



# CONTE

Conference on Nuclear Training and Education:  
A Biennial International Forum

# 2023

## **Mind, Brain, & Education Science and Student Exam Anxiety**

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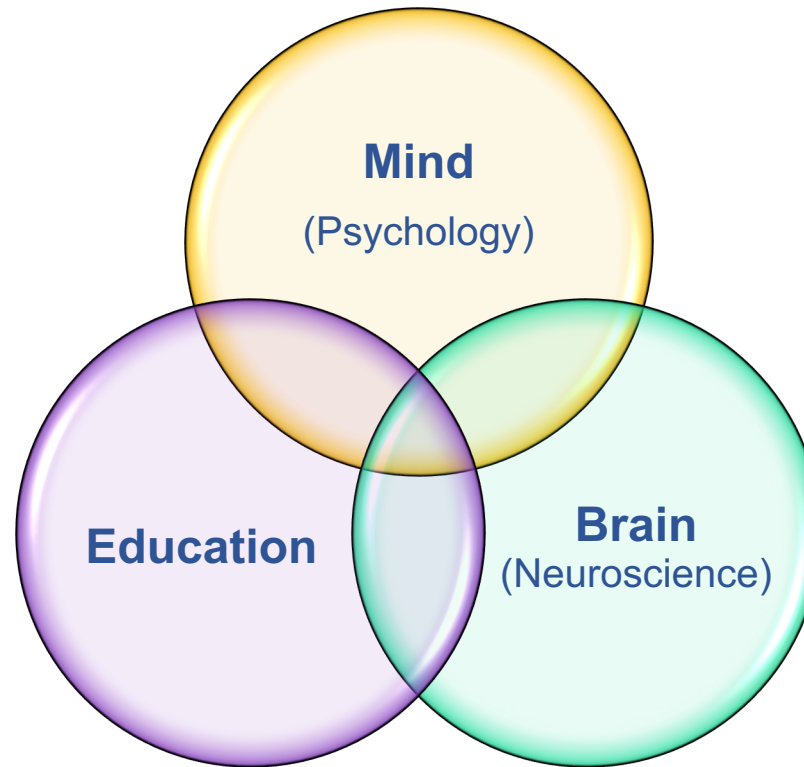
# Mind, Brain, & Education Science

- Consciousness
- Perception
- Emotion
- Personality
- Behavior
- Cognition
- Interpersonal relationships

“Useable knowledge”:

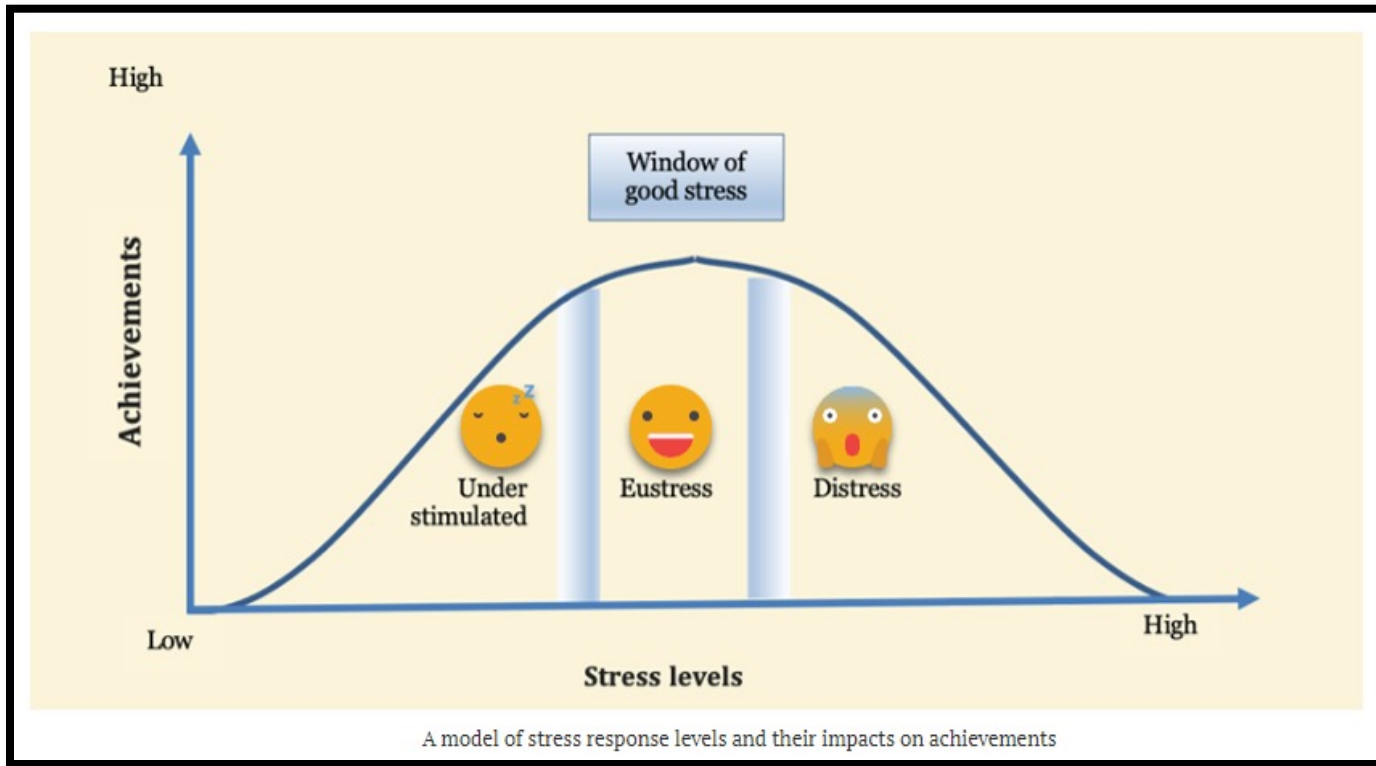
Taking what we know about how the brain learns and using it to engender **effective instruction**

- Pedagogy
- Methodology
- Content subject matter
- Age group knowledge
- Classroom management
- Differentiation
- Planning
- Assessment
- Educational research
- Educational philosophy
- Educational technology



- Nervous system
- Brain
- Neurons
- Synapses
- Neurotransmitters
- Neural networks
- Sensory systems
- Motor control
- Learning
- Memory
- Cognition
- Arousal mechanisms

# Stress & Anxiety Profoundly Influence Life & Learning



## Social

- Increased Aggressiveness
- Social Isolation
- Negative Self-Image

## Physical

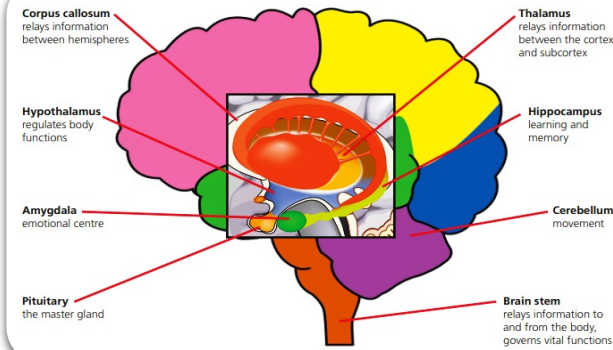
- Insomnia & Sleep Disturbances
- Dizziness & Nausea
- Erratic Breathing

## Academic

- Increased Rumination
- Decreased Exam Scores
- Hindered Problem-Solving

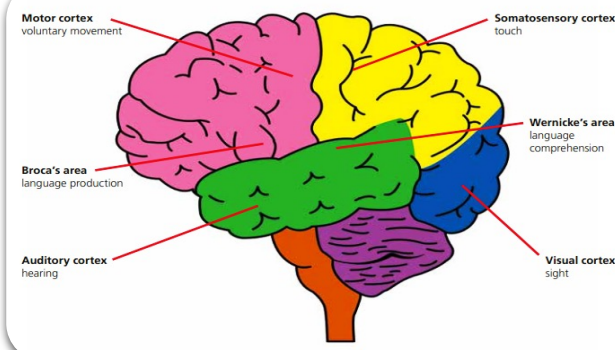


At BVPS, we explain to students both the psychological and the physiological implications of stress/anxiety & how best to manage them



### 'Subcortical' structures (e.g. the limbic system)

- **survival**; allow us to detect threats, activate the body to avoid threats, and store memories of threats to prevent recurrence
- **more readily activated or 'favored' by the brain, because they are responsible for keeping us alive**



### 'Cortical' structures (e.g. the prefrontal cortex).

- **complex reasoning and emotional work** that are central to humanity as a species
- decision-making, problem-solving, intelligence, and emotion regulation

During 'Fight or Flight,' **working memory is wiped clean** to make room for automatic physical and mental actions

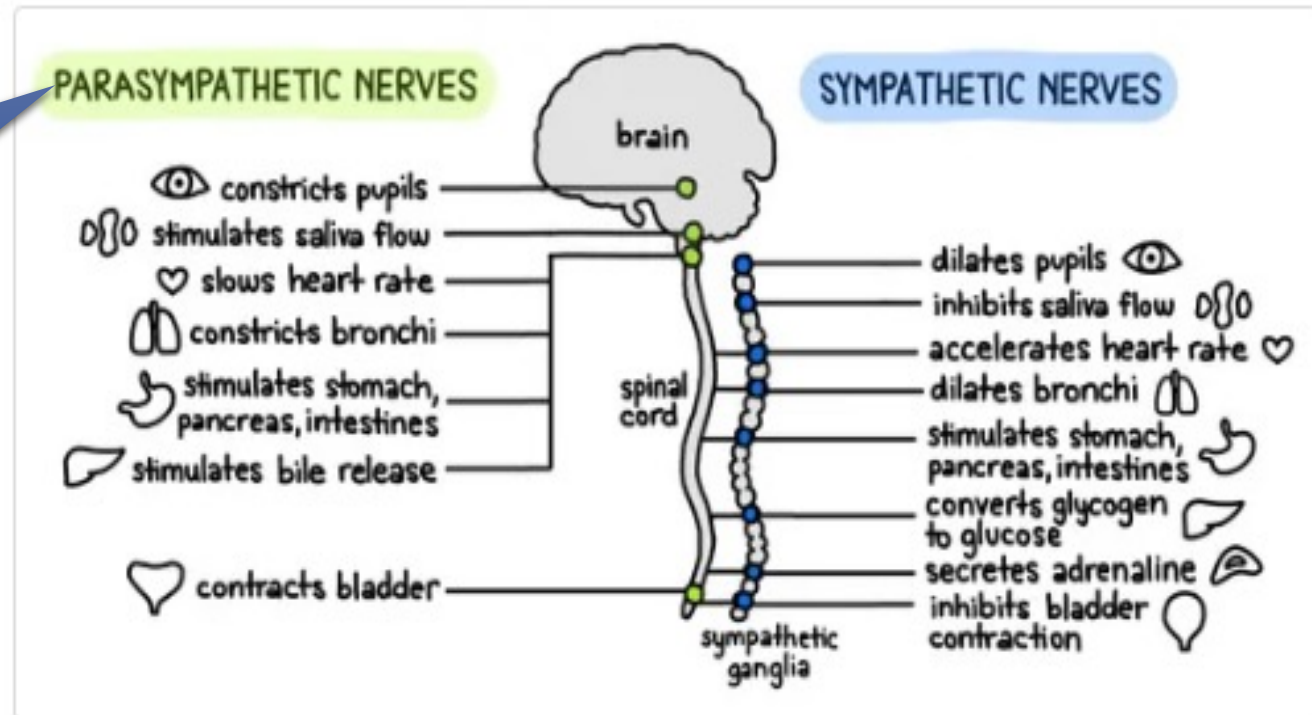
# Ultimately:

Threats move through the body via the sympathetic nervous system (SNS), thus making certain individuals feel stressed during test-taking

Activation of the **parasympathetic nervous system (PNS)** is essential to mitigating test anxiety, as it is what compels the body to 'rest and digest'

As a result of the PNS, the cortical functions of the brain come into full view, allowing for clear thinking and complex problem-solving [by bringing the body and its functions to equilibrium – slowing breathing, re-organizing blood flow, resuming digestion, etc.]

We seek to show students how to activate their PNS

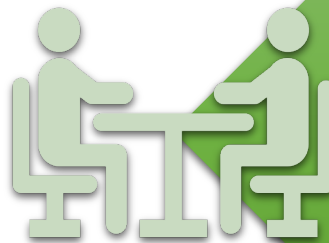


# *At BVPS, we have a Two-Part Approach to Exam Anxiety supported by informed Instructional Staff that help identify students in need*



## Part 1:

- All ILT Classes
- 30-45 Minute Cognitive-Based Approach Workshop
- Exam Taking/Stress Reduction Techniques
- Focus on Elimination of Cognitive Noise & “Plan” Development



## Part 2:

- Work One-on-One with Students in Need
- Meet with Instructional Technologist (as often as needed)
- Supported by Supervision and Instructor(s)



## Encourages Metacognition

- Helps students think about their own thinking to understand what is happening



## Creates Cues

- Helps encourage focus and engender situational control



## Eliminates Cognitive Noise

- Helps manage anxieties via thought modification and control

## Before Exam

## During Exam

## After Exam

### (Diet & Sleep)

Maslow's Hierarchy of Needs

Journaling Anxieties

Developing Affirmations

Developing a Plan

### (Cues & Cognitive Noise)

Implementation of Plan  
(and Adherence to)

Primacy-Recency Effect

Handling Cognitive Distortions

Breathing Techniques,  
Progressive Relaxation,  
& Basic Meditation

### (Review and Reassess)

How to Debrief

Cognitive Noise Sources  
& How to Handle Next Time

Power of Metacognitive Strategies

Changing and Adjusting their Plan

## Example Student Results A

Candidate	Combined Avg	GFE Average	Systems Average	EOP/ATA/MCD Average	Mod 5 System Review Average	NRC Practice Average	BV Exam	Independent Audit	NRC Exam
Student X	83.1	84.2	83.9	81.5	80	80.3	77	86	88



Plan Implementation

## Example Student Results B

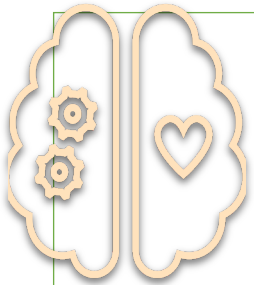
Candidate	Combined Avg	GFE Average	Systems Average	EOP/ATA/MCD Average	Mod 5 System Review Average	NRC Practice Average	Independent Audit	NRC Exam
Student Y	84.4	91.0	87.9	87.7	87.0	79.6	81.0	83.0



Plan Implementation



# Key Takeaways:



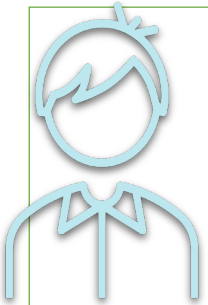
## Anxiety and stress impact learning

- *Affect* matters as much as cognition
- We need to attend to students' emotional considerations, where possible



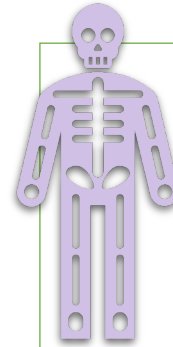
## BVPS implements a two-pronged cognitive-based approach

- Integrated via classroom instruction and, as needed, individual sessions with the Instructional Technologist



## One of the most important aspects is the identification of students in need

- As such, instructors must be educated
- Many students will not self identify



## Students are taught about three facets important to the development of a plan [meant to activate the PNS]:

- the elimination of cognitive noise
- the creation of external and internal cues
- the encouragement of metacognition

# Key Conference Takeaways:

Neuroleadership – Pamela Terry

Extended Mind – Dave Helling

Community of Practice – Marlene Khalil

Instructional Coaching – Amanda Cobb

- The impacts of culture and the power of the affective domain cannot be underestimated
- Research-based instructional practices are advancing the nuclear classroom beyond the instructor-centered format

# Questions?

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