THE PRESSUREPROOF SYSTEM

The Science Behind the Neurohacks

EVIDENCE BASED GUIDE

EVERY TOOL IN THE TOOLKIT

MARY POFFENROTH, PH.D.

Mary Poffenroth

For the Curious Ones

This resource is for the curious ones, the people who don't just want to know what works, but why it works. Every neurohack in the PressureProof toolkit is grounded in peer reviewed research from neuroscience, biopsychology, and behavioral science. What follows is the science behind every tool, written so any curious person can understand it and, if they want, dig deeper into the original research.

Because here's the thing: understanding the science doesn't just satisfy your curiosity, it actually makes the tools work better. When you know why a breathing pattern calms your nervous system or why naming an emotion reduces its intensity, you're not just following instructions. You're working with your biology, not against it.

The RAIN Method

R A I N · RECOGNIZE · ASSIGN · IDENTIFY · NAVIGATE

If there's one framework that ties everything in the PressureProof System together, it's RAIN. I developed RAIN as a sequential, four step intervention you can use in real time, right in the moment when pressure hits. It's not a personality label or a diagnostic tool. It's a practice. And like any practice, the more you use it, the more automatic it becomes.

RAIN stands for Recognize, Assign, Identify, and Navigate. Each step maps to a specific neurobiological process, and together they move you from reactive to intentional in a matter of minutes. Here's the science behind each step.

R Recognize

The first step is deceptively simple: notice that you're under pressure. But here's why it matters so much, your amygdala, the brain's rapid threat detector, can trigger a full body stress response in milliseconds, long before your conscious mind catches up. Research on interoception, your ability to sense internal body signals, shows that people who can detect their own stress responses earlier have significantly better emotional regulation (Critchley & Garfinkel, 2017; Khalsa et al., 2018).

In practice, this looks like noticing the physical signals: tight jaw, shallow breathing, clenched fists, racing heart. You're not trying to stop the response. You're trying to catch it, so you can work with it instead of being hijacked by it.

A Assign

Once you've recognized that pressure is present, the next step is to name what you're feeling. A landmark UCLA study by Lieberman and colleagues (2007) found that simply putting a name to an emotion significantly reduced amygdala activation. Torre and Lieberman's (2018) meta-analytic review confirmed that affect labeling functions as a form of implicit emotion regulation, your prefrontal cortex sends a calming signal back to the threat center when you give the emotion a label.

The more precise the label, the greater the prefrontal calming effect. Kircanski et al. (2012) showed that more granular emotional labels during exposure therapy produced greater fear reduction than generic labels. "I'm stressed" is a start, but "I'm feeling inadequate and exposed" gives your brain something specific to work with.

I Identify

Now you go deeper. The Identify step asks: what is the root fear driving this pressure response? Most fears trace back to Fear of Not Enough or Fear of Losing Control. This step draws on cognitive appraisal theory (Lazarus & Folkman, 1984), when we consciously evaluate the source of a threat, we shift processing from the reactive amygdala to the deliberate prefrontal cortex. Smith and Ellsworth (1985) demonstrated that different appraisal patterns produce distinct emotional and coping responses, which is why getting to the root matters.

N Navigate

The final step is action. Navigate is where you deploy a neurohack matched to what your nervous system needs. The Navigate step is grounded in the principle of neuroplasticity, the brain's ability to rewire itself through repeated experience. Every time you complete the RAIN cycle, you're building new neural pathways. Craske et al. (2014) call this inhibitory learning, new associations that compete with old fear memories, making each subsequent pressure moment easier to navigate.

THE SCIENCE BEHIND IT

Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. Current Opinion in Psychology, 17, 7–14. https://doi.org/10.1016/j.copsyc.2017.04.020

Kircanski, K., Lieberman, M. D., & Craske, M. G. (2012). Feelings into words: Contributions of language to exposure therapy. Psychological Science, 23(10), 1086–1091.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. Springer.

Lieberman, M. D., et al. (2007). Putting feelings into words: Affect labeling disrupts amygdala activity. Psychological Science, 18(5), 421–428.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. Journal of Personality and Social Psychology, 48(4), 813–838.

Torre, J. B., & Lieberman, M. D. (2018). Putting feelings into words: Affect labeling as implicit emotion regulation. Emotion Review, 10(2), 116–124.

BREATHING TECHNIQUES

If I could only teach you one category of neurohacks, it would be breathing. Your breath is the only autonomic function you can consciously control. That makes it your direct line to your autonomic nervous system, and the fastest way to shift your body's stress state without any equipment, any app, or anyone noticing.

Box Breathing

Inhale 4 counts, hold 4 counts, exhale 4 counts, hold 4 counts. Repeat.

Box breathing, also called tactical breathing, is used by Navy SEALs, first responders, and elite athletes for a reason: it works fast and reliably. The four equal phases create balanced stimulation of both branches of your autonomic nervous system. The inhale activates the sympathetic branch (alertness), while the exhale activates the parasympathetic branch (calm) via the vagus nerve. The holds between each phase give your baroreceptors, pressure sensors in your blood vessels, time to recalibrate.

Röttger et al. (2021) directly compared tactical breathing with prolonged exhalation under stress conditions and found it effective for passive coping scenarios. In military contexts, Ibrahim et al. (2023) demonstrated that tactical breathing significantly improved marksmanship accuracy in student officers under pressure, showing the technique produces calm alertness, not drowsiness. The hold phases are especially important: Vaschillo et al. (2006) showed that at optimal breathing rates, heart rate oscillations increase 4 to 10 times through baroreceptor resonance via vagal pathways.

THE SCIENCE BEHIND IT

Ibrahim, F., et al. (2023). Tactical breathing as an intervention to increase marksmanship accuracy in student officers. Military Psychology, 36(6), 542–551. https://doi.org/10.1080/08995605.2023.2258737

Röttger, S., et al. (2021). The effectiveness of combat tactical breathing as compared with prolonged exhalation. Applied Psychophysiology and Biofeedback, 46(1), 19–28. https://doi.org/10.1007/s10484-020-09485-w

Vaschillo, E. G., et al. (2006). Characteristics of resonance in heart rate variability stimulated by biofeedback. Applied Psychophysiology and Biofeedback, 31(2), 129–142.

Balancing Breath

Extend your exhale longer than your inhale to activate your body's calming system.

When you make your exhale longer than your inhale, you're directly stimulating the vagus nerve. During exhalation, your heart rate naturally slows due to respiratory sinus arrhythmia. By extending the exhale, you extend the braking period, tipping your autonomic balance toward parasympathetic dominance.

A landmark 2023 Stanford study by Balban et al. compared cyclic sighing (exhale dominant breathing) with box breathing and mindfulness meditation in a randomized controlled trial. Cyclic sighing produced superior mood improvement and greater parasympathetic activation than the other techniques. Gerritsen and Band (2018) detailed the neurophysiological mechanism: slower respiration with longer exhalations both tonically and phasically stimulates the vagus nerve through respiratory sinus arrhythmia. This is why sighing feels so good, your body already knows this trick; the Balancing Breath just makes it intentional.

THE SCIENCE BEHIND IT

Balban, M. Y., et al. (2023). Brief structured respiration practices enhance mood and reduce physiological arousal. Cell Reports Medicine, 4(1), 100895. https://doi.org/10.1016/j.xcrm.2022.100895

Gerritsen, R. J. S., & Band, G. P. H. (2018). Breath of Life: The Respiratory Vagal Stimulation Model. Frontiers in Human Neuroscience, 12, 397. https://doi.org/10.3389/fnhum.2018.00397

Boosting Breath

Extend your inhale longer than your exhale to boost energy and alertness.

The Boosting Breath is the Balancing Breath's energizing sibling. During inhalation, your heart rate naturally increases through respiratory sinus arrhythmia working in the opposite direction. Extended inhales increase oxygen delivery and stimulate mild sympathetic arousal.

The same Stanford study (Balban et al., 2023) tested cyclic hyperventilation with retention, an inhale dominant protocol, as a distinct condition, providing direct experimental evidence for different breathing ratios producing different autonomic effects. Laborde et al. (2022) showed how breathing rate and phase duration systematically modulate the balance between sympathetic and parasympathetic dominance. This is the neurohack for when you need to perform but feel flat or foggy, the physiological equivalent of pressing the accelerator gently.

THE SCIENCE BEHIND IT

Balban, M. Y., et al. (2023). Brief structured respiration practices enhance mood and reduce physiological arousal. Cell Reports Medicine, 4(1), 100895.

Laborde, S., et al. (2022). Psychophysiological effects of slow-paced breathing with or without HRV biofeedback. Psychophysiology, 59(1), e13952. https://doi.org/10.1111/psyp.13952

Blow Out the Candles

Nasal inhale for 4 seconds. Purse lips and slowly exhale through the mouth for 8 seconds.

This technique combines two physiological power moves: nasal breathing and pursed lip exhalation. Breathing in through your nose stimulates the release of nitric oxide in the sinuses, Lundberg and Weitzberg showed that nasal airflow dramatically increases NO production, which dilates blood vessels and improves oxygen exchange (Lundberg, 2008). Nasal inhalation captures significantly higher nitric oxide concentrations than oral breathing.

The pursed lip exhale creates back pressure that slows exhalation rate and extends vagal stimulation. Mitsungnern et al. (2021) demonstrated in a randomized controlled trial that pursed lip breathing significantly reduced both systolic and diastolic blood pressure in acute stress contexts. The 1:2 ratio, four seconds in, eight seconds out, provides maximum vagal activation through the extended exhale phase. I love this one because it's discreet and memorable. You can do it walking into a job interview and nobody will notice.

THE SCIENCE BEHIND IT

Lundberg, J. O. (2008). Nitric oxide and the paranasal sinuses. Anatomical Record, 291(11), 1479–1484. https://doi.org/10.1002/ar.20782

Mitsungnern, T., et al. (2021). The effect of pursed-lip breathing on blood pressure and heart rate. Journal of Clinical Hypertension, 23(3), 672–679. https://doi.org/10.1111/jch.14168

VAGAL NERVE ACTIVATION

The vagus nerve is the MVP of your calming system. Running from brainstem to gut, it's the primary nerve of the parasympathetic nervous system. Higher vagal tone means your body can shift more quickly from stress to calm. The neurohacks in this section directly stimulate the vagus nerve through different sensory pathways.

Pinch the Valley

Apply firm pressure to the HeGu point, the fleshy area between your thumb and index finger.

The HeGu point (Large Intestine 4 in traditional Chinese medicine) is one of the most well studied acupressure points in the world. Au et al. (2015) conducted a meta-analysis of randomized controlled trials and found that acupressure at points including LI4 significantly reduced anxiety, with a large effect size. A larger meta-analysis by Chen et al. (2022) analyzing 27 RCTs confirmed these findings, acupressure significantly reduced anxiety with LI4 identified as one of the most frequently effective acupoints.

The mechanism involves both vagal stimulation through peripheral nerve pathways and a pain gating effect, the firm pressure creates a competing sensory signal that interrupts stress processing. This is one of my go to neurohacks because you can do it anywhere, under a conference table, in your lap during a presentation, and it works within seconds.

THE SCIENCE BEHIND IT

Au, D. W. H., et al. (2015). Effects of acupressure on anxiety: A systematic review and meta-analysis. Acupuncture in Medicine, 33(5), 353–359. https://doi.org/10.1136/acupmed-2014-010720

Chen, S. R., et al. (2022). Effects of acupressure on anxiety: A systematic review and meta-analysis. Journal of Integrative and Complementary Medicine, 28(1), 25–35. https://doi.org/10.1089/jicm.2020.0256

Sooth with Sound

Singing or humming stimulates the vagus nerve, helping your body shift into calm.

The vagus nerve runs directly through your larynx. When you sing, hum, or chant, the vibration of your vocal cords mechanically stimulates it. Vickhoff et al. (2013) demonstrated this beautifully in a study of choir singers: singing induced slower breathing patterns that directly regulated vagal activity, with heart rate variability synchronizing to musical structure. Humming, hymn singing, and mantra chanting all showed vagal regulation effects.

The vibration component is key, it's not just about the sound but the physical vibration traveling through tissues surrounding the vagus nerve. This is why chanting appears across virtually every spiritual tradition: the mechanism is physiological. Your nervous system doesn't care if you're on key. It just needs the vibration.

THE SCIENCE BEHIND IT

Vickhoff, B., et al. (2013). Music structure determines heart rate variability of singers. Frontiers in Psychology, 4, 334. https://doi.org/10.3389/fpsyg.2013.00334

Frequency Fix

Close your lips and hum softly for 5 to 7 seconds. Feel the vibration in your chest and head.

Closed mouth humming creates vibration in the soft palate, nasal cavity, and chest, all areas rich in vagal nerve endings. Weitzberg and Lundberg (2002) made a remarkable discovery: humming increases nasal nitric oxide production by fifteenfold compared to quiet exhalation. Nitric oxide is a potent vasodilator that improves blood flow and oxygen delivery throughout the body.

Research on Bhramari pranayama (the "humming bee breath" of yoga) shows that humming produces measurable changes in heart rate variability, confirming acute vagal modulation (Iaccarino et al., 2017). By focusing on where you feel the vibration, chest, throat, forehead, you add an interoceptive awareness layer that amplifies the calming effect.

THE SCIENCE BEHIND IT

Weitzberg, E., & Lundberg, J. O. (2002). Humming greatly increases nasal nitric oxide. American Journal of Respiratory and Critical Care Medicine, 166(2), 144–145. https://doi.org/10.1164/rccm.200202-138BC

Iaccarino, G., et al. (2017). Heart rate variability changes during Bhramari pranayama. International Journal of Yoga, 10(2), 89–94. https://doi.org/10.4103/0973-6131.205518

The MacEwen Triangle

Gently massage the soft area behind your earlobe where your jaw meets your skull.

The MacEwen Triangle is where the auricular branch of the vagus nerve (Arnold's nerve) runs close to the skin surface. This isn't folk medicine, transcutaneous auricular vagus nerve stimulation (taVNS) is an active area of clinical research with FDA approved devices targeting this exact spot.

Frangos et al. (2015) used fMRI to demonstrate that electrical stimulation of the external ear activates vagus nerve central projections in the brainstem nucleus tractus solitarius, foundational evidence that you can access the vagal system through the ear. Badran et al. (2018) confirmed in a concurrent taVNS/fMRI study that tragus stimulation produces significant changes in central vagal projections. Your fingers provide a similar (gentler) mechanical stimulation to the same neural pathways.

> **THE SCIENCE BEHIND IT**
>
> Badran, B. W., et al. (2018). Neurophysiologic effects of transcutaneous auricular vagus nerve stimulation. Brain Stimulation, 11(3), 492–500. https://doi.org/10.1016/j.brs.2017.12.009
>
> Frangos, E., et al. (2015). Non-invasive access to the vagus nerve central projections via electrical stimulation of the external ear. Brain Stimulation, 8(3), 624–636. https://doi.org/10.1016/j.brs.2014.11.018

Face the Cold

Hold your breath, submerge your face in cold water for 30 seconds to activate the dive reflex.

This is the most dramatic neurohack in the toolkit, and possibly the fastest. Cold water on your face triggers the mammalian dive reflex, an ancient response shared by all air breathing vertebrates. Gooden (1994) detailed the mechanism: breath holding combined with facial cold water contact triggers parasympathetic stimulation to the cardiac pacemaker, producing immediate bradycardia, peripheral vasoconstriction, and blood pressure stabilization.

Khurana and Wu (2006) demonstrated that the cold face test reliably triggers bradycardia within about 6 seconds, independent of baroreceptor mechanisms, it's direct vagal activation. A meta-analysis by Ackermann et al. (2023), synthesizing 17 studies, confirmed cold facial immersion as a potent vagal stimulus that significantly increases cardiac vagal activity. The temperature must be cold enough, below 70°F (21°C), to trigger the reflex. Note: if you have a heart condition, consult your doctor before using this one.

> **THE SCIENCE BEHIND IT**
>
> Ackermann, S., et al. (2023). The diving response and cardiac vagal activity: A systematic review and meta-analysis. Psychophysiology, 59, e14183. https://doi.org/10.1111/psyp.14183
>
> Gooden, B. A. (1994). Mechanism of the human diving response. Integrative Physiological & Behavioral Science, 29(1), 6–16. https://doi.org/10.1007/BF02691277
>
> Khurana, R. K., & Wu, R. (2006). The cold face test: A non-baroreflex mediated test of cardiac vagal function. Clinical Autonomic Research, 16(3), 202–207. https://doi.org/10.1007/s10286-006-0332-9

Bravery Bites

Activate your rest and digest mode with a crunchy snack, gum, or crushed ice.

Chewing activates the parasympathetic nervous system through a surprisingly direct pathway. Scholey et al. (2009) conducted a randomized crossover trial that proved it: chewing gum during acute psychological stress significantly reduced salivary cortisol, state anxiety, and subjective stress while increasing alertness. The mechanism involves both trigeminal nerve stimulation and vagal activation through the jaw brainstem pathway.

Allen and Smith (2015) reviewed the broader evidence and found that chewing modulates both the autonomic nervous system and the HPA (stress hormone) axis. From an evolutionary perspective, eating is biologically incompatible with fight or flight, you would never stop to eat if you were being chased. So when you chew, your brain interprets the behavior as evidence of safety and downregulates the stress response. Crunchy foods are especially effective because the strong jaw movements create more trigeminal and vagal stimulation.

THE SCIENCE BEHIND IT

Allen, A. P., & Smith, A. P. (2015). Chewing gum: Cognitive performance, mood, well-being, and associated physiology. BioMed Research International, 2015, 654806. https://doi.org/10.1155/2015/654806

Scholey, A., et al. (2009). Chewing gum alleviates negative mood and reduces cortisol during acute laboratory psychological stress. Physiology & Behavior, 97(3–4), 304–312. https://doi.org/10.1016/j.physbeh.2009.02.028

EYE & VISUAL TECHNIQUES

Your eyes are literally extensions of your brain, the retina develops from neural tissue. The way you move and focus your eyes has a measurable impact on your stress state and arousal level.

The Near & The Far

Shift your gaze between a close object and a distant point to regulate your nervous system.

When you're stressed, your visual system narrows, literally. Tunnel vision is a documented physiological response: under sympathetic activation, your pupils dilate and your visual focus tightens. The Near & The Far technique interrupts this by alternating between convergence (near focus) and divergence (distant gaze).

When you shift to panoramic, distant focus vision, you activate parasympathetic pathways because wide field vision is associated with environmental safety, your brain only uses panoramic vision when it has determined there's no immediate threat. Mobbs et al. (2007) demonstrated that threat proximity produces distinct neural shifts: close threats activate reactive midbrain regions while distant threats engage prefrontal cortex. By deliberately shifting to far focus vision, you're essentially telling your brain the threat is distant, which engages your rational prefrontal circuits.

THE SCIENCE BEHIND IT

Mobbs, D., et al. (2007). When fear is near: Threat imminence elicits prefrontal-periaqueductal gray shifts in humans. Science, 317(5841), 1079–1083. https://doi.org/10.1126/science.1144298

Rapid Eye Recharge

Close your eyes, move them quickly left to right five times, then open and exhale strongly.

Bilateral eye movements have a direct impact on nervous system regulation. De Voogd et al. (2018) published a breakthrough study in the Journal of Neuroscience demonstrating that horizontal eye movements enhance fear extinction via direct amygdala deactivation, the first neuroimaging evidence that eye movements don't just distract from fear, they actively suppress the brain's threat center.

Van den Hout and Engelhard (2012) explained the mechanism through working memory taxation: bilateral eye movements compete for the same limited cognitive resources your brain uses to maintain vivid, emotional memories. When working memory is taxed by the eye movements, emotional memories lose their vividness and intensity. A meta-analysis by Houben et al. (2020) confirmed these effects across multiple laboratory studies. The strong exhale at the end provides a vagal nerve activation chaser that seals the reset.

THE SCIENCE BEHIND IT

de Voogd, L. D., et al. (2018). Eye-movement intervention enhances extinction via amygdala deactivation. Journal of Neuroscience, 38(40), 8694–8706. https://doi.org/10.1523/JNEUROSCI.0703-18.2018

Houben, S. T. L., et al. (2020). Effects of eye movements on vividness and emotionality of negative memories: A meta-analysis. Journal of Experimental Psychopathology, 11(1). https://doi.org/10.1177/2043808720907744

van den Hout, M. A., & Engelhard, I. M. (2012). How does EMDR work? Journal of Experimental Psychopathology, 3(5), 724–738. https://doi.org/10.5127/jep.028212

Slow Your Eye Roll

Fix your gaze ahead, slowly shift your eyes upward for two seconds, return to center, and repeat five times.

The slow upward eye movement activates the oculocardiac reflex, a well documented physiological response where specific eye movements trigger a decrease in heart rate via the vagus nerve. The reflex arc runs from the extraocular muscles through the trigeminal nerve to the vagal nucleus in the brainstem, and from there sends a "slow down" signal to the heart. This reflex is well established in clinical ophthalmology and anesthesia literature.

The slow, deliberate quality matters. Rapid eye movements activate alertness circuits; slow, controlled movements activate calming circuits. By repeating five times, you give your vagus nerve five consecutive activation signals. Gerritsen and Band (2018) demonstrated that slow, rhythmic physiological patterns consistently shift autonomic balance toward parasympathetic dominance, the same principle applies whether the rhythm comes from breathing or eye movement.

THE SCIENCE BEHIND IT

Gerritsen, R. J. S., & Band, G. P. H. (2018). Breath of Life: The Respiratory Vagal Stimulation Model. Frontiers in Human Neuroscience, 12, 397.

SENSORY GROUNDING

When your brain is locked in a fear response, it's essentially time traveling, replaying a past threat or projecting a future one. Sensory grounding floods your brain with present moment data, forcing it back into the here and now.

Connect 4

Name 4 things you can see, hear, feel, and smell to ground yourself in the present moment.

Connect 4 systematically engages four sensory modalities, forcing your brain to search for and label specific sensory details. You're doing two things simultaneously: engaging your prefrontal cortex (searching, counting, labeling) and flooding your sensory cortex with real time environmental data.

Ochsner and Gross (2005) established that when prefrontal cognitive control regions are highly engaged, they exert top down inhibition on the amygdala. By giving your prefrontal cortex a demanding task, find and name 16 specific sensory details, you're pulling resources away from threat processing. The sensory data provides additional grounding because it anchors your brain in present moment reality rather than imagined threats. Phelps et al. (2001) showed that the amygdala responds equally to both real and cognitively represented fear, grounding techniques work by replacing the cognitive representation with actual sensory input.

THE SCIENCE BEHIND IT

Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. Trends in Cognitive Sciences, 9(5), 242–249. https://doi.org/10.1016/j.tics.2005.03.010

Phelps, E. A., et al. (2001). Activation of the left amygdala to a cognitive representation of fear. Nature Neuroscience, 4(4), 437–441. https://doi.org/10.1038/86110

The Smell of Courage

Use essential oils or strong scents to interrupt the stress response and shift your state.

Of all your senses, smell has the most direct line to your emotional brain. Soudry et al. (2011) mapped the unique neural architecture: the olfactory bulb connects directly to the amygdala and hippocampus without passing through the thalamus, the relay station that filters all other sensory input. Kadohisa (2013) showed that this direct pathway means scent can trigger emotional and physiological changes before you consciously identify what you're smelling.

This direct connection makes scent one of the fastest sensory interrupts available. Herz (2009) conducted a comprehensive scientific analysis of olfactory effects on mood, cognition, and behavior, finding measurable

effects of specific scent categories on both cortisol levels and autonomic balance. Over time, pairing a specific scent with a calm state creates a conditioned response, classical conditioning, one of the most replicated findings in all of psychology.

THE SCIENCE BEHIND IT

Herz, R. S. (2009). Aromatherapy facts and fiction: A scientific analysis. International Journal of Neuroscience, 119(2), 263–290. https://doi.org/10.1080/00207450802333539

Kadohisa, M. (2013). Effects of odor on emotion, with implications. Frontiers in Systems Neuroscience, 7, 66. https://doi.org/10.3389/fnsys.2013.00066

Soudry, Y., et al. (2011). Olfactory system and emotion: Common substrates. European Annals of Otorhinolaryngology, 128(1), 18–23. https://doi.org/10.1016/S1879-7296(10)00124-7

Sour Jolt

Dampen the amygdala's response by chewing on intensely sour candies or tart fruits.

The Sour Jolt works through sensory override. An intensely sour taste creates such a strong sensory signal that your brain diverts processing resources from the fear circuit. The gustatory cortex lights up, the trigeminal nerve fires (sour creates a mild pain adjacent sensation), and the vagus nerve activates through the taste visceral reflex.

This technique draws from Dialectical Behavior Therapy's TIPP protocol (Temperature, Intense exercise, Paced breathing, Progressive relaxation), which uses strong sensory inputs to interrupt acute emotional distress. Ochsner et al. (2002) demonstrated via fMRI that when cognitive resources are redirected to process a competing stimulus, amygdala activation decreases. Sour taste is particularly potent because it creates an immediate, unmissable sensory event that your brain must attend to, and in attending to it, it releases its grip on the fear loop.

THE SCIENCE BEHIND IT

Ochsner, K. N., et al. (2002). Rethinking feelings: An fMRI study of the cognitive regulation of emotion. Journal of Cognitive Neuroscience, 14(8), 1215–1229. https://doi.org/10.1162/089892902760807212

Focus on Function

Inhale and hold your breath while naming one object around you and its function, then exhale.

Focus on Function combines breath holding with cognitive engagement. The breath hold creates a brief CO2 buildup that stimulates the vagus nerve, while the object naming task forces your prefrontal cortex online, you have to identify an object, retrieve its function from semantic memory, and articulate the answer.

Critchley and Garfinkel (2017) showed that interoceptive engagement (attending to internal body states like breath holding) combined with external cognitive tasks creates a powerful grounding effect. The cognitive task has to be simple enough to do under stress but demanding enough to redirect processing away from the threat loop. Khalsa et al. (2018) established that this kind of body mind integration, simultaneously attending to a physiological state and a cognitive task, is one of the most effective routes to emotional regulation.

THE SCIENCE BEHIND IT

Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. Current Opinion in Psychology, 17, 7–14.

Khalsa, S. S., et al. (2018). Interoception and mental health: A roadmap. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 3(6), 501–513. https://doi.org/10.1016/j.bpsc.2017.12.004

BODY BASED RESETS

Your body stores stress, that's biology, not metaphor. When your sympathetic nervous system activates, it floods your muscles with adrenaline and cortisol. If that energy doesn't get discharged through movement, it stays trapped as residual tension. Body based resets complete the stress cycle.

Tapping Into Courage

Tap specific points on your face and body in a rhythmic pattern to release tension.

Emotional Freedom Technique (EFT) involves rhythmically tapping on acupressure points, face, collarbone, and under the arm. Church, Yount, and Brooks (2012) conducted a landmark randomized controlled trial comparing EFT with talk therapy and found that a single hour long EFT session reduced cortisol levels by 24%, significantly more than the talk therapy or rest conditions.

Clond (2016) conducted a systematic review with meta-analysis and found a weighted effect size of 1.23 (large) for EFT's reduction of anxiety across clinical studies. Bach et al. (2019) showed that clinical EFT improves multiple physiological markers simultaneously: cortisol, heart rate, blood pressure, and immune markers. The rhythm matters, steady, repetitive tapping creates predictable sensory input, and your brain interprets predictability as safety.

THE SCIENCE BEHIND IT

Bach, D., et al. (2019). Clinical EFT improves multiple physiological markers of health. Journal of Evidence-Based Integrative Medicine, 24, 2515690X18823691. https://doi.org/10.1177/2515690X18823691

Church, D., Yount, G., & Brooks, A. J. (2012). The effect of EFT on stress biochemistry: A randomized controlled trial. Journal of Nervous and Mental Disease, 200(10), 891–896. https://doi.org/10.1097/NMD.0b013e31826b9fc1

Clond, M. (2016). EFT for anxiety: A systematic review with meta-analysis. Journal of Nervous and Mental Disease, 204(5), 388–395. https://doi.org/10.1097/NMD.0000000000000483

Puppy Shake Reset

Mimic your mammalian instinct by micro shaking your whole body head to toe.

Have you ever watched a dog shake after a stressful encounter? That shaking is a neurobiological mechanism for discharging stress chemicals from the muscles and nervous system. Mammals do this instinctively. Humans suppress it because we've been taught that trembling equals weakness.

Beattie and Berceli (2021) studied Trauma Release Exercises (TRE), a structured protocol for inducing therapeutic neurogenic tremors, and found significant reductions in perceived stress and improvements in

well being. The theoretical foundation, articulated by Peter Levine's Somatic Experiencing framework (1997), is that physical completion of the stress response is essential for returning to baseline. Micro shaking activates proprioceptors throughout your musculature, sending "movement complete" signals to your brainstem that tell your nervous system the mobilization phase is over.

THE SCIENCE BEHIND IT

Beattie, A., & Berceli, D. (2021). The effects of TRE on perceived stress and flourishing. Journal of Bodywork and Movement Therapies, 27, 466–475. https://doi.org/10.1016/j.jbmt.2021.05.020

Levine, P. A. (1997). Waking the tiger: Healing trauma. North Atlantic Books.

Left Right Reset

For 30 seconds, gaze straight ahead while tapping your feet in a steady left right left rhythm.

The Left Right Reset uses bilateral alternating stimulation, the same principle behind EMDR. By tapping your feet in an alternating pattern while maintaining a forward gaze, you create rhythmic, bilateral proprioceptive input that alternately activates the left and right hemispheres.

Servan-Schreiber et al. (2006) tested alternating bilateral stimulation directly in a randomized pilot study and found that it was effective for reducing PTSD symptoms, supporting the therapeutic potential of bilateral input beyond just eye movements. De Voogd et al. (2018) showed that bilateral stimulation enhances fear extinction via amygdala deactivation, the mechanism works whether the bilateral input comes through the eyes, hands, or feet. The fixed forward gaze prevents visual scanning behavior associated with threat detection, while the rhythm provides the predictability signal your nervous system interprets as safety.

THE SCIENCE BEHIND IT

de Voogd, L. D., et al. (2018). Eye-movement intervention enhances extinction via amygdala deactivation. Journal of Neuroscience, 38(40), 8694–8706.

Servan-Schreiber, D., et al. (2006). EMDR for PTSD: A pilot blinded randomized study of stimulation type. Psychotherapy and Psychosomatics, 75(5), 290–297. https://doi.org/10.1159/000094450

COGNITIVE REFRAMING

Every stress response starts with an appraisal, your brain's lightning fast assessment of whether a situation is threatening. Cognitive reframing tools engage your prefrontal cortex to update faulty threat appraisals. Buhle et al. (2014) conducted a meta-analysis of neuroimaging studies confirming that cognitive reappraisal reliably decreases amygdala activity while increasing prefrontal cortex engagement.

Name It to Claim It

Derail a fear response by naming a single emotion in the moment using the Fear Wheel.

This might be the single most powerful neurohack in the deck. Lieberman et al. (2007) used fMRI to demonstrate that when participants labeled the emotion in a fearful face, their amygdala activity decreased

significantly compared to simply viewing the face. The mechanism involves the right ventrolateral prefrontal cortex, which activates during labeling and sends inhibitory projections to the amygdala.

Torre and Lieberman (2018) confirmed in a meta-analytic review that affect labeling functions as implicit emotion regulation, it works even when you're not trying to regulate your emotions. Crucially, Kircanski et al. (2012) showed that more specific emotional labels during exposure therapy produced greater fear reduction than generic labels. That's why I created the Fear Wheel, it gives you a precise vocabulary for your inner experience. Because your brain can't manage what it can't name.

> **THE SCIENCE BEHIND IT**
>
> Kircanski, K., et al. (2012). Feelings into words: Contributions of language to exposure therapy. Psychological Science, 23(10), 1086–1091. https://doi.org/10.1177/0956797612443830
>
> Lieberman, M. D., et al. (2007). Putting feelings into words: Affect labeling disrupts amygdala activity. Psychological Science, 18(5), 421–428. https://doi.org/10.1111/j.1467-9280.2007.01916.x
>
> Torre, J. B., & Lieberman, M. D. (2018). Affect labeling as implicit emotion regulation. Emotion Review, 10(2), 116–124. https://doi.org/10.1177/1754073917742706

Flip the Script

Your brain defaults to automatic thoughts, but they're not always true. Question it. Reframe it.

Flip the Script is grounded in cognitive reappraisal. Ochsner et al. (2002) used fMRI to show that when people deliberately reinterpret the meaning of a negative stimulus, prefrontal cortex activity increases while amygdala activity decreases. Ochsner and Gross (2005) reviewed the neural bases and established that cognitive control of emotion engages a network of lateral and medial prefrontal regions that send top down inhibitory signals to the amygdala.

Buhle et al. (2014) confirmed these findings in a meta-analysis of 48 neuroimaging studies: cognitive reappraisal consistently and reliably modulates the neural circuits of emotion. This isn't positive thinking. Most automatic thoughts under pressure are distortions, your overactive threat detection system generating worst case scenarios. Flipping the script is about correcting the distortion, not pretending everything is fine.

> **THE SCIENCE BEHIND IT**
>
> Buhle, J. T., et al. (2014). Cognitive reappraisal of emotion: A meta-analysis of human neuroimaging studies. Cerebral Cortex, 24(11), 2981–2990. https://doi.org/10.1093/cercor/bht154
>
> Ochsner, K. N., et al. (2002). Rethinking feelings: An fMRI study of cognitive regulation of emotion. Journal of Cognitive Neuroscience, 14(8), 1215–1229. https://doi.org/10.1162/089892902760807212
>
> Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. Trends in Cognitive Sciences, 9(5), 242–249.

Fear Fact Check

Not all fears are the same. Factual fear is an immediate threat. Fictional fear is stress and worry.

Your amygdala can't tell the difference between a real threat and a vividly imagined one. Phelps et al. (2001) demonstrated that the left amygdala activates in response to a purely cognitive representation of fear,

meaning your brain generates the same physiological stress response to "what if I fail?" as it would to an actual danger.

Mobbs et al. (2007) added crucial nuance: threat proximity produces distinct neural shifts. Distant or imagined threats engage prefrontal cortex (you can reason about them), while close threats activate reactive midbrain circuits (you can only react). The Fear Fact Check engages your prefrontal cortex to make the distinction your amygdala can't: "Is this fear factual or fictional?" That question alone shifts processing from reactive to evaluative circuits.

> **THE SCIENCE BEHIND IT**
>
> Mobbs, D., et al. (2007). When fear is near: Threat imminence elicits prefrontal-periaqueductal gray shifts. Science, 317(5841), 1079–1083. https://doi.org/10.1126/science.1144298
>
> Phelps, E. A., et al. (2001). Activation of the left amygdala to a cognitive representation of fear. Nature Neuroscience, 4(4), 437–441. https://doi.org/10.1038/86110

Decoding Fear Signals

Fear shows up in the body before the mind catches on. Pause and identify what your body is telling you.

Your body knows you're stressed before you do. Critchley and Garfinkel (2017) established that interoception, the ability to sense internal body signals, is a core component of emotional experience and regulation. People with higher interoceptive accuracy have better emotional regulation and faster stress recovery.

Khalsa et al. (2018), in a landmark roadmap paper in Biological Psychiatry, showed that disrupted interoception is a transdiagnostic feature across anxiety, depression, and trauma disorders, and that improving interoceptive awareness has therapeutic value. This card maps six body signals: racing heart, dry mouth, foggy thinking, faster breathing, clammy skin, and digestive issues. Learning which signals show up first for you is one of the most valuable things you can do for long term pressure management.

> **THE SCIENCE BEHIND IT**
>
> Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. Current Opinion in Psychology, 17, 7–14. https://doi.org/10.1016/j.copsyc.2017.04.020
>
> Khalsa, S. S., et al. (2018). Interoception and mental health: A roadmap. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 3(6), 501–513. https://doi.org/10.1016/j.bpsc.2017.12.004

Identify & Categorize

Feeling overwhelmed? Ask: is this Fear of Not Enough, or Fear of Losing Control?

This neurohack takes affect labeling deeper by identifying the root category of fear. Lazarus and Folkman's (1984) cognitive appraisal theory established that how we categorize a threat determines which coping resources we deploy. Smith and Ellsworth (1985) demonstrated that different appraisal patterns produce distinct emotional experiences and distinct coping responses.

The binary sort, Not Enough vs. Losing Control, immediately narrows the problem space. Each root responds to different interventions: Fear of Not Enough benefits from evidence gathering (Fear Fact Check), while Fear of Losing Control benefits from agency building (Shift with Strength). More specific threat appraisals produce more targeted and effective coping, your prefrontal cortex can handle nuance, but only if you give it the right question.

THE SCIENCE BEHIND IT

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. Springer.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. Journal of Personality and Social Psychology, 48(4), 813–838. https://doi.org/10.1037/0022-3514.48.4.813

T.M.I. (Trigger, Mind Chatter, Improve)

Identify your Trigger, notice the Mind Chatter, then choose one action to Improve.

T.M.I. is a three step cognitive intervention grounded in metacognitive therapy principles. Wells (2009) established that metacognition, thinking about your own thinking, is a powerful emotion regulation tool. By separating the trigger (external event) from the mind chatter (internal interpretation), you create a gap between stimulus and response.

Flavell (1979), in the foundational work on metacognition, showed that the ability to observe your own cognitive processes is a learnable skill that improves with practice. The "Improve" step moves you from insight to action, because your nervous system settles fastest when it has something constructive to do. One small, controllable action tells your brain you're not helpless, one of the fastest ways to downregulate a stress response.

THE SCIENCE BEHIND IT

Flavell, J. H. (1979). Metacognition and cognitive monitoring. American Psychologist, 34(10), 906–911. https://doi.org/10.1037/0003-066X.34.10.906

Wells, A. (2009). Metacognitive therapy for anxiety and depression. Guilford Press.

JOURNALING & REFLECTION

Writing about emotional experiences is one of the most well documented therapeutic interventions in psychology. Pennebaker's pioneering research showed that expressive writing reduces stress hormones, improves immune function, and enhances emotional processing.

Courage Spiral

Grab a pen and write your thoughts in the shape of a spiral to disrupt swirling thoughts.

Pennebaker and Beall (1986) established in their foundational study that writing about traumatic or emotional experiences produces significant health improvements. Pennebaker (1997) later demonstrated

that the therapeutic effect comes from the cognitive processing involved in translating emotional experience into language, the prefrontal cortex must stay engaged throughout, maintaining its inhibitory influence on the amygdala.

The Courage Spiral adds a spatial motor disruption component. Writing in a spiral shape forces your brain to coordinate thought content with a spatial motor pattern simultaneously, breaking ruminative loops. Baikie and Wilhelm (2005) reviewed decades of expressive writing research and confirmed consistent benefits across physical health, psychological well being, and cognitive function. The spiral format externalizes your worries, what felt infinite becomes a visible, finite thing on paper.

THE SCIENCE BEHIND IT

Baikie, K. A., & Wilhelm, K. (2005). Emotional and physical health benefits of expressive writing. Advances in Psychiatric Treatment, 11(5), 338–346. https://doi.org/10.1192/apt.11.5.338

Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. Psychological Science, 8(3), 162–166. https://doi.org/10.1111/j.1467-9280.1997.tb00403.x

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. https://doi.org/10.1037/0021-843X.95.3.274

Courage Compass

Describe how you recognize, express, and cope with life's everyday fears big and small.

The Courage Compass builds self knowledge through structured narrative reflection. McAdams et al. (2001) showed that people who construct coherent narratives about their emotional experiences, including redemption sequences where negative events lead to positive outcomes, have significantly better psychological adaptation.

Adler et al. (2016) reviewed the field of narrative identity and well being, finding that narrative coherence and the ability to make meaning from emotional experiences are robust predictors of psychological health. The Courage Compass asks you to map your patterns: How do you recognize fear? How do you express it? What coping strategies serve you? Knowing your story makes you better equipped to write the next chapter intentionally.

THE SCIENCE BEHIND IT

Adler, J. M., et al. (2016). Narrative identity and well-being: A review and recommendations. Personality and Social Psychology Review, 20(2), 142–175. https://doi.org/10.1177/1088868315585068

McAdams, D. P., et al. (2001). Sequences of redemption and contamination in life narrative. Personality and Social Psychology Bulletin, 27(4), 472–483. https://doi.org/10.1177/0146167201274008

BEHAVIORAL COURAGE BUILDERS

These aren't quick physiological interventions, they're behavioral practices that rewire your brain's relationship with fear over time. Grounded in exposure therapy, growth mindset research, and self-efficacy science.

One Step at a Time

Progressive fear exposure, start small, build up gradually, expand your comfort zone layer by layer.

One Step at a Time is based on graduated exposure therapy, one of the most effective anxiety treatments ever developed. Foa and Kozak (1986) established the emotional processing theory: exposure to feared stimuli allows the brain to process and update its threat appraisals, reducing fear over repeated encounters.

Craske et al. (2014) advanced this understanding with the inhibitory learning model: each successful exposure creates a new "safety" memory that competes with the original fear memory. Your amygdala doesn't forget the fear; your prefrontal cortex builds a competing association that says "this is manageable." The key is starting small enough that your nervous system can handle it, then gradually increasing the challenge. This is not about throwing yourself into the deep end. It's about building a staircase.

> **THE SCIENCE BEHIND IT**
>
> Craske, M. G., et al. (2014). Maximizing exposure therapy: An inhibitory learning approach. Behaviour Research and Therapy, 58, 10–23. https://doi.org/10.1016/j.brat.2014.04.006
>
> Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. Psychological Bulletin, 99(1), 20–35. https://doi.org/10.1037/0033-2909.99.1.20

Tiny Leaps

Mild exposure cycles, take one small brave action daily to build your courage capacity.

Tiny Leaps is the daily practice version of graduated exposure. Each tiny leap activates your brain's reward circuitry, creating positive associations with courage taking behavior. Bandura (1977) established that self-efficacy, your belief in your ability to succeed, is the single strongest predictor of whether you'll attempt a challenging task, and it's built through accumulated small successes, not grand gestures.

Bandura's (1997) comprehensive self-efficacy framework showed that mastery experiences (successfully completing a task) are the most powerful source of self-efficacy, more powerful than watching others succeed, being told you can do it, or managing your emotional state. Connor and Davidson (2003) incorporated this principle into their resilience model, showing that perceived self-efficacy contributes directly to overall psychological resilience. One small brave action daily compounds into a fundamentally different relationship with fear.

> **THE SCIENCE BEHIND IT**
>
> Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191
>
> Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.
>
> Connor, K. M., & Davidson, J. R. T. (2003). Development of the Connor-Davidson Resilience Scale. Depression and Anxiety, 18(2), 76–82. https://doi.org/10.1002/da.10113

Shift with Strength

Change is scary but vital. Choose one thing you can control today to turn fear into forward momentum.

Shift with Strength addresses the paralysis of perceived uncontrollability. When your brain perceives loss of control, the prefrontal cortex goes offline and the stress response escalates unchecked. The antidote is agency, even tiny amounts.

Bandura (1977) demonstrated that perceived self-efficacy directly predicts action: people who believe they can influence an outcome are more likely to try, persist, and succeed. Craske et al. (2014) showed in their inhibitory learning model that taking action during an anxiety provoking situation is itself a form of exposure that builds new "I can cope" associations. It doesn't matter how small the action is, what matters is that your brain registers the experience of choosing and acting. That registration reactivates the prefrontal cortex and interrupts the helplessness spiral.

> **THE SCIENCE BEHIND IT**
>
> Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215.
>
> Craske, M. G., et al. (2014). Maximizing exposure therapy: An inhibitory learning approach. Behaviour Research and Therapy, 58, 10–23.

Let Go of Perfect

Perfectionism keeps you caged in fear. Take one step toward that dream you feel unready for.

Perfectionism isn't high standards, it's fear wearing a productivity mask. The perfectionist delay loop is a sophisticated avoidance behavior. Foa and Kozak (1986) established that avoidance is the primary mechanism that maintains anxiety: by never exposing yourself to the feared outcome (imperfect performance), you never give your brain the opportunity to update its threat appraisal.

Bravata et al. (2020) found in a systematic review that perfectionism and imposter syndrome are closely linked, with both driven by fear of evaluation and exposure. The Let Go of Perfect neurohack interrupts avoidance by asking you to act before you feel ready. Here's the neuroscience punchline: readiness is a feeling generated by your prefrontal cortex after you've already done the thing. The only way to feel ready is to start before you're ready.

> **THE SCIENCE BEHIND IT**
>
> Bravata, D. M., et al. (2020). Prevalence, predictors, and treatment of impostor syndrome: A systematic review. Journal of General Internal Medicine, 35(4), 1252–1275. https://doi.org/10.1007/s11606-019-05364-1
>
> Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear. Psychological Bulletin, 99(1), 20–35.

Ditch the Imposter

Where do you downplay success? Own one achievement today and celebrate your worth.

Imposter syndrome affects an estimated 70% of people. Clance and Imes (1978) first described the imposter phenomenon: a persistent internal experience of intellectual fraudulence despite objective evidence of

competence. It's not a character flaw, it's a prediction error in your brain's self model, overweighting the possibility of exposure while underweighting evidence of competence.

Bravata et al. (2020), in a systematic review spanning over 60 studies, confirmed that impostor syndrome is pervasive across demographics and professions, and is strongly associated with anxiety, depression, and reduced job performance. Ditch the Imposter works through behavioral evidence accumulation: when you deliberately claim one achievement, not dismiss it, not attribute it to luck, you force your prefrontal cortex to process contradicting evidence. Bandura (1997) showed that mastery experiences are the most powerful source of self-efficacy. Each owned achievement is a data point that makes the imposter story harder to sustain.

THE SCIENCE BEHIND IT

Bravata, D. M., et al. (2020). Prevalence, predictors, and treatment of impostor syndrome. Journal of General Internal Medicine, 35(4), 1252–1275.

Clance, P. R., & Imes, S. A. (1978). The imposter phenomenon in high achieving women. Psychotherapy: Theory, Research and Practice, 15(3), 241–247. https://doi.org/10.1037/h0086006

The Full Reference List

Every study referenced in this guide, in alphabetical order, APA seventh edition, with DOIs where available.

All citations referenced in this document, in alphabetical order, APA 7th edition. DOIs included where available.

1. Ackermann, S., et al. (2023). The diving response and cardiac vagal activity: A systematic review and meta-analysis. Psychophysiology, 59, e14183. https://doi.org/10.1111/psyp.14183

2. Adler, J. M., et al. (2016). The incremental validity of narrative identity in predicting well-being. Personality and Social Psychology Review, 20(2), 142–175. https://doi.org/10.1177/1088868315585068

3. Allen, A. P., & Smith, A. P. (2015). Chewing gum: Cognitive performance, mood, well-being, and associated physiology. BioMed Research International, 2015, 654806. https://doi.org/10.1155/2015/654806

4. Au, D. W. H., et al. (2015). Effects of acupressure on anxiety: A systematic review and meta-analysis. Acupuncture in Medicine, 33(5), 353–359. https://doi.org/10.1136/acupmed-2014-010720

5. Bach, D., et al. (2019). Clinical EFT improves multiple physiological markers of health. Journal of Evidence-Based Integrative Medicine, 24, 2515690X18823691. https://doi.org/10.1177/2515690X18823691

6. Badran, B. W., et al. (2018). Neurophysiologic effects of transcutaneous auricular vagus nerve stimulation. Brain Stimulation, 11(3), 492–500. https://doi.org/10.1016/j.brs.2017.12.009

7. Baikie, K. A., & Wilhelm, K. (2005). Emotional and physical health benefits of expressive writing. Advances in Psychiatric Treatment, 11(5), 338–346. https://doi.org/10.1192/apt.11.5.338

8. Balban, M. Y., et al. (2023). Brief structured respiration practices enhance mood and reduce physiological arousal. Cell Reports Medicine, 4(1), 100895. https://doi.org/10.1016/j.xcrm.2022.100895

9. Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

10. Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.

11. Beattie, A., & Berceli, D. (2021). The effects of TRE on perceived stress and flourishing. Journal of Bodywork and Movement Therapies, 27, 466–475. https://doi.org/10.1016/j.jbmt.2021.05.020

12. Bravata, D. M., et al. (2020). Prevalence, predictors, and treatment of impostor syndrome: A systematic review. Journal of General Internal Medicine, 35(4), 1252–1275. https://doi.org/10.1007/s11606-019-05364-1

13. Buhle, J. T., et al. (2014). Cognitive reappraisal of emotion: A meta-analysis of human neuroimaging studies. Cerebral Cortex, 24(11), 2981–2990. https://doi.org/10.1093/cercor/bht154

14. Chen, S. R., et al. (2022). Effects of acupressure on anxiety: A systematic review and meta-analysis. Journal of Integrative and Complementary Medicine, 28(1), 25–35. https://doi.org/10.1089/jicm.2020.0256

15. Church, D., Yount, G., & Brooks, A. J. (2012). The effect of EFT on stress biochemistry: A randomized controlled trial. Journal of Nervous and Mental Disease, 200(10), 891–896. https://doi.org/10.1097/NMD.0b013e31826b9fc1

16. Clance, P. R., & Imes, S. A. (1978). The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention. Psychotherapy: Theory, Research and Practice, 15(3), 241–247. https://doi.org/10.1037/h0086006

17. Clond, M. (2016). EFT for anxiety: A systematic review with meta-analysis. Journal of Nervous and Mental Disease, 204(5), 388–395. https://doi.org/10.1097/NMD.0000000000000483

18. Connor, K. M., & Davidson, J. R. T. (2003). Development of the Connor-Davidson Resilience Scale. Depression and Anxiety, 18(2), 76–82. https://doi.org/10.1002/da.10113

19. Craske, M. G., et al. (2014). Maximizing exposure therapy: An inhibitory learning approach. Behaviour Research and Therapy, 58, 10–23. https://doi.org/10.1016/j.brat.2014.04.006

20. Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. Current Opinion in Psychology, 17, 7–14. https://doi.org/10.1016/j.copsyc.2017.04.020

21. Flavell, J. H. (1979). Metacognition and cognitive monitoring. American Psychologist, 34(10), 906–911. https://doi.org/10.1037/0003-066X.34.10.906

22. Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. Psychological Bulletin, 99(1), 20–35. https://doi.org/10.1037/0033-2909.99.1.20

23. Frangos, E., et al. (2015). Non-invasive access to the vagus nerve central projections via the external ear. Brain Stimulation, 8(3), 624–636. https://doi.org/10.1016/j.brs.2014.11.018

24. Gerritsen, R. J. S., & Band, G. P. H. (2018). Breath of Life: The Respiratory Vagal Stimulation Model. Frontiers in Human Neuroscience, 12, 397. https://doi.org/10.3389/fnhum.2018.00397

25. Gooden, B. A. (1994). Mechanism of the human diving response. Integrative Physiological & Behavioral Science, 29(1), 6–16. https://doi.org/10.1007/BF02691277

26. Herz, R. S. (2009). Aromatherapy facts and fiction: A scientific analysis. International Journal of Neuroscience, 119(2), 263–290. https://doi.org/10.1080/00207450802333539

27. Houben, S. T. L., et al. (2020). Effects of eye movements on vividness and emotionality of negative memories: A meta-analysis. Journal of Experimental Psychopathology, 11(1). https://doi.org/10.1177/2043808720907744

28. Iaccarino, G., et al. (2017). Heart rate variability changes during Bhramari pranayama. International Journal of Yoga, 10(2), 89–94. https://doi.org/10.4103/0973-6131.205518

29. Ibrahim, F., et al. (2023). Tactical breathing as an intervention to increase marksmanship accuracy. Military Psychology, 36(6), 542–551. https://doi.org/10.1080/08995605.2023.2258737

30. Kadohisa, M. (2013). Effects of odor on emotion, with implications. Frontiers in Systems Neuroscience, 7, 66. https://doi.org/10.3389/fnsys.2013.00066

31. Khalsa, S. S., et al. (2018). Interoception and mental health: A roadmap. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 3(6), 501–513. https://doi.org/10.1016/j.bpsc.2017.12.004

32. Khurana, R. K., & Wu, R. (2006). The cold face test: A non-baroreflex mediated test of cardiac vagal function. Clinical Autonomic Research, 16(3), 202–207. https://doi.org/10.1007/s10286-006-0332-9

33. Kircanski, K., et al. (2012). Feelings into words: Contributions of language to exposure therapy. Psychological Science, 23(10), 1086–1091. https://doi.org/10.1177/0956797612443830

34. Laborde, S., et al. (2022). Psychophysiological effects of slow-paced breathing with or without HRV biofeedback. Psychophysiology, 59(1), e13952. https://doi.org/10.1111/psyp.13952

35. Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. Springer.

36. Levine, P. A. (1997). Waking the tiger: Healing trauma. North Atlantic Books.

37. Lieberman, M. D., et al. (2007). Putting feelings into words: Affect labeling disrupts amygdala activity. Psychological Science, 18(5), 421–428. https://doi.org/10.1111/j.1467-9280.2007.01916.x

38. Lundberg, J. O. (2008). Nitric oxide and the paranasal sinuses. Anatomical Record, 291(11), 1479–1484. https://doi.org/10.1002/ar.20782

39. McAdams, D. P., et al. (2001). Sequences of redemption and contamination in life narrative. Personality and Social Psychology Bulletin, 27(4), 472–483. https://doi.org/10.1177/0146167201274008

40. Mitsungnern, T., et al. (2021). The effect of pursed-lip breathing on blood pressure and heart rate. Journal of Clinical Hypertension, 23(3), 672–679. https://doi.org/10.1111/jch.14168

41. Mobbs, D., et al. (2007). When fear is near: Threat imminence elicits prefrontal-periaqueductal gray shifts. Science, 317(5841), 1079–1083. https://doi.org/10.1126/science.1144298

42. Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. Trends in Cognitive Sciences, 9(5), 242–249. https://doi.org/10.1016/j.tics.2005.03.010

43. Ochsner, K. N., et al. (2002). Rethinking feelings: An fMRI study of cognitive regulation of emotion. Journal of Cognitive Neuroscience, 14(8), 1215–1229. https://doi.org/10.1162/089892902760807212

44. Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. Psychological Science, 8(3), 162–166. https://doi.org/10.1111/j.1467-9280.1997.tb00403.x

45. Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event. Journal of Abnormal Psychology, 95(3), 274–281. https://doi.org/10.1037/0021-843X.95.3.274

46. Phelps, E. A., et al. (2001). Activation of the left amygdala to a cognitive representation of fear. Nature Neuroscience, 4(4), 437–441. https://doi.org/10.1038/86110

47. Röttger, S., et al. (2021). The effectiveness of combat tactical breathing as compared with prolonged exhalation. Applied Psychophysiology and Biofeedback, 46(1), 19–28. https://doi.org/10.1007/s10484-020-09485-w

48. Scholey, A., et al. (2009). Chewing gum alleviates negative mood and reduces cortisol during acute stress. Physiology & Behavior, 97(3–4), 304–312. https://doi.org/10.1016/j.physbeh.2009.02.028

49. Servan-Schreiber, D., et al. (2006). EMDR for PTSD: A pilot blinded randomized study of stimulation type. Psychotherapy and Psychosomatics, 75(5), 290–297. https://doi.org/10.1159/000094450

50. Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. Journal of Personality and Social Psychology, 48(4), 813–838. https://doi.org/10.1037/0022-3514.48.4.813

51. Soudry, Y., et al. (2011). Olfactory system and emotion: Common substrates. European Annals of Otorhinolaryngology, 128(1), 18–23. https://doi.org/10.1016/S1879-7296(10)00124-7

52. Torre, J. B., & Lieberman, M. D. (2018). Affect labeling as implicit emotion regulation. Emotion Review, 10(2), 116–124. https://doi.org/10.1177/1754073917742706

53. Vaschillo, E. G., et al. (2006). Characteristics of resonance in heart rate variability stimulated by biofeedback. Applied Psychophysiology and Biofeedback, 31(2), 129–142.

54. Vickhoff, B., et al. (2013). Music structure determines heart rate variability of singers. Frontiers in Psychology, 4, 334. https://doi.org/10.3389/fpsyg.2013.00334

55. Weitzberg, E., & Lundberg, J. O. (2002). Humming greatly increases nasal nitric oxide. American Journal of Respiratory and Critical Care Medicine, 166(2), 144–145. https://doi.org/10.1164/rccm.200202-138BC

56. Wells, A. (2009). Metacognitive therapy for anxiety and depression. Guilford Press.

57. de Voogd, L. D., et al. (2018). Eye-movement intervention enhances extinction via amygdala deactivation. Journal of Neuroscience, 38(40), 8694–8706. https://doi.org/10.1523/JNEUROSCI.0703-18.2018

58. van den Hout, M. A., & Engelhard, I. M. (2012). How does EMDR work? Journal of Experimental Psychopathology, 3(5), 724–738. https://doi.org/10.5127/jep.028212

TOTAL NEUROHACKS DOCUMENTED: 33 · RAIN METHOD: 4 STEPS · TOTAL UNIQUE CITATIONS: 58

GOING FURTHER

Diving Deeper

The full PressureProof System, the RAIN Method, and every neurohack in this guide live inside your deep dive companion, ready whenever you want to go further.

MARYPOFFENROTH.COM / PRESSUREPROOF

THE PRESSUREPROOF SYSTEM

CREATED BY MARY POFFENROTH, PH.D.