expressive writing were based on the idea that inhibition of thoughts and emotions causes a high mental workload and therefore leads to ongoing physiological arousal (Traue & Pennebaker, 1993). Accordingly, the expression of these thoughts and emotions was thought to decrease physiological arousal and improve physical and mental health (Pennebaker & Beall, 1986).

##### 1.5.2 | Exposure theory

Analogous to prolonged exposure therapy (Foa, Hembree, & Rothbaum, 2007), expressive writing may work as an imaginative exposure, eliciting mechanisms such as habituation and extinction. During expressive writing, the extensive confrontation with a negative stimulus, namely, the memory of an emotional event, might lead to habituation, meaning that the person's emotional and physiological responses to the stimulus decrease over time (Rankin et al., 2009). Extinction refers to the cognitive and behavioral

learning process during exposure, in which the confrontation with an aversive topic does not lead to aversive consequences, and the original stress/anxiety response is unlearned or replaced by a different response. This process might underlie expressive writing (Sloan & Marx, 2004).

### 1.5.3 | Cognitive processing

In studies with text analysis procedures, Pennebaker (1993) found that people who used *causation words* (e.g., because, effect) and *insight words* (e.g., realize, understand) particularly benefited from expressive writing. Pennebaker concluded that forming a coherent story of the event and its consequences by organizing and integrating the experience in the context of other memories is an essential mechanism in expressive writing.

Several reviews elaborate these three theories, offer further explanations for the underlying mechanisms, and summarize the findings for each theory (Baikie & Wilhelm, 2005; Pennebaker & Chung, 2011; Sloan & Marx, 2004). These reviews suggest that none of the proposed theories fully explain how expressive writing works, but that the hypothesized factors all contribute to the complex mechanisms underlying expressive writing. As a consequence, it appears that expressive writing may be based on mechanisms similar to other widespread treatments with oral narrative components, such as cognitive processing therapy (CPT; e.g., Resick & Schnicke, 1993), trauma-focused cognitive behavioral therapy (TF-CBT; e.g., Cohen, Mannarino, Berliner, & Deblinger, 2000), or exposure-based cognitive therapy for depression (e.g., Hayes et al., 2007).

## 1.6 | Research questions of this meta-analysis

In sum, empirical research on expressive writing as a therapeutic intervention shows small effects for expressive writing for improving different physical and psychological health variables. Nevertheless, these effects are still of practical relevance because expressive writing is a low-threshold treatment that can be easily applied in many contexts and provides options to explore therapeutic change. In spite of efforts to gain more knowledge about the context and conditions to enhance expressive writing, many questions about the essential characteristics of populations, beneficial writing settings, and specific outcome variables are yet to be explored. This meta-analysis attempted to address some of these questions with the currently available literature.

Several recent systematic reviews have focused on samples with physical health problems. Within the populations with psychological stressors, people with trauma history or PTSD diagnosis have received special attention—not only by a recent meta-analysis on PTSD samples (van Emmerik et al., 2013) but also because of a large number of existing

studies focusing on trauma samples in general. As a result, trauma samples were overrepresented in previous meta-analyses, even though the authors drew conclusions for psychological samples in general. This meta-analysis raised the question of whether other samples with varying degrees of psychological stress, but without PTSD diagnosis, would yield equal results for expressive writing.

Even though most studies on expressive writing followed the original paradigm by Pennebaker and Beall (1986), some variations concerning the setting, the writing topic, and the instructions are available in the literature. Because of the differing findings concerning the effectiveness of expressive writing, it is relevant to further explore the potential conditions under which expressive writing is most beneficial. The present meta-analysis examined whether the moderating variables identified by Frattaroli (2006) could be replicated.

There are plenty of outcome variables that expressive writing could potentially influence. As this meta-analysis focuses on samples with varying degrees of psychological stress, it is essential to examine to what extent expressive writing is beneficial for psychological health. One especially important outcome for psychological health is depressive symptoms. In comparison with other mental and physical disorders, depression leads to the highest decrease in the quality of life (Wittchen et al., 2011), and although depressive symptoms are common with a 12-month prevalence for major depression of 6.9% (Wittchen et al., 2011), only 14% of people with a major depression diagnosis are in therapy (Wittchen & Jacobi, 2005). There is an even larger group of people with subclinical depressive symptoms who not only have a higher risk of developing depressive episodes but also suffer from significant impairments in psychosocial functioning (Judd, 1995). Thus, low-threshold interventions to lower depressive symptoms are extremely important for the well-being of society. This meta-analysis aimed at gaining further understanding of whether expressive writing can lower depressive symptoms. As a consequence, the main research questions of this meta-analysis were as follows:

1. What effect does expressive writing have on depressive symptoms in physically healthy adults without PTSD?
2. Which variables moderate the effect of expressive writing on depressive symptoms?

## 2 | METHOD

### 2.1 | Inclusion and exclusion criteria

The eligibility of studies was determined by the following criteria. (a) Only RCTs were included. Control groups contained either no intervention (waiting list) or a neutral writing task that instructed participants to write nonemotionally

about a trivial topic. (b) Study samples included only participants over 18 years who were *not* selected due to a physical health problem, trauma experience, or PTSD symptoms. (c) Studies had to apply an expressive writing intervention that instructed participants to write about a personal and emotional topic. If participants received any other intervention in addition to the writing task, such as therapy sessions or mindfulness techniques, the additional intervention had to be equivalent in the experimental and control groups. (d) At least one measure of depressive symptoms had to be assessed in each eligible study. Studies with more general mental health measures or mood scales were excluded. (e) Studies provided sufficient information on depression outcomes to compute effect sizes. (f) The reported data set was *not* the same data as in any of the other eligible articles.

## 2.2 | Literature search and study selection

A systematic literature search was conducted between April and September 2015, consisting of a *keyword search* in various databases and a *backward search*, in which various meta-analyses and systematic reviews were screened for further eligible studies. It included articles published between 1986 (the year in which the original study by Pennebaker and Beall was published) and 2015.

The web-based keyword search was carried out in the databases Medline, PsycINFO, and PSYINDEX. The search followed guidelines of the Cochrane Collaboration (Higgins & Green, 2011) and combined two different concepts. One contained a variety of terms describing the required intervention, whereas the other summarized method and outcomes. The search terms of each concept as well as a description of further search restrictions that were applied through advanced search features can be found in the supporting information (Data S1). All resulting studies were screened by title and abstract, and efforts were made to get access to full-text articles of all potentially eligible studies. In a next step, full-text articles were screened for eligibility.

In the backward search, the meta-analysis by Frattaroli (2006) was first examined because it included a total of 26 studies with depression outcome measures. Due to Frattaroli's broad inclusion criteria, it could be assumed that her meta-analysis covered all of the eligible studies for this meta-analysis until 2004, the year in which Frattaroli's literature search was conducted. Hence, only similarly new or newer meta-analyses and systematic reviews were examined for further backward search (see Data S1), which did not yield any further eligible studies.

Figure 1 gives an overview of the study selection process through keyword search and backward search. A total of 39 full-text articles met the inclusion criteria, containing 64 intervention–control group comparisons (see Data S2).

According to their titles and abstracts, another seven studies were potentially eligible for this meta-analysis, but full-text articles could not be obtained, in spite of efforts to get access. All of them were dissertations from more than a decade ago (see Data S2).

## 2.3 | Coding procedure and quality assessment

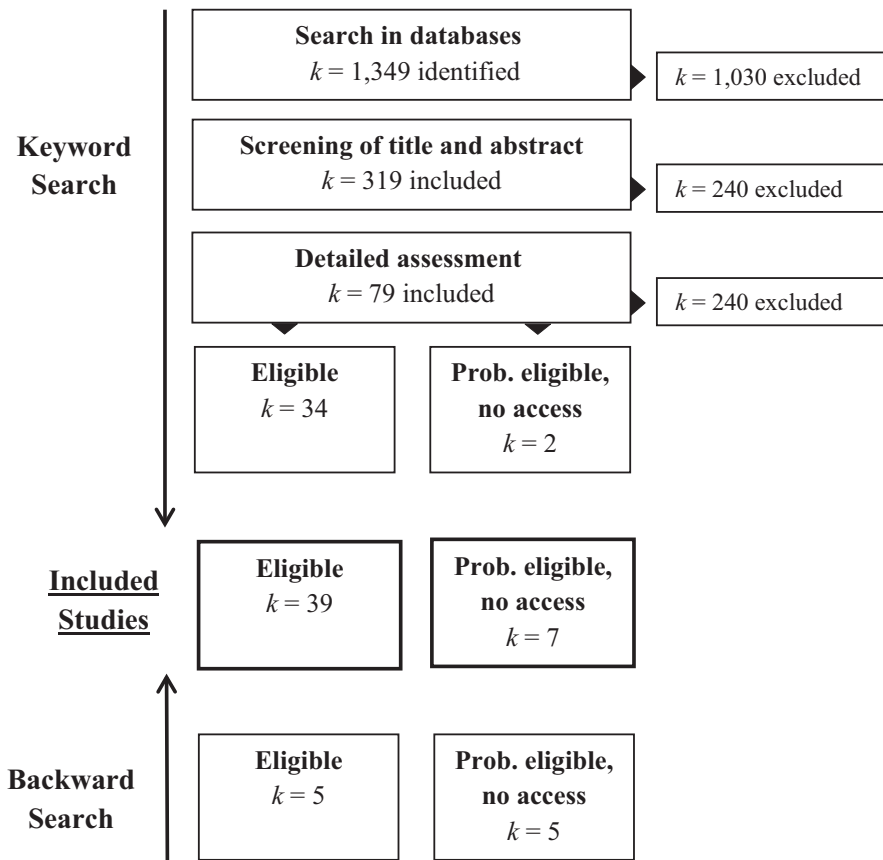
A coding manual was developed to standardize the coding procedure. During coding, the manual was continuously revised to optimize data extraction. All studies were coded again with the final coding manual. The coding manual can be found in the supporting information (see Data S3).

Results of each study were assessed by coding the number of data records; means and standard deviations were assessed for each intervention and control group at pretest, post-test, and follow-ups, as far as data were available. In some cases, change scores from pretest to follow-up or regression coefficients were reported instead of means and standard deviations. The given information was then directly converted into effect sizes.

Study quality was assessed with the Cochrane Collaboration's tool for assessing risk of bias (Higgins & Green, 2011), which allows for a detailed judgment of the risk of bias in different domains (selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias). A reasonable judgment of the domains detection bias and reporting bias was not possible for this study. As all outcomes were self-report measures, there was no need for blinding outcome assessors (detection bias). The reporting bias was not judged, as no study protocols were available to determine whether published reports included all pre-specified outcomes.

## 2.4 | Statistical analysis

For each study, change scores from pretest to post-test, pretest to follow-up 1, and pretest to follow-up 2 were calculated for experimental and control groups. In a next step, standardized mean differences between experimental and control groups were computed for the change scores, resulting in the Hedges'  $g$  effect sizes  $g_{post}$ ,  $g_{fu1}$ ,  $g_{fu2}$ . The primary effect size for this meta-analysis is  $g_{fu1}$  because the positive effects of expressive writing are expected to manifest themselves only after some time. Furthermore, follow-up outcomes were reported by nearly all of the studies, whereas data directly at post-treatment were only available in approximately one-third of the studies. Due to the way standardized mean differences were calculated, negative values indicate larger effects in experimental than in control groups and are therefore in line with the hypotheses that expressive writing lowers depressive symptoms.



**FIGURE 1** Keyword search and backward search leading to the total number of included studies.  $k$  = number of studies

Because of varying sample characteristics, intervention instructions, and outcome measures, heterogeneity between effect sizes was expected. Furthermore, many of the eligible studies had more than one expressive writing group or several measures of depressive symptoms; thus, effects were likely to be dependent. To account for these dependencies, multilevel meta-analyses were applied, which allowed for estimating both the between-study variance,  $\tau^2$ , and the within-study variance,  $\sigma^2$  (Van den Noortgate, López-López, Marín-Martínez, & Sánchez-Meca, 2013). To investigate the impact of continuous as well as categorical study characteristics on effect sizes, moderator analyses were carried out through meta-regression analyses (Higgins & Green, 2011) for the primary effect size,  $g_{ful}$ . Continuous moderators were analyzed if they were nonconstant across studies. Categorical moderators were analyzed if they had at least two levels and at least three studies assigned to each level.

A common problem in meta-analyses is publication bias, as research articles are more likely to be published when they report significant results (Lipsey & Wilson, 2001). Thus, when the majority of studies included in a meta-analysis were published, effects might be overestimated. This meta-analysis tried to avoid a publication bias by also including dissertation papers. Unfortunately, it was not possible to gain access to all of the possibly eligible

dissertations (see the section Literature Search and Study Selection). To examine to what extent results are likely to be biased by a publication bias, funnel plots were created, and the trim and fill method (Duval & Tweedie, 2000) was applied.

All analyses were conducted with the System for Statistical Computation and Graphics R (R Core Team, 2017), applying the R package *metafor* (Viechtbauer, 2010). Statistical tests were conducted at a 5% significance level and were one-tailed, when hypotheses were available.

## 3 | RESULTS

### 3.1 | Study characteristics

Overall, 64 outcomes reported in 39 studies were included in the analysis, with a total number of 4,009 participants. The mean age of participants was 27.9 years, and 26% were male. Sixty-one percent of the participants were students, 46% were selected according to a psychological stressor, 10% were patients with a diagnosed clinical disorder, and 6% were patients with major depression as the main diagnosis. In 24 studies with a total of 2,989 participants, ethnicity was reported: 63% identified themselves as Caucasian, 6% as Hispanic, 14% as African American, 10%

as Asian, and 7% as belonging to another ethnicity. On average, participants wrote for 17.5 min in 3.8 sessions, with a spacing of 2.6 days between sessions. In most of the included studies, writing instructions followed the traditional paradigm of writing about a negative event in the past without further specifications. On average, the first follow-up was 6.4 months after treatment (range = 1–16 months), and the second follow-up (if present) was 15.6 months after treatment (range = 2–24 months). The four main depression measures were the CES-D (Center for Epidemiologic Studies Depression Scale; Radloff, 1977), the BDI-II (Beck Depression Inventory-II; Beck, Steer, & Brown, 1996), the Depression scale of the HADS (Hamilton Anxiety and Depression Scale; Kjærgaard, Arfwedson Wang, Waterloo, & Jorde, 2014), and the Depression scale of the DASS (Depression Anxiety Stress Scales; Lovibond & Lovibond, 1995). Of the 57 outcomes in 34 studies for which initial depression scores were available, 23 (40%) reported average values in the experimental group that exceeded the measure-specific cut-off for mild depression. A table with descriptive information on all study variables and a list of each study's samples and writing topics are provided in Data S6.

### 3.2 | Study quality and handling of outliers

Domains of bias judged by the Cochrane Collaborations's tool for assessing risk of bias (Higgins & Green, 2011) were not significantly associated with studies' effect sizes, suggesting that study quality did not have any impact on study outcomes. Two studies with unrealistically large effect sizes of  $g_{ful} = -1.5$  (Koschwanetz et al., 2013) and  $g_{ful} = -2.1$  (Epstein, Sloan, & Marx, 2005) were identified. The former seems to be caused by a typo in the article, as the reported summary statistics are inconsistent with the results of the significance tests. Thus, the study of Koschwanetz et al. (2013) was excluded from further analyses. The statistics reported by Epstein et al. (2005) appear valid and were thus included in the main analyses.

### 3.3 | Overall effects of expressive writing

When analyzing the immediate impact of expressive writing after the last writing session, a significant effect of  $g_{post} = -0.09$ , 95% CI  $[-0.15, -0.02]$ ,  $p = .006$  (one-tailed),  $k = 22$ ,  $\tau < 0.01$ ,  $\sigma < 0.01$ , was found. This is considered as a very small effect (Cohen, 1988). The analysis of the first follow-up revealed a nonsignificant overall effect of  $g_{ful} = -0.03$  of expressive writing on depressive symptoms, 95% CI  $[-0.16, 0.09]$ ,  $p = .296$  (one-tailed),  $k = 61$ ,  $\tau = 0.35$ ,  $\sigma < 0.01$ , meaning that average change scores from baseline to follow-up 1

approached zero and, as such, did not differ significantly between experimental and control groups. The effect at the second follow-up was not significant as well,  $g_{fu2} = -0.03$ , 95% CI  $[-0.09, 0.03]$ ,  $p = .345$ ,  $k = 15$ ,  $\tau < 0.01$ ,  $\sigma < 0.01$ . Figure 2 shows a forest plot with individual effect sizes for each study and the corresponding 95% confidence intervals, as well as the overall effect for follow-up 1. The low  $\tau$  and the high overlap of studies' confidence intervals in the forest plot indicated low heterogeneity between the studies. Forest plots for the change scores as post-test and follow-up 2 are provided in Data S6.

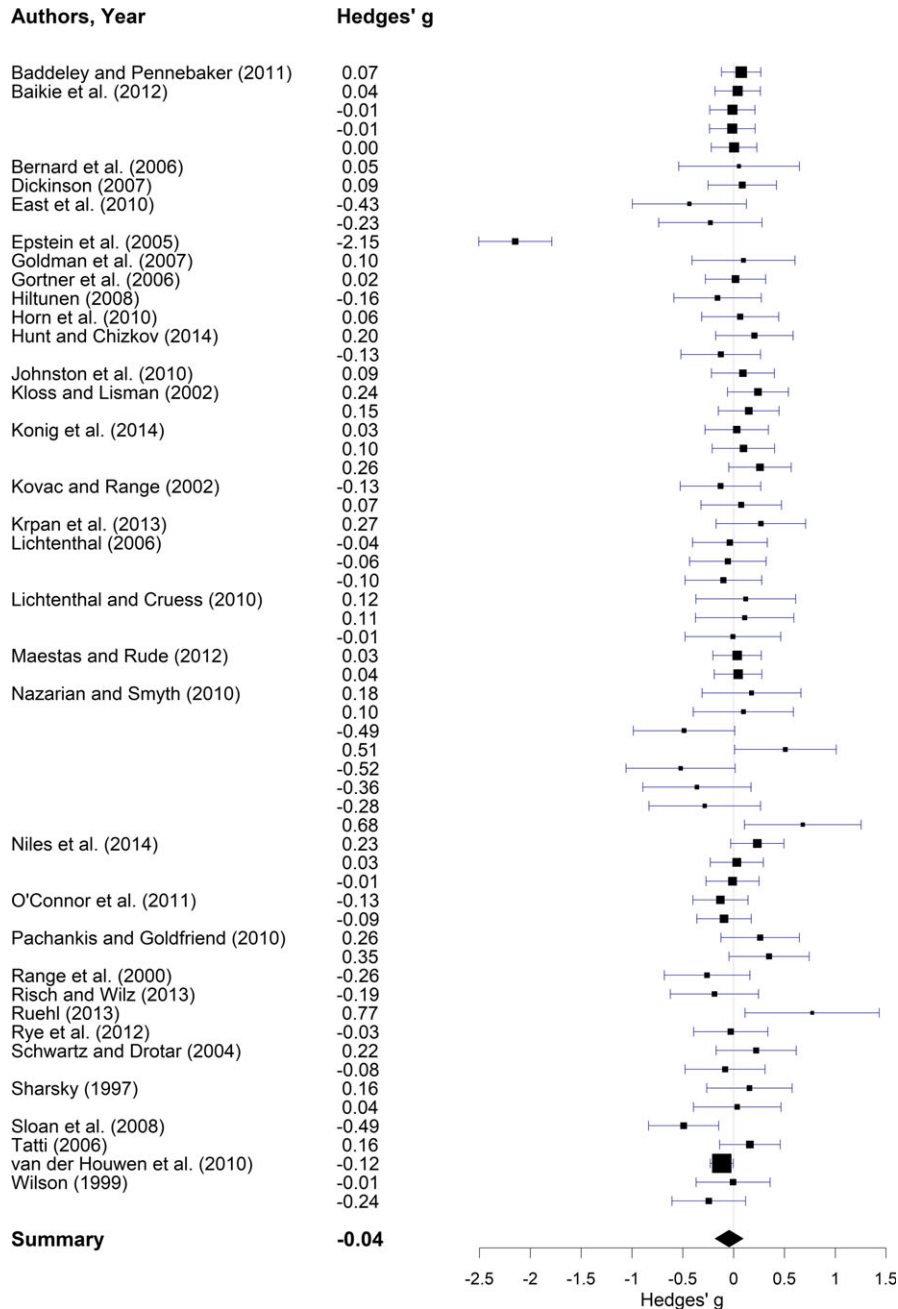
### 3.4 | Moderating variables

Most variables were not significantly related to the main effect size  $g_{ful}$  (see Data S4). In particular, no moderating effect was found for variables pertaining to the severity of depressive symptoms. Effect sizes did not differ between samples with and without a psychological stressor ( $b = -0.01$ ,  $z = -0.11$ ,  $p = .457$ ), between clinical and nonclinical samples ( $b = -0.01$ ,  $z = -0.09$ ,  $p = .464$ ), and between clinically depressed samples and other samples ( $b = 0.13$ ,  $z = 0.92$ ,  $p = .358$ ). Furthermore, the standardized depression scores of the experimental group at pre-treatment did not account for variation in the effect sizes ( $b = 0.03$ ,  $z = 0.46$ ,  $p = .643$ ). In contrast, studies had significantly larger effect sizes when they had a higher number of writing sessions ( $b = -0.03$ ,  $z = -1.77$ ,  $p = .038$ ) and a specific writing topic ( $b = -0.09$ ,  $z = -2.05$ ,  $p = .020$ ). Also, effect sizes increased with higher mean age of the participants ( $b = -0.005$ ,  $z = -2.24$ ,  $p = .025$ ) and higher percentage of female participants ( $b = -0.003$ ,  $z = -2.91$ ,  $p = .004$ ).

### 3.5 | Sensitivity analyses

Publication bias was tested by a funnel plot and the trim and fill method for  $g_{ful}$ . The funnel plot allows a visual evaluation of whether articles were more likely to be published when they reported significant results. The symmetrical appearance of the plot indicated that results were unlikely to be impacted by a publication bias (see Figure 3). This was confirmed by the trim and fill method, which estimated that the number of missing studies was zero.

A sensitivity analysis for follow-up 1 was conducted excluding the possibly unrealistically large effect size reported by Epstein et al. (2005; see above). The meta-analytic effect was still very small and nonsignificant,  $g_{ful} = 0.01$ , 95% CI  $[-0.03, 0.06]$ ,  $p = .563$ ,  $k = 60$ ,  $\tau = 0.06$ ,  $\sigma < 0.01$ , with a substantially reduced between-study variance.



**FIGURE 2** Funnel plot of  $g_{ful}$  effect sizes with 95% confidence intervals of the included intervention–control group comparisons. The overall effect size is represented as a square below studies' individual effect sizes

## 4 | DISCUSSION

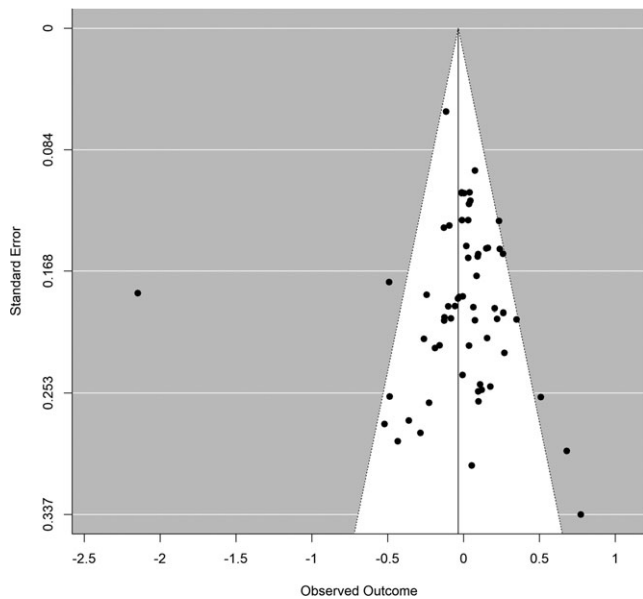
### 4.1 | Summary

The meta-analytic results of the 64 included intervention–control group comparisons reported in 39 studies led to the conclusion that expressive writing is not associated with any long-term effects on depressive symptoms in samples of physically healthy adults without PTSD diagnosis. Thus, the first hypothesis was not confirmed. The effect size including standardized mean differences between experimental and control groups from baseline to follow-up was not significantly different from zero ( $g_{ful} = -0.03$ ,

$g_{fu2} = -0.03$ ). Yet, a very small immediate effect from baseline to post-test was found, with  $g_{post} = -0.09$ .

Due to low heterogeneity between studies' effect sizes, moderator analyses were unlikely to reveal substantial moderators, and most hypotheses on relationships between assessed variables and the studies' main effect size were not confirmed. The only variables with a significant relationship to the outcome were number of writing sessions, focus of expressive writing, mean age, and percentage of female participants. Effects were larger when studies had a larger number of writing sessions (increase of  $g = 0.03$  per additional session), a specific writing topic (difference of  $g = 0.1$ ), older participants (increase of  $g = 0.005$  per





**FIGURE 3** Funnel plot of studies' main effect sizes. A symmetrical appearance indicates the absence of a publication bias

year), and a higher percentage of women (increase of  $g = 0.003$  per percent point). These findings indicate expressive writing is more effective when applied as a longer, more directed intervention although the corresponding effect sizes remain small. Also, older and female participants appeared to benefit more.

## 4.2 | Methodological limitations

For further interpretation of results, some general methodological limitations of this meta-analysis must be considered. A total of seven potentially eligible studies could not be accessed. In addition, some studies with depression outcome measures had to be excluded due to insufficient information regarding depression outcomes. Within the included studies, information was not always sufficient to code all variables, meaning that some variables lack information from a few studies. This is particularly important for interpreting the different effect sizes, as some studies did not provide information for pretest, post-test, and follow-up, which resulted in varying numbers of studies included in the immediate and the long-term effect size.

## 4.3 | Absent overall effect and potentially influencing factors

Revealing a nonsignificant effect size, the present meta-analysis could not replicate the findings of Frattaroli's meta-analysis (2006). Despite the diverse samples and a variety of writing topics (see Data S5), the 64 intervention–control group comparisons had very homogeneous effect sizes (with the exception of one outlier). The finding that expressive writing

is not correlated with greater reductions in depressive symptoms than control writing in participants without PTSD is therefore assumed to be very stable. The following sections explore explanations for this finding in light of other results in the field of expressive writing research and discuss the limitations and implications of this meta-analysis.

### 4.3.1 | Sample

The inclusion criteria of this meta-analysis differed from previous meta-analyses by focusing on samples with varying degrees of psychological stress but without physical illness or trauma history. The different composition of included samples might have contributed to the finding that Frattaroli's (2006) results on depression could not be replicated in this meta-analysis. Several meta-analyses (Frattaroli, 2006; Frisina et al., 2004) came to the conclusion that expressive writing is more effective for samples with physical illness than samples with psychological stressors. It is therefore possible that this meta-analysis focused on samples that benefited less from expressive writing than others. Nevertheless, this interpretation must be treated with caution because differences in effects between physical and psychological samples referred to overall effects, rather than to effects on depressive symptoms. The question of whether expressive writing is similarly ineffective in decreasing depressive symptoms in other samples, such as samples with physical health problems, should be addressed by future research.

When looking at the statistical properties of the studies that were included, it becomes clear that studies' sample variances are fairly large, indicating that expressive writing effects may differ considerably between participants. Hence, a possible reason for null findings is that some participants benefit from expressive writing, whereas many others do not. Several studies examining participants' characteristics as potential moderators have suggested that effects of expressive writing are related to individual differences (Niles, Haltom, Mulvenna, Lieberman, & Stanton, 2014; Páez, Velasco, & González, 1999; Solano, Donati, Pecci, Persicheeti, & Colaci, 2003). Based on the current evidence, it is only possible to say that expressive writing is not associated with the expected effects on depression measures when conducted in samples with fairly broad inclusion criteria.

Finally, generalizability of results among different ethnic groups might be restricted due to almost all studies with data on participants' ethnicity reporting the majority of participants to be White/Caucasian.

### 4.3.2 | Setting and expressive writing method

Even though an examination of the impact of setting variables was intended, few conclusions can be drawn from

this meta-analysis due to homogeneity on most setting variables, such as number of sessions, length of sessions, type of control group, or other simultaneous intervention. Most studies compared expressive writing to a neutral writing task, had participants write for 20 min on 3 consecutive days, and did not apply any further intervention. This meta-analysis showed that expressive writing is not associated with any long-term effects, when applied as described above. Still, it remains unclear whether expressive writing is more effective when applied as a longer intervention with therapeutic feedback, perhaps in a therapeutic setting. The present meta-analysis found expressive writing was more effective when the number of sessions was higher, when writing topics were more specific, and when instructions differed between sessions, which provide support for this idea.

Moreover, a recent meta-analysis of nine studies by van Emmerik et al. (2013) yielded promising results by examining writing therapy for PTSD samples and found a large overall effect for PTSD measures as well as on depression measures. The main difference from previous meta-analyses was that van Emmerik et al. (2013) included only studies in which writing therapy was conducted by trained therapists. Future research should address whether van Emmerik's findings can be extended to other samples with psychological stressors.

### 4.3.3 | Outcome

Another possibility for the absence of changes in depressive symptoms might be due to a floor effect, meaning that assessment tools with lower limits cannot reliably distinguish between participants' scores close to this limit (Everitt, 2002). In the present meta-analysis, if depression scores were low from the beginning, depression measures would not have been able to identify changes in depressive symptoms. However, we found that the average initial depression of the treatment group exceeded the measure-dependent cut-offs for mild depression in 41% of the studies, making it unlikely that most participants had negligible depressive symptoms at baseline. Furthermore, none of the moderator variables pertaining to the severity of depressive symptoms were significant. In particular, studies with higher initial depression scores did not reveal higher effects than studies with low initial depression scores.

### 4.4 | Significant effects for post-test

Contrary to the broadly accepted notion that expressive writing leads to an increase in short-term negative emotions (e.g., Esterling, L'Abate, Murray, & Pennebaker, 1999), the present meta-analysis found a significant decrease in depressive symptoms from baseline to post-test. These

findings suggest that it is possible for the upsetting qualities of expressive writing to lessen over time within the writing sessions. Whereas some studies assessing depressive symptoms or affect between sessions support this idea (Graf, Gaudiano, & Geller, 2008; Pachankis & Goldfried, 2010), a large number of studies find an increase in negative affect throughout writing sessions (e.g., Kloss & Lisman, 2002; Kovac & Range, 2002; Richards, Beal, Seagal, & Pennebaker, 2000; Seih, Chung, & Pennebaker, 2011).

Looking at the effect sizes included in the present analysis, it becomes clear that the effect might arise from methodological reasons rather than from real differences of depressive symptoms at post-test and at follow-up. As described above, effect sizes in this meta-analysis varied in their number of included studies, depending on reported data. Therefore, the number of intervention-control group comparisons included in the short-term effect was 22 and much lower than for the more important long-term effect  $g_{\text{full}}$ .

## 4.5 | Practical implications

Results of this meta-analysis show that a brief, self-directed expressive writing intervention does not have any long-term impact on depressive symptoms in adults with varying levels of stress. Thus, based on the current state of research, writing emotionally and freely about traumatic or other emotional events during three sessions of 20 min cannot be considered a therapeutic intervention for depressive symptoms among those without PTSD. When applied the way described above, expressive writing could potentially function as a control condition for future therapeutic research on how to lower depressive symptoms.

However, findings of this meta-analysis indicate that expressive writing might be more beneficial when applied as a longer, more directed intervention. To determine whether expressive writing can actually lead to significant effects, participants should write for more than three sessions about one specific topic (e.g., like coming to college or a recent divorce). Moreover, instructions should differ from session to session, guiding participants on how to approach each session and what to write about.

## 5 | CONCLUSIONS

As the last broad meta-analysis of expressive writing in adult samples was published by Frattaroli in 2006, many new studies on expressive writing with a large diversity of samples and outcome measures have been published. This meta-analysis gives an update on expressive writing research by examining whether expressive writing has an impact on depressive symptoms in physically healthy

adults without PTSD. Even though previous meta-analyses also examined effects on depressive symptoms, this meta-analysis offers findings based on a much higher number of studies.

Results indicated that expressive writing is not associated with the expected effects on depressive symptoms. Main effect sizes were very small and did not differ significantly from zero, suggesting that writing emotionally about personal events in comparison with writing about neutral topics does *not* evoke long-term changes on depression measures. Moreover, a high homogeneity between studies' effects indicates that results are fairly stable across different samples and writing conditions, despite a high diversity of samples and writing topics. According to the present findings, expressive writing was not helpful in reducing depressive symptoms in physically healthy adults with varying levels of stress (but without PTSD diagnosis).

These null findings do not preclude the possibility that expressive writing may be helpful for the well-being of people per se. Future research should address the question of whether null findings on depression measures can be extended to samples with physical health problems. More studies with variations of the setting, for example, longer writing interventions and the involvement of therapists, are needed to determine whether null findings are caused by the briefness or the self-directedness of the intervention. And finally, the examination of further well-being measures would help clarify whether findings can be generalized to psychological well-being.

As long as these questions remain unanswered, expressive writing should not be considered a therapeutic intervention to reduce depressive symptoms; however, the potential advantages of written interventions should not be neglected.

## CONFLICT OF INTERESTS

The authors declare no conflict of interests.

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