

# Research-Backed Breathing Exercise

## 💡 Why These Work for Executive Function Access

- They calm the autonomic nervous system → improving prefrontal cortex access
- They lower emotional reactivity → supporting cognitive flexibility and working memory
- They interrupt negative feedback loops (anxiety → more anxiety)

### **Box Breathing (Square Breathing)**

How: Inhale for 4 counts → Hold for 4 → Exhale for 4 → Hold for 4 → Repeat

#### **Why it works:**

Slows heart rate and calms the nervous system by balancing sympathetic and parasympathetic activity

Often used by military and first responders to reduce stress under pressure

Shown to increase focus and reduce anxiety (Frontiers in Psychology, 2017)

### **4-7-8 Breathing**

How: Inhale through nose for 4 counts → Hold for 7 → Exhale slowly through mouth for 8

#### **Why it works:**

Promotes parasympathetic (rest-and-digest) activation

Helps regulate heart rate variability (HRV), a marker of resilience to stress

Can aid in sleep initiation (Journal of Clinical Psychology, 2015)

### **Pursed-Lip Breathing**

How: Inhale slowly through the nose → Exhale through pursed lips (as if blowing out a candle) for twice as long

#### **Why it works:**

Slows exhalation and prevents breath holding

Reduces air trapping and increases oxygen exchange, often used for people with lung conditions

Helps manage panic symptoms (Chest, 2012)

### **Coherent Breathing (Resonance Breathing)**

How: Breathe at 5-6 breaths per minute (inhale ~5 sec, exhale ~5 sec)

#### **Why it works:**

Synchronizes heart rate variability (HRV) and respiration

Shown to reduce anxiety and improve mood

Often used in HRV biofeedback therapy (Applied Psychophysiology and Biofeedback, 2010)

## **Diaphragmatic Breathing (Belly Breathing)**

How: Place one hand on the chest and one on the belly → Breathe so the belly rises on inhale, falls on exhale

### **Why it works:**

Engages the diaphragm for more efficient oxygenation  
Reduces reliance on shallow chest breathing linked to anxiety  
Lowers cortisol levels over time (Journal of Health Psychology, 2017)

## **Alternate Nostril Breathing (Nadi Shodhana)**

How: Use thumb and ring finger to alternate closing off each nostril during slow breathing

### **Why it works:**

Balances activity between brain hemispheres  
Lowers heart rate and blood pressure  
Reduces perceived stress (Medical Science Monitor Basic Research, 2013)

## **Physiological Sigh**

How: Take two short inhales (stacked breaths) → Long, slow exhale

### **Why it works:**

Mimics natural sighing to reset breathing and reduce CO2 levels  
Rapidly lowers arousal and stress in the body (Cell Reports Medicine, 2023)