

WELLNESS TEAM CULTURE

Evidence-based wellness, leadership, and team dynamics

RESEARCH BRIEF · THE EVIDENCE, PLAINLY

The Word That Did the Work

ISSUE 93 · SEPTEMBER 8, 2026 · JOURNALING NEUROSCIENCE

Expressive writing is one of the most replicated interventions in health psychology, and the popular account of why it works, release, is not the account the data support. The writers who improved were the ones whose language shifted across the days toward cause and insight, not the ones who wrote with the most emotion. A parallel imaging literature shows that putting a feeling into words reduces amygdala response and engages a prefrontal region that regulates it, and that people consistently predict the opposite. This brief lays out both literatures, the study that joined them, and the honest size of the effect, and grades every study by tier.

WHAT WAS ACTUALLY STUDIED

01 Pennebaker & Beall (1986), Journal of Abnormal Psychology

TIER 1 · ORIGINAL EXPERIMENT

The experiment that started the field. College students were assigned to write on consecutive evenings about either a traumatic experience or a trivial topic, with the trauma condition further split by whether participants wrote about facts, feelings, or both. The widely cited outcome is that participants who wrote about both the facts and the feelings of a trauma made fewer visits to the student health center in the months that followed. PubMed carries the record but not the abstract, so the specific outcome detail here is drawn from the later literature that anchors on this paper, including the Frattaroli meta-analysis and Pennebaker's own 1997 reanalysis. It is included as the origin point rather than as a load-bearing effect estimate.

02

Pennebaker, Mayne & Francis (1997), Journal of Personality and Social Psychology

TIER 1 · REANALYSIS OF SIX EXPERIMENTS PLUS A PROSPECTIVE STUDY

The buried finding. Essays from 177 participants across six previous writing experiments were run through a computerized text analysis program and the language variables were used to predict later health. Increased use of words associated with insightful and causal thinking across the writing days was linked to improved physical health, but not to improved mental health. A higher ratio of positive to negative emotion words was also associated with better health. An empirical model derived from those data was then tested on interview transcripts of 30 men who had lost their partners to AIDS, where the cognitive-change model predicted post-bereavement distress at one year. The practical content is that the change in the writing, not the intensity of it, tracked the benefit.

03

Lieberman et al. (2007), Psychological Science

TIER 1 · FMRI EXPERIMENT

The affect labeling paper. Participants viewed negative emotional images and faces and, in the labeling condition, chose a word for the emotion shown; comparison conditions included matching faces to faces and other non-verbal encodings. Affect labeling, relative to the other forms of encoding, diminished the response of the amygdala and other limbic regions, and increased activity in one region, the right ventrolateral prefrontal cortex. Activity in that region and in the amygdala were inversely correlated during labeling, and the relationship was mediated by activity in medial prefrontal cortex. The authors describe the study as designed to remedy methodological limits of earlier imaging work on the same question. Sample size is not stated in the abstract and is not reported here.

04

Lieberman, Inagaki, Tabibnia & Crockett (2011), Emotion

TIER 1 · FOUR BEHAVIORAL STUDIES

The prediction finding. Four studies examined what affect labeling does to self-reported emotional experience, as opposed to brain response. Self-reported distress was lower during labeling than during passive viewing of negative images, and labeling produced effects comparable to two deliberate emotion regulation strategies, reappraisal and distraction. In each of the first three studies, participants predicted beforehand that labeling would increase their distress, and after experiencing it lower their distress they still predicted it would increase distress in the future. The fourth study used positive images and found that labeling reduced self-reported pleasure, which suggests the effect is a general dampening of affective response rather than a specific relief of negative affect. The authors characterize labeling as an incidental rather than intentional form of regulation.

05

Memarian, Torre, Haltom, Stanton & Lieberman (2017), Social Cognitive and Affective Neuroscience

TIER 2 · FMRI WITH PREDICTIVE MODELING

The study that joined the two literatures. Participants completed an affect labeling task in the scanner and then an expressive writing intervention. Neural responses during labeling predicted changes in four measures of psychological and physical well-being, physical symptoms, depression, anxiety and life satisfaction, three months later. Right ventrolateral prefrontal cortex and the amygdalae were the top predictors across the four outcomes, and specific regions predicted benefits attributable to the writing itself in life satisfaction and depression. The prediction used supervised machine learning and was more accurate than a conventional linear model. Sample size is not stated in the abstract. This is a predictive-association study, not a causal test of mechanism, and is graded accordingly.

06

Frattaroli (2006), Psychological Bulletin

TIER 1 · META-ANALYSIS, 146 RANDOMIZED STUDIES

The size of the effect. One hundred and forty-six randomized studies of experimental disclosure, the umbrella term for writing or talking about personal and meaningful topics, were pooled using random-effects models, which generalize better than the fixed-effects approach used by two earlier, smaller meta-analyses. The average effect was positive and significant, $r = .075$. A number of moderators were identified, which is to say the effect varies with how and with whom the intervention is run. This is the number that keeps the rest of the brief honest: the intervention works, and the average effect is small.

07

Ramirez & Beilock (2011), Science

TIER 1 · TWO LABORATORY AND TWO RANDOMIZED FIELD EXPERIMENTS

The immediate-use version. The authors reasoned that sitting for an important exam produces worries about the situation and its consequences that occupy working memory and undermine performance, and tested whether having students write down their thoughts immediately before a test would help. A brief expressive writing assignment immediately before an important exam significantly improved scores, especially for students habitually anxious about test taking. Two of the four experiments were randomized field studies in real classrooms. The intervention is minutes long and single-session, which distinguishes it from the multi-day Pennebaker paradigm.

A mechanism check on the exam finding. Eighty students varying in math anxiety either sat quietly or wrote about their thoughts and feelings regarding the test they were about to take, then completed difficulty-matched math and word problems. In the control group, highly math-anxious students performed significantly worse on the math problems than low-anxious students. In the writing group that gap was significantly reduced. Among the highly anxious, use of words related to anxiety, cause, and insight in the writing was positively related to math performance, which lines up with the 1997 language finding in a very different setting. One study, one sample; corroborating rather than load-bearing.

WHAT THEY FOUND

The benefit of expressive writing tracked the words, not the intensity. Across 177 participants in six writing experiments, increased use of causal and insight words across the writing days was associated with improved physical health, and a higher ratio of positive to negative emotion words was associated with better health. Emotional intensity on its own was not the predictor (Pennebaker et al., 1997).

Putting a feeling into words changes the brain's response to it. Choosing a word for an emotional image reduced amygdala and limbic response relative to other ways of processing the same image, and increased activity in the right ventrolateral prefrontal cortex. Those two responses were inversely related, with medial prefrontal cortex mediating the relationship (Lieberman et al., 2007).

3 months

how far ahead brain activity during affect labeling predicted changes in physical symptoms, depression, anxiety and life satisfaction after an expressive writing intervention (Memarian et al., 2017, right ventrolateral prefrontal cortex and amygdalae as top predictors).

The two literatures connect. Brain responses during an affect labeling task predicted, three months later, how much a person's physical symptoms, depression, anxiety and life satisfaction changed after expressive writing, with the same prefrontal region and the amygdalae as the strongest predictors (Memarian et al., 2017).

People predict the opposite of what happens. Across three studies, labeling lowered self-reported distress about as much as reappraisal and distraction, yet participants predicted beforehand that it would raise their distress, and after experiencing it work, still predicted it would raise their distress next

time. In a fourth study, labeling also reduced self-reported pleasure to positive images (Lieberman et al., 2011).

The effect is real and small. Pooling 146 randomized studies of experimental disclosure with random-effects models produced a positive, significant average effect of $r = .075$, with identified moderators (Frattaroli, 2006).

A single brief session has a use of its own. Writing about worries immediately before a high-stakes exam improved scores in two laboratory and two randomized field experiments, most for habitually test-anxious students (Ramirez & Beilock, 2011). In a follow-up with 80 students, the same brief writing reduced the performance gap between high and low math-anxious students, and among the anxious the use of anxiety, cause and insight words related positively to performance (Park et al., 2014).

Eight sources, and the honest reading is that the mechanism is better established than the size of the benefit.

The well-supported claim is that expressive writing has a positive effect on health outcomes and that the effect is carried by cognitive processing rather than emotional discharge. The meta-analytic evidence across 146 randomized studies supports the first half (Frattaroli, 2006). The language analysis across 177 writers supports the second: what predicted improved physical health was a shift toward causal and insight words across the days, not the emotional intensity of the writing (Pennebaker et al., 1997). A separate imaging literature supplies a plausible mechanism, in that labeling an emotion reduces amygdala response and engages right ventrolateral prefrontal cortex (Lieberman et al., 2007), and one study connects the two by showing that brain response during labeling predicts the benefit a person later gets from writing (Memarian et al., 2017).

The under-supported claim is any large effect. The pooled average across 146 randomized studies is $r = .075$, which is real and small, and the moderator analysis means the effect depends on how the writing is run and for whom. Nothing here supports writing as a substitute for treatment, and the 2011 behavioral work adds a second caution: labeling dampens positive affect as well as negative, so it is a tool for difficult states rather than a general filter. The imaging studies establish that labeling changes brain response; they do not by themselves establish that this is why writing improves health, and the study that links them is predictive, not causal.

What survives both readings is a small, specific, and usable claim. Putting a feeling into words engages a prefrontal regulatory system and reduces the threat response, people reliably expect it to do the opposite, and the writing that helps is the writing that builds a causal account across days rather than repeating the same raw account. A brief session before a high-stakes task has separate randomized support (Ramirez & Beilock, 2011). That asymmetry between what people predict and what the studies show is the practical content of this issue.

WHAT THIS DOES NOT PROVE

The 1986 origin paper's abstract is not available in PubMed, so its specific outcome detail is reported here from the later literature that cites it rather than verified against the primary record. Its role in this brief is historical, not evidential.

The 1997 language finding is a reanalysis of existing essays, and the association between insight and causal words and later health is correlational. It does not show that instructing people to use those words produces the benefit; it shows that the writers who naturally moved toward them did better. The finding was for physical health only, not mental health, and the brief does not claim otherwise.

The 2007 and 2017 imaging studies do not report sample sizes in their abstracts, and those numbers are not reported here. Neuroimaging samples of this era are typically modest. The 2007 study was designed to correct methodological limits in earlier work, which is a strength; it is still one laboratory's paradigm.

The 2017 linking study is a predictive-association study using machine learning on imaging data. It shows that brain response during labeling forecasts the benefit of writing. It does not show that the labeling mechanism causes the writing benefit, and predictive accuracy in a single sample is not the same as a replicated causal pathway.

The meta-analytic effect is small. An average r of .075 across 146 randomized studies is a real effect and a modest one, and it varies with the moderators the analysis identified. Any reader who has heard expressive writing described as transformative should hold this number next to that description.

The 2011 behavioral work found that labeling dampened positive affect as well as negative. The technique is not free of side effects, and the issue frames it as a tool for hard states rather than a general practice on that basis.

The exam-writing studies were run with students before tests. The extension to presentations, difficult conversations, and other high-stakes adult performance situations is a reasonable inference from the working-memory account the authors give, and it is an inference, not a tested result.

None of this is therapy or medical advice. Writing about a trauma that does not change across days, or that makes symptoms worse rather than clearer, is a clinical matter. A clinician is the right instrument for it, and a notebook is not.

WHAT IT MEANS FOR YOU

Write the because, because across 177 writers the shift toward causal and insight words across days is what predicted improved physical health, and those words do not arrive on their own. Name it before you fix it, because choosing a word for an emotion reduced amygdala response and engaged prefrontal

regulation in the imaging work, and because participants in four behavioral studies predicted the opposite outcome every time, including after they had just experienced the real one. Watch the essay change, not the mood, because the writers who improved were the ones whose account changed across the days, and an identical account on day four is closer to the repetitive thought this newsletter covered last week than to processing. Write the worry before the thing, because a brief writing session immediately before a high-stakes exam improved scores in two randomized field experiments, most for the habitually anxious, and the working-memory account the authors give applies to any performance situation where worry is occupying the space. And name what is in the room, because labeling is regulation done with language, the mechanism does not require the label to be private, and the expectation that saying it will make things worse is, in the data, the reliably wrong prediction. The newsletter walks through those five moves. The research above is why they are the five, and where each one runs out.

GO TO THE SOURCE

TIER 1 · ORIGINAL EXPERIMENT Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology*, 95(3), 274-281. doi.org/10.1037//0021-843X.95.3.274

TIER 1 · REANALYSIS PLUS PROSPECTIVE STUDY Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, 72(4), 863-871. doi.org/10.1037//0022-3514.72.4.863

TIER 1 · FMRI EXPERIMENT Lieberman, M. D., Eisenberger, N. I., Crockett, M. J., Tom, S. M., Pfeifer, J. H., & Way, B. M. (2007). Putting feelings into words: Affect labeling disrupts amygdala activity in response to affective stimuli. *Psychological Science*, 18(5), 421-428. doi.org/10.1111/j.1467-9280.2007.01916.x

TIER 1 · FOUR BEHAVIORAL STUDIES Lieberman, M. D., Inagaki, T. K., Tabibnia, G., & Crockett, M. J. (2011). Subjective responses to emotional stimuli during labeling, reappraisal, and distraction. *Emotion*, 11(3), 468-480. doi.org/10.1037/a0023503

TIER 2 · FMRI WITH PREDICTIVE MODELING Memarian, N., Torre, J. B., Haltom, K. E., Stanton, A. L., & Lieberman, M. D. (2017). Neural activity during affect labeling predicts expressive writing effects on well-being: GLM and SVM approaches. *Social Cognitive and Affective Neuroscience*, 12(9), 1437-1447. doi.org/10.1093/scan/nsx084

TIER 1 · META-ANALYSIS Frattaroli, J. (2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin*, 132(6), 823-865. doi.org/10.1037/0033-2909.132.6.823

TIER 1 · RANDOMIZED FIELD AND LABORATORY EXPERIMENTS

Ramirez, G., & Beilock, S. L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, 331(6014), 211-213. doi.org/10.1126/science.1199427

TIER 2 · SINGLE LABORATORY STUDY

Park, D., Ramirez, G., & Beilock, S. L. (2014). The role of expressive writing in math anxiety. *Journal of Experimental Psychology: Applied*, 20(2), 103-111. doi.org/10.1037/xap0000013

Tier 1 means peer-reviewed primary research or meta-analysis, the strongest evidence. Tier 2 means an expert framework or smaller study that traces to peer-reviewed work. We grade every source so you can see the weight behind each claim.

Pegasus Realm publishes Wellness Team Culture and the practice resources behind it.

Education, not medical advice.

