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Short-Term Psychophysiological Interventions in College Counseling

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Learning Objectives

- Participants will be able to discuss the prevalence of stress among college students and its impact on their functioning.
- Participants will be able to describe the effects of stress on the sympathetic and parasympathetic branches of the autonomic nervous system.
- Participants will be able to list 3 short-term evidence-based treatment strategies for improving mental-health in college students.



Stress and College Students

Felt overwhelmed by all you had to do

| | <i>Percent (%)</i> | Male | Female | Total |
|---|--------------------|-------------|---------------|--------------|
| No, never | | 14.7 | 5.4 | 8.2 |
| No, not last 12 months | | 7.5 | 3.2 | 4.4 |
| Yes, last 2 weeks | | 40.6 | 57.0 | 52.4 |
| Yes, last 30 days | | 15.3 | 16.6 | 16.1 |
| Yes, in last 12 months | | 21.9 | 17.8 | 18.9 |
| | | | | |
| <i>Any time within the last 12 months</i> | | 77.8 | 91.4 | 87.4 |



Stress and College Students

Felt overwhelming anxiety

| | Percent (%) | Male | Female | Total |
|---|-------------|------|--------|-------|
| No, never | | 35.7 | 19.9 | 24.3 |
| No, not last 12 months | | 15.4 | 11.1 | 12.3 |
| Yes, last 2 weeks | | 18.2 | 30.9 | 27.6 |
| Yes, last 30 days | | 10.5 | 14.8 | 13.6 |
| Yes, in last 12 months | | 20.1 | 23.3 | 22.3 |
| <i>Any time within the last 12 months</i> | | 48.8 | 68.9 | 63.4 |

Felt so depressed that it was difficult to function

| | Percent (%) | Male | Female | Total |
|---|-------------|------|--------|-------|
| No, never | | 45.0 | 34.9 | 37.3 |
| No, not last 12 months | | 20.7 | 21.2 | 20.9 |
| Yes, last 2 weeks | | 11.9 | 15.7 | 15.1 |
| Yes, last 30 days | | 6.1 | 8.6 | 8.0 |
| Yes, in last 12 months | | 16.3 | 19.7 | 18.8 |
| <i>Any time within the last 12 months</i> | | 34.3 | 44.0 | 41.9 |

American College Health Association. American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2018. Silver Spring, MD: American College Health Association; 2018.

- The number of college students reporting anxiety and depression has been steadily rising over the past decade.
- Research shows that mental health issues are negatively correlated with retention and overall academic performance.



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Stress and College Students

- Given an increased demand for counseling services combined with limited resources, there is a growing need for effective, evidence-based, short-term interventions that meet the needs of diverse student populations.
- San Diego State University is among the leading universities using three psychophysiological interventions that utilize technology to engage students in the therapeutic process.
- (HRV) biofeedback, Neurofeedback, and EMDR are empirically based and have demonstrated effectiveness in decreasing levels of stress, anxiety, and negative mood in college students as well as enhancing coping strategies.
- Outline program and address practical applications



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A Four-Session Biofeedback Intervention Program for College Students Experiencing Academic Stress

Martin Doucett, Ph.D.
San Diego State University



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Biofeedback General

- A tool to decrease/manage stress and anxiety
- A way to increase relaxation using diaphragmatic breathing
- See instant feedback of your physiological processes on a computer screen



RF-HRV Biofeedback Specifics

- Resonant Frequency (FR) regulates diaphragmatic breathing at about 5 to 7 breaths per minute, a rate that matches the resonant frequency of the cardiovascular system at about 0.1 Hz (Hassett et al., 2007).
- Heart rate variability (HRV) is the beat-to-beat changes in heart rate (Task Force of the European Society of Cardiology and The North American Society of Pacing Electrophysiology, 1996).



RF-HRV Biofeedback Specifics

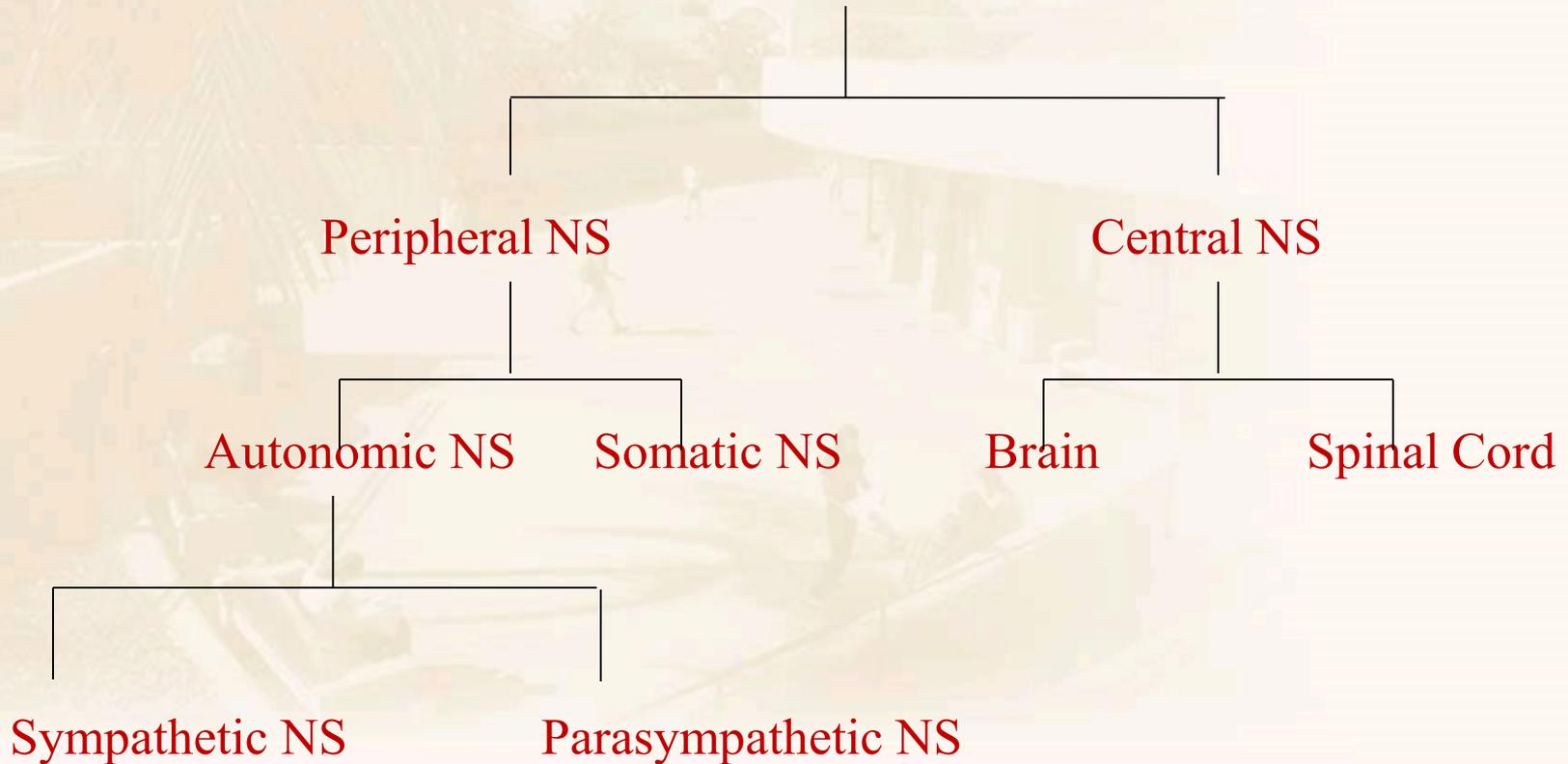
- Resonant frequency, heart rate variability biofeedback
 - Low HRV indicates decreased vagal nerve activity and increased sympathetic activity.
 - Low HRV and diminished vagal tone are associated with hypertension, stroke, and immune system dysfunction. (Stein and Kleiger, 1999)
 - Linked to diminished emotional and cognitive regulation. (Thayer and Lane, 2009)
 - Linked to panic disorder, PTSD, GAD, and phobic anxiety. (Friedman, 2007)



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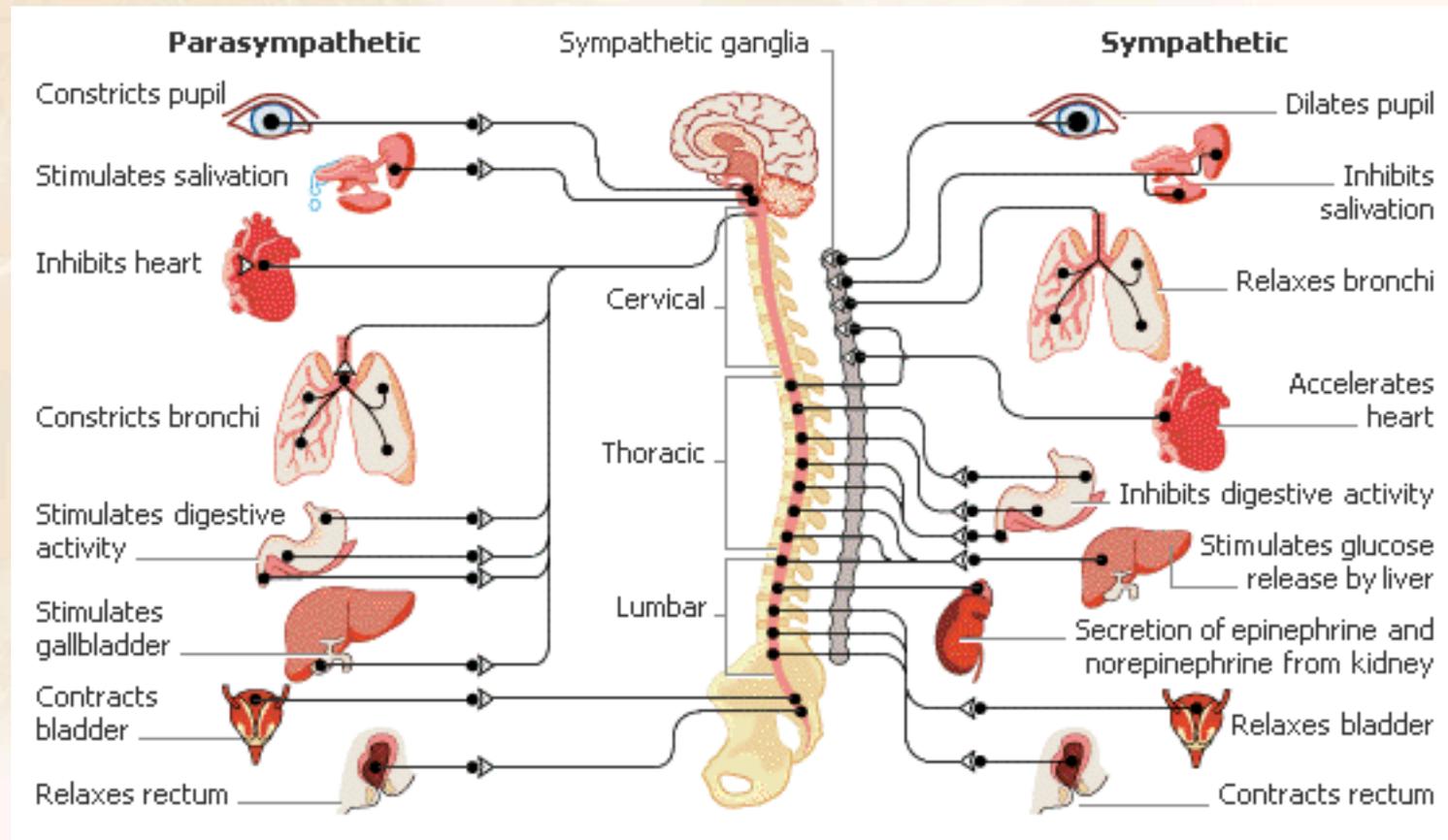
Physiology

Nervous System





Autonomic Nervous System





Sympathetic Nervous System

Fight or Flight Response -Automatic response to 'danger'
Gas pedal (stuck in sympathetic overdrive)

| Organ | Effect |
|-----------------|---|
| Eyes | Dilates pupils/ better peripheral vision /light |
| Heart | Increase rate/force of contraction |
| Lungs | Dilates bronchioles |
| Blood Vessels | Constricts/diverts blood from torso to limbs |
| Sweat Glands | Activate sweat secretion |
| Digestive Tract | Inhibits digestion |
| Brain | Interferes with normal cognitive processing |



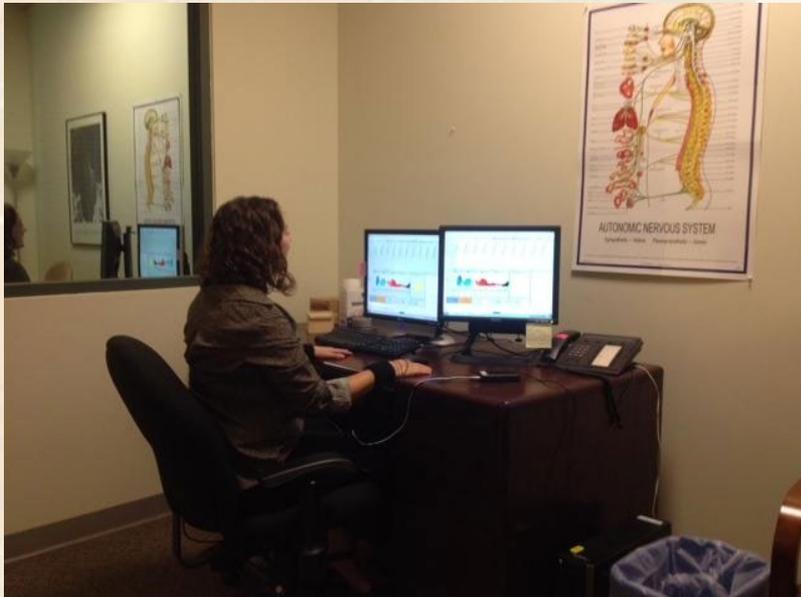
Parasympathetic Nervous System

- Rest and Digest
- The vagus nerve is the tenth cranial nerve and interfaces with parasympathetic control of the heart and digestive tract.
 - Acts as a ‘brake pedal’
 - Slows breathing and heart rate, blood volume returns to torso, pupils constrict
- Diaphragmatic breathing anchored to markers for RF and HVR is the process by which the PNS is innervated.



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Biofeedback Office and Laptop





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Biofeedback Equipment





Diaphragmatic or Abdominal Breathing

- Breathing is the only bodily function that we do both voluntarily and involuntarily
- We can use breathing to influence the sympathetic and parasympathetic nervous systems
- Diaphragmatic breathing can aid in better regulating blood pressure, heart rate, circulation, digestion and cognitive functions.



Biofeedback Intervention

Session 1

- Student completes intake paperwork prior to first session:
 - Brief Symptom Inventory
 - Difficult Life Events Checklist
 - Nijmegen Questionnaire
- Conduct a (modified) intake that focuses on hx of presenting issue and academic impact
- Explain theoretical underpinnings of biofeedback
- Demonstrate and practice diaphragmatic breathing
- ‘Hook student up’, establish resting respiration rate and establish resonant breathing frequency
- Give practice materials and homework



Biofeedback Intervention

Session 2

- Review worksheet, assess progress, MI to reinforce daily practice
- Discuss presenting symptoms (both physio and cognitive)
- Begin biofeedback
 - Once std. is breathing with the pacer, monitor, explain, and reinforce markers for increased PNS activity and decreased SNS activity
- Give homework practice sheet and review barriers to practice



Biofeedback Intervention

Session 3

- Review worksheet, assess progress, MI to reinforce daily practice
- Discuss presenting symptoms (both physio and cognitive)
- Begin biofeedback
 - Conduct stress test: serial 7 backward or ‘pop quiz’ or other stress induced event tied to presenting issue
 - Monitor/count recovery breathing
- Give homework practice sheet and review barriers to practice
- (Schedule final session 2 to 3 weeks out)



Biofeedback Intervention

Session 4

- Complete a follow-up Nijmegen (compare pre/post scores)
- Review worksheet, assess progress, MI to reinforce daily practice
- Discuss presenting symptoms (both physio and cognitive)
- Begin biofeedback
 - Conduct stress test:
 - Monitor/count recovery breathing
- Termination/wrap up



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Biofeedback C&PS

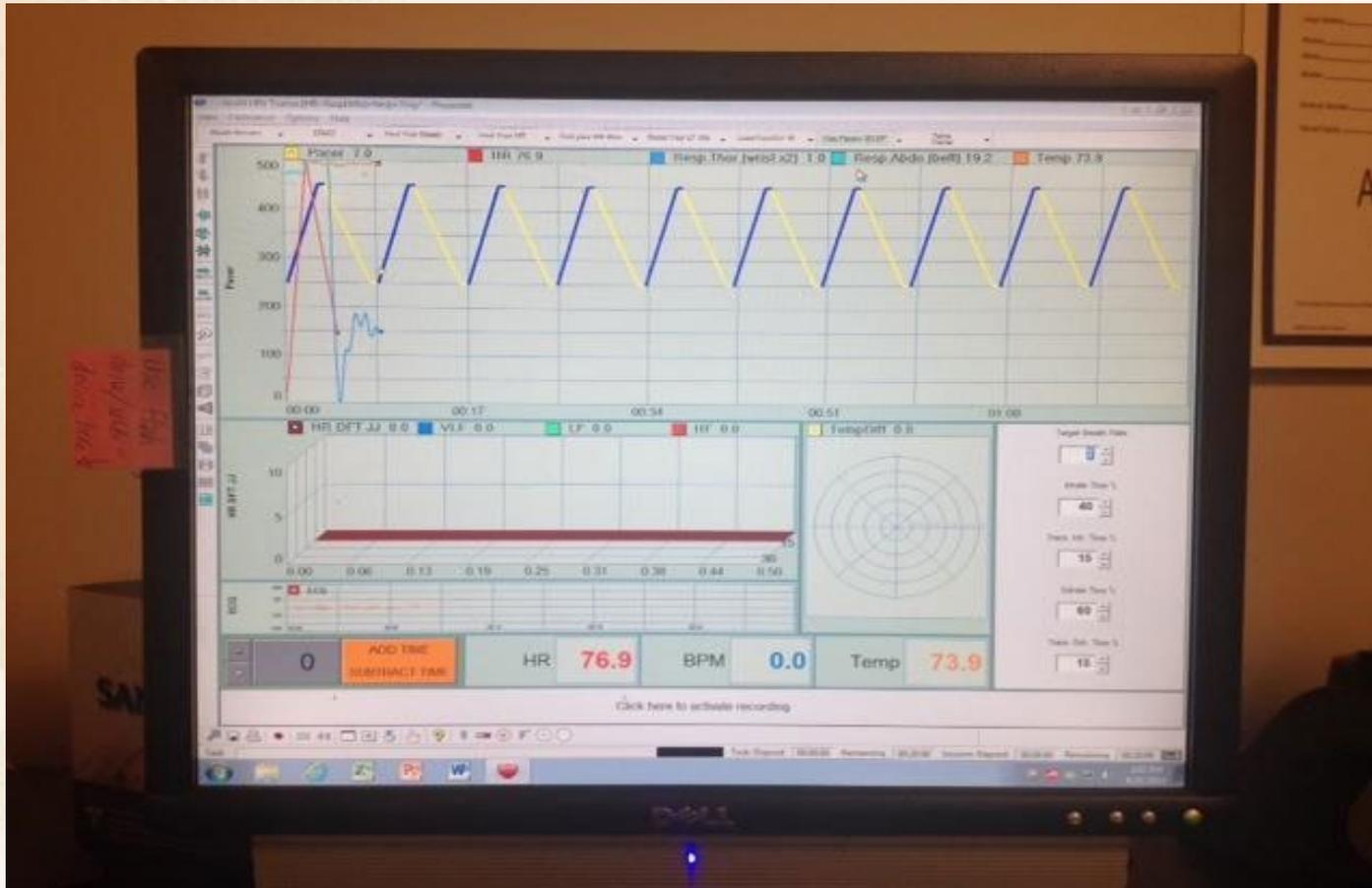


- Biofeedback Program has been in effect for **10 years**, providing an average of **100 sessions** of biofeedback to approximately **35 students per semester**.
- **~10 therapists** providing this intervention currently.
- Each new **intern class is trained in biofeedback** and they have ongoing biofeedback supervision throughout the year.



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Biofeedback Screen





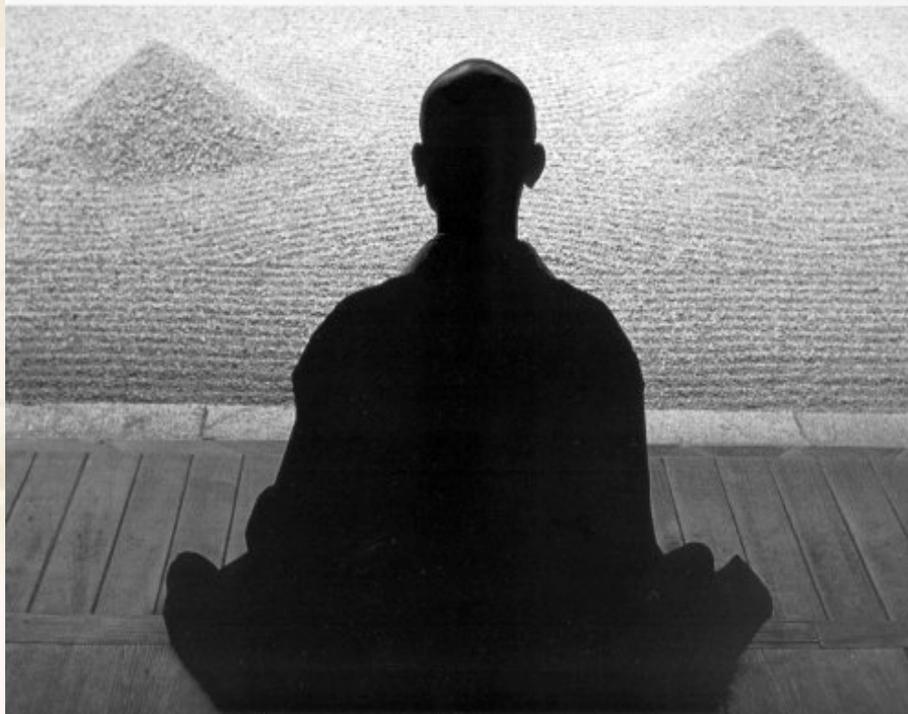
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Benefits of Biofeedback

Decreases levels of anxiety

Increases level of calmness and alertness

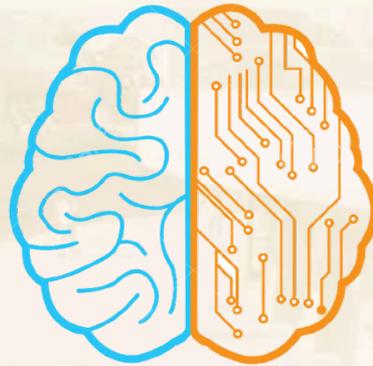
Improve academic performance





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Neurofeedback



“**Neurofeedback** is a specialty field of Biofeedback where the goal is to train people, to gain control over electrophysiology, in the human brain.”

(Gilbert & Moss, 2003; Schwartz & Andrasik, 2003)



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NeuroFeedback Program Implementation



- Stens 5-Day Advanced Training
- Ongoing consultation with certified BCIA therapist
- Hours toward certification
- Direct service to students beginning Spring 2017
- 3 therapists currently provide services
 - Provided 112 neurofeedback session 13 students. Overall attendance rate of 82%.
 - Students who have completed a course of treatment have demonstrated improved (post-test) TOVA scores - objective measure and reported decreased distress.



Neurofeedback Background

- Computer assisted therapy that helps train brain bx
- Painless, relaxing, and non-invasive
- Therapist places sensors on student's scalp and or ears
- The sensors detect a student's brain waves which are then monitored by an EEG monitor, amplifier, and computer based instrument that process signals and provides feedback to students.

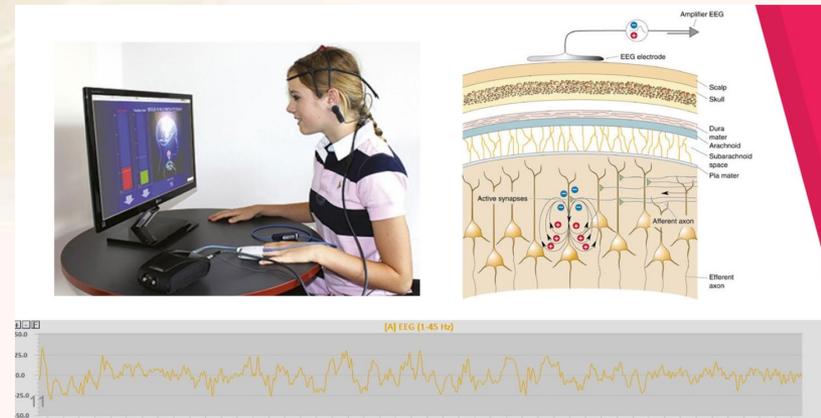


Figure: Mind Media



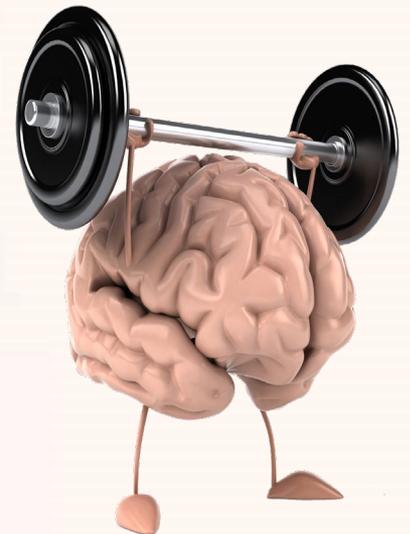
Neurofeedback Background

- Based on Operant Conditioning Principles
- During neurofeedback treatment the student uses their brain waves to control a video game or movie on the computer screen.
- If they produce the brain wave patterns they are trying to enhance the game continues and the student is rewarded.
- If they produce the wrong brain wave patterns the game slows down or stops.



Neurofeedback Background

- Exercising specific brain waves increases the brain's regulatory mechanisms allowing the brain to function more effectively and efficiently.
- Through consistent training at the proper frequency and duration, the brain learns to self-regulate.
- Neurofeedback = exercise for the brain
- Neurofeedback is a type of Biofeedback that addresses the brain.

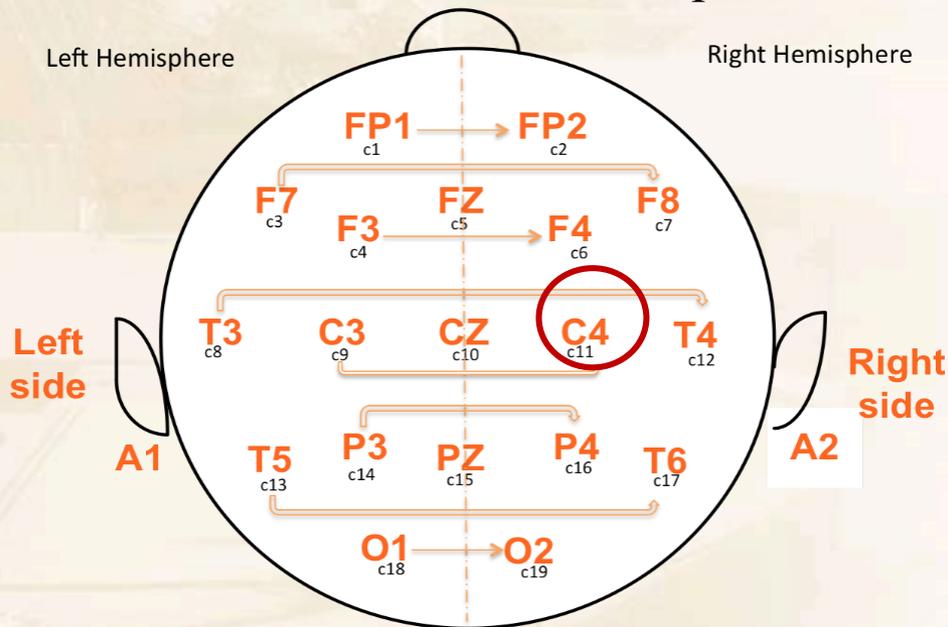




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Why Does Neurofeedback Work?

Neurofeedback protocols are evidence based for particular areas of the brain.



Frontal Lobes : are associated with Executive Functioning, concentration

Right Hemisphere : overarousal-anxiety, compulsiveness

Left Hemisphere : underarousal-depression, inattention



EEG Frequency Bands



| | | | | | | |
|------------------------------------|--|-----------------------------------|---|--|---|--|
| EEG | | | | | | |
| | | | | | | |
| DELTA | THETA | ALPHA | SMR | LO-BETA | HI-BETA | GAMMA |
| 1-4 HZ | 4-8 HZ | 8-12 HZ | 12-15 HZ | 13-21 HZ | 21-35 HZ | 35-45 HZ |
| | | | | | | |
| -Deep Sleep -Mind turned inward | -Distractibility -Inattention -Daydreaming -Light sleep -Brain makes novel connections in this state | -Relaxation -Calm -Peaceful | -Sensory -Motor -Rhythm -Relaxed -Attention | -Attentive - -Wakefulness -Alertness | -Hyperactivity -Busy Brain -Agitation -Anxiety | -Cognitive Processes -Learning -Memory |



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Neurofeedback Uses

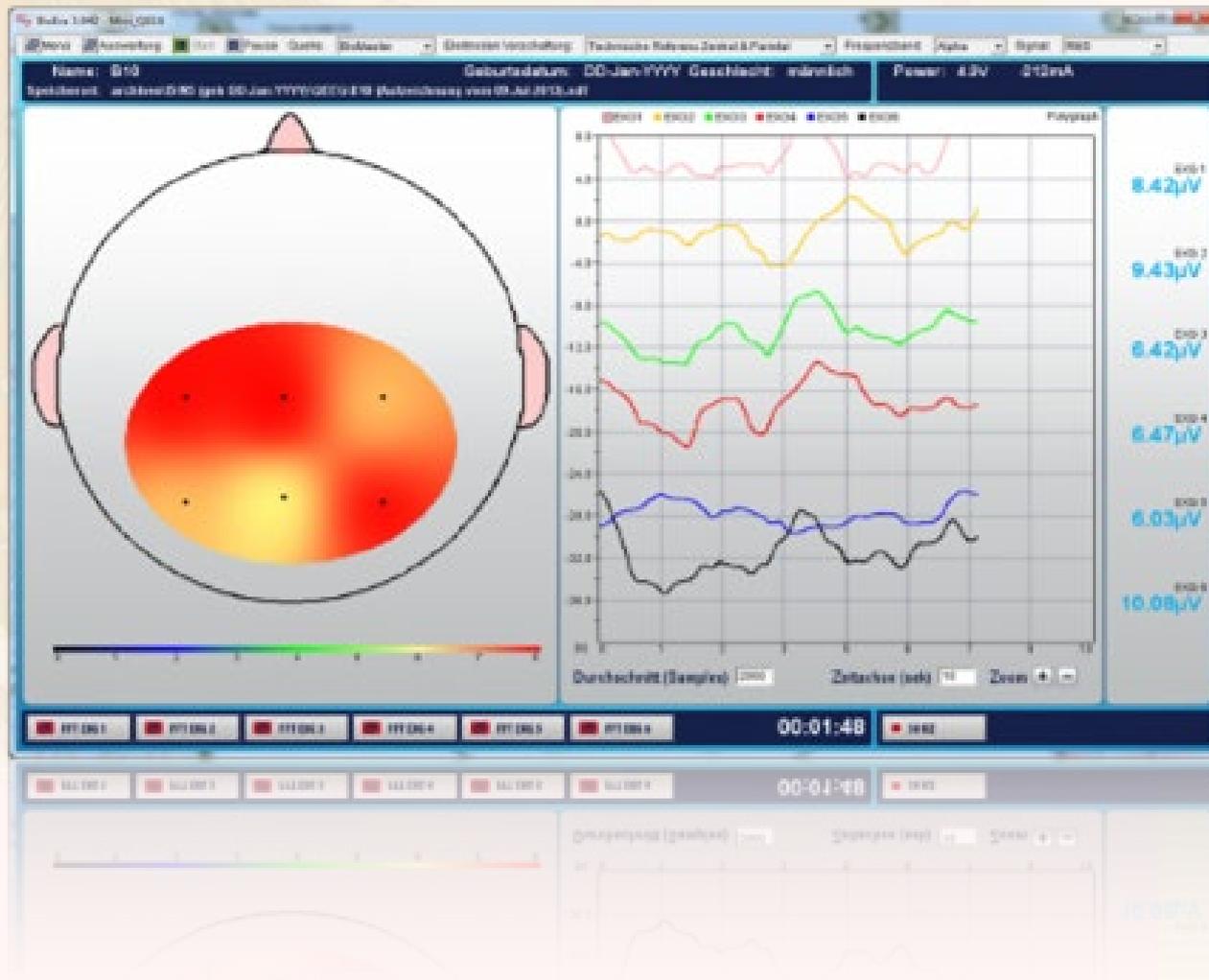


- ADHD
- Anxiety
- Depression
- Cognitive Functioning
- Headaches/Migraines
- Peak Performance
- Sleep Disturbances
- Somatic Symptoms
- Brain Injuries



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Neurofeedback Screen





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SDSU Neurofeedback



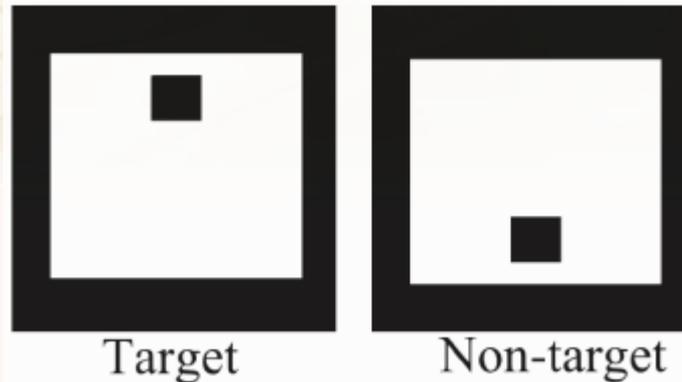
- Initial paperwork, informed consent
- Neurofeedback Intake
 - Discuss presenting symptoms
 - Assess SX for Overarousal/Underarousal:
 - Attentional, Emotional, Cognitive, Sleep, Pain, Neurological, Motor, Immune, Substance Use, Current Medications
 - History- Birth and development, physical, psychological stressors, learning difficulties, head injuries



SDSU Neurofeedback



- Test of Variables of Attention (TOVA)
 - Objective Measure
 - Administered (pre and post intervention)
 - Variables measured: Response Time, Variability of response time (consistency), commission (impulsivity), errors of omission (inattention), ADHD score.





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SDSU Neurofeedback



- Neurofeedback intervention ~1020 session
 - 2 x weekly 30 min for 5-10 weeks
 - Goal to complete within 1 semester w/ option of refresher the next semester
- Between Session Rating Scale
- Termination and Post-Test TOVA
- Post-Treatment Student Evaluation
- Referral to longer-term treatment providers as needed



Neurofeedback Evaluation



| | Strongly disagree | | Neutral | | | Strongly agree | |
|---|-------------------|---|---------|---|---|----------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I benefited from my neurofeedback sessions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I benefited from biofeedback sessions. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My academic performance has improved. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My social functioning has improved | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| My emotional functioning has improved | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Please list any additional improvements you have noticed from participating in neurofeedback or biofeedback sessions:

Please share any comments or feedback about your experience with neurofeedback and biofeedback:



Neurofeedback Evaluation



Please place an X next to any symptom you feel has improved from neurofeedback .

- | | |
|--|--|
| <input type="checkbox"/> Impulsiveness | <input type="checkbox"/> Spaciness' or feeling foggy |
| <input type="checkbox"/> Aggressiveness | <input type="checkbox"/> Cry easily |
| <input type="checkbox"/> Hyper focus (over focus) | <input type="checkbox"/> Motivation |
| <input type="checkbox"/> Agitation/Irritability | <input type="checkbox"/> Energy |
| <input type="checkbox"/> Anxiety | <input type="checkbox"/> Depression |
| <input type="checkbox"/> Anger | <input type="checkbox"/> Loss of emotional control |
| <input type="checkbox"/> Obsessive thoughts | <input type="checkbox"/> Forgetfulness |
| <input type="checkbox"/> Compulsive behaviors | <input type="checkbox"/> Ability to complete tasks requiring steps |
| <input type="checkbox"/> Difficulty falling asleep | <input type="checkbox"/> Snoring |
| <input type="checkbox"/> Nightmares | <input type="checkbox"/> Trouble staying asleep |
| <input type="checkbox"/> Body tension | <input type="checkbox"/> Fearfulness |
| <input type="checkbox"/> Tics | <input type="checkbox"/> Nausea |
| <input type="checkbox"/> Headaches | <input type="checkbox"/> Talkative |
| <input type="checkbox"/> Racing thoughts | <input type="checkbox"/> Feeling dull |
| <input type="checkbox"/> Hyperactivity | <input type="checkbox"/> Confused thinking |
| <input type="checkbox"/> Feeling jumpy | <input type="checkbox"/> Memory |
| <input type="checkbox"/> Happiness | <input type="checkbox"/> Punctuality |
| <input type="checkbox"/> Negative thoughts | <input type="checkbox"/> Feeling calm or relaxed |
| <input type="checkbox"/> Skin crawling sensation | <input type="checkbox"/> Reading |
| <input type="checkbox"/> Pain awareness | <input type="checkbox"/> Voice calmer or lower |
| <input type="checkbox"/> Organization | <input type="checkbox"/> Body awareness |
| <input type="checkbox"/> Aware of dreams | <input type="checkbox"/> Empathy for others |
| <input type="checkbox"/> Clear thinking | <input type="checkbox"/> Talkative |
| <input type="checkbox"/> Reaction time | <input type="checkbox"/> Attention, concentration |
| <input type="checkbox"/> Eye contact with others | |



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Neurofeedback Case



Spring Semester 2018

WP 2/1/18 – 5/8/18

WP completed 1 PC call, 1 Intake session

17 sessions of Neurofeedback (6 C4, 6 Fz, 5Fz/P4), 30 min sessions

2 sessions of Biofeedback

2 sessions to take the Pre and Post TOVA.

The total clinical time was 12 hours.

At intake, WP reported anxiety, intrusive thoughts, and stress. On the BSI, std. scored in high for somatic, obsessive, and phobic. He scored in the moderate range for interpersonal sensitivity, depression, and distortions in thinking. His overall stress level was in the moderate range.

Symptoms tracked over the course of treatment included general stress level, obsessive thoughts, sleep difficulty, attention to physical issues (somatic).



Neurofeedback Case



Results: WP reported that he benefited from biofeedback & neurofeedback (6/7). Academic performance improved (5/7), Social functioning improved (6/7) Emotional functioning improved (7/7).

31 SX improved over the course of treatment. He added, “reduction in chest tightness, reduction of unwanted daydreaming, and desire to be more open with my feelings.” He also noted, “The majority of the reduction/improvements occurred immediately following the session. It seemed to taper off throughout the day. This may have just been from me getting used to it. Either way, I still notice residual effects from the sessions, just not as profound as when I first tried neurofeedback and then walked outside.”

NEUROFEEDBACK INTERSESSION CHECKLIST. target symptoms using a scale of 1 (positive) to 10 (negative) with the following pre/post ratings:

| SYMPTOM | PRE | POST | TOVA | PRE | POST |
|--------------------|-----|------|------|-----|------|
| ANXIETY | 7 | 2 | TOVA | .85 | 3.93 |
| OBSESSIVE THOUGHTS | 5 | 4 | | | |
| SLEEP | 5 | 1 | | | |
| SOMATIC COMPLAINTS | 8 | 2 | | | |



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Eye Movement Desensitization and Reprocessing (EMDR)



- A physiologically based therapy to process distressing memories, thoughts and body sensations into less distressing ways
- Supports an adaptive resolution using the brain's natural healing processes by drawing upon sensory memories
- Commonly used for PTSD and Anxiety





Brief History

- 1987- Francine Shapiro, PhD
- Bilateral Stimulation
 - eye movements/tactile/sound
 - decreases vividness of memory and re-processes with adaptive information
- 1995- 8 Phases





Phases of Treatment

- 1: **History Taking** (*and treatment planning*)
- 2: **Preparation** (*including **Calm/Safe Place**, & other practices to shift **physiology***)
- 3: **Assessment** (*Image, Negative Cognition, Subjective Units of Distress, Positive Cognition, Validity Of Cognition, **Body Sensations***)
- 4: **Desensitization** (***Bilateral stimulation**, and checking SUDS*)
- 5: **Installation** (of the adaptive belief after distress has lowered)
- 6: **Body Scan** (***Tuning into the body***)
- 7: **Closure**

- 8: **Re-evaluation**

- Additional: **Resourcing**





Adaptive Information Processing (AIP) Model

- Adaptive Processing = Brain assimilates new information with older material in neural memory networks
- Networks are organized around the earliest memory
- Trauma interrupts this natural process, and information is often held in the limbic system (raw, emotional state)

*Sensory
Memory*

*Short Term
Memory*

*Long Term
Memory*



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Goals of Treatment



Connection with helpful
and adaptive information
that is embodied.



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Evidence-Based for Trauma

- APA 1998
- American Psychiatric Association 2004
- US Department of Veterans Affairs 2010

- Internationally:
 - World Health Organization 2013
 - ISTSS 2009
 - Dutch National Guidelines 2003
 - United Kingdom 2005



Research Supporting

- Positive outcomes for anxiety disorders including **panic disorder, phobias, and performance anxiety**.
(Dejongh et al, 1999; Faretta, 2013; Foster et al, 1996; Shapiro, 2001)
- EMDR with **college students**, shown to decrease overall **testing anxiety**, including components of worry and emotionality, and physiological symptoms of anxiety.
(Enright et al, 2000; Gosselin & Matthews, 1995; Maxfield & Melnyk, 2000)



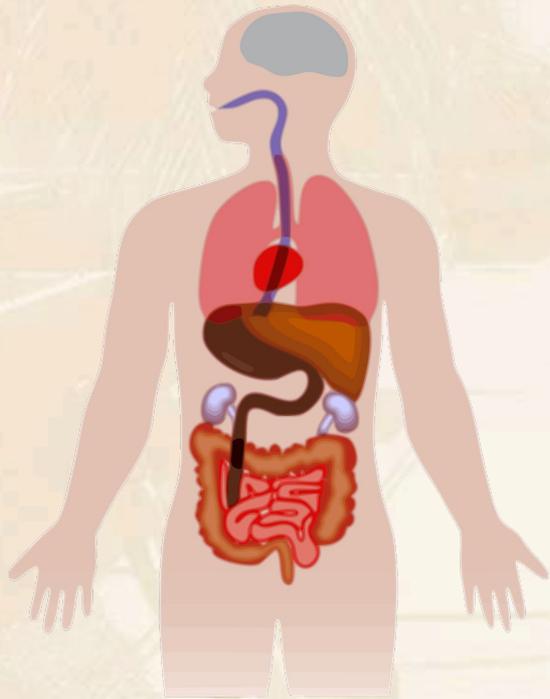
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Possible Mechanisms of Change

- Working Memory
- Orienting Response
- Similar to REM Sleep
- Physiological Changes
- Neurological Changes



Physiological Studies



- Decreased physiological arousal (Heart Rate, Skin Conductance, Respiration Rate)
- HRV increase
- Increase in parasympathetic (vagal) tone

(Sack et al, 2007; Schubert et al, 2011; Frustaci et al, 2010)



Neuroimaging Studies



- Significant increase of alpha power in the left temporal lobe & increased coherence in beta between C3 and T5 (Farina et al, 2015)
- Increase in gray matter density in emotional regulation areas, imaged in the prefrontal cortex (Boukezzi et al, 2017)



In a Short-Term Context

- In 3-8 sessions, EMDR has shown to reduce PTSD dx by 60-90%
 - Three 90-minute sessions of EMDR no longer met criteria for post-traumatic stress disorder in 90% of rape survivors (Rothbaum, 1997)
 - 100% single trauma and 77% multiple trauma no longer met criteria for PTSD after six 50-minute sessions
(Marcus, Maquis & Sakai 1997, 2004)



In a Short-Term Context

Inclusion Criteria

Students seeking to address:

- **A single trauma**
 - Car accident
 - Assault (physical, sexual)
 - Victim of a Crime
 - Witnessing harm to another person
 - Exposure to trauma of another
 - Experiencing a natural disaster
- **Symptom relief** after a distressing event (ex: improvement in sleep, nightmares, distressing memories, anxiety reduction, improvement in mood)

Students who have **tried other therapies** for:

- A distressing event
- Anxiety, panic, performance or testing anxiety and are seeking another approach



In a Short-Term Context

Exclusion Criteria

Students seeking to address:

- **Multiple traumas** or distressing events
- Multiple traumas they have not processed, or feel they have not healed from
- Has significant affect dysregulation, limited internal/external resources, or a history of hospitalizations that would **require greater stabilization prior to engaging in EMDR**
- **History of seizures, neurological disorder, or is severely dissociative**
- Pregnant

**could be referred to an EMDR provider in the community*



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Differences From Other Counseling

- Does not require:
 - *detailed descriptions of the event*
 - *challenging beliefs*
 - *homework*
- Can also be helpful for students who:
 - *have experienced a sexual assault without memory of event*
 - *prefers alternative treatment to medications*



EMDR Intake Session

- **Initial Paperwork**
 - EMDR Specific Consent
 - Post Traumatic Stress Disorder Checklist (PCL-5)
 - Difficult Life Events Checklist (DLE)
 - Dissociative Experiences Scales (DES)
- Provide information on EMDR, including giving student a brochure to take home
- Begin Phase 1 & 2: History Taking and Treatment Planning



Considerations In a Short-Team Context

- Using EMD(r), RET for Single Traumas vs. EMDR
- Choosing target event (worst, most recent)
- 60 minute sessions vs. 90 minute
- Scheduling in consideration of academics
- Flexibility (not using EMDR some sessions, clinical judgment to switch to EMDR/changing target)
- Giving permission to discontinue at anytime
- Having EMDR providers in your referral list for longer-term needs

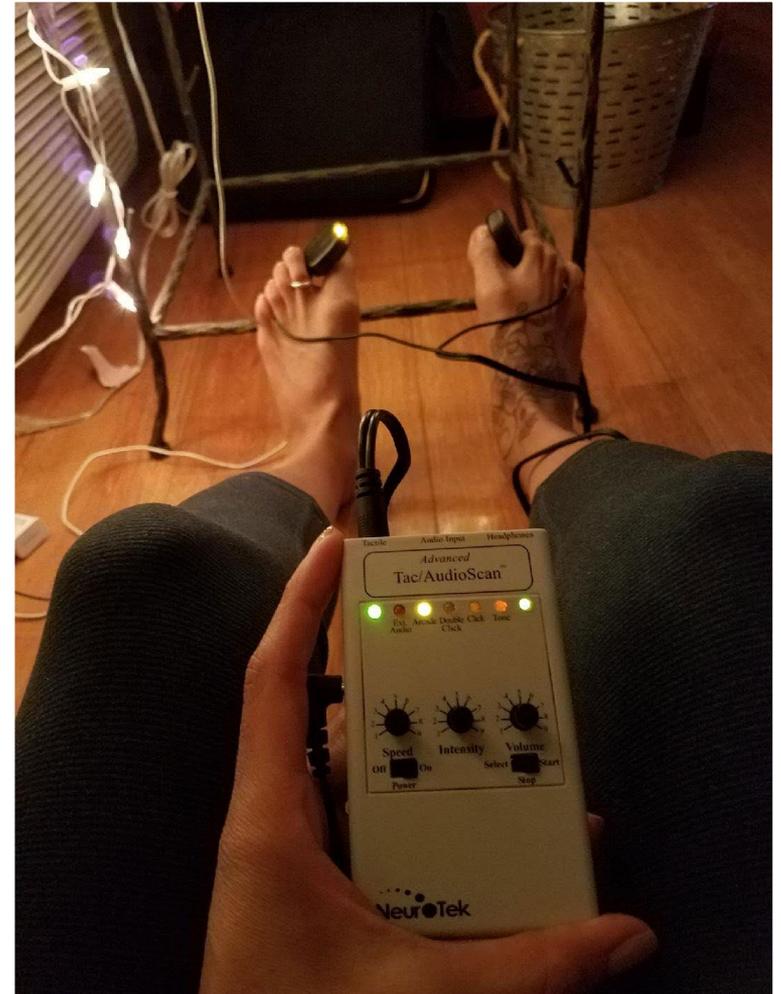


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EMDR Technology



<https://neurotekcorp.com>





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Considerations With Students

- Start with *Resourcing* to introduce to bilateral stimulation
- Take time to debrief after first use of bilateral stimulation
- Be able to laugh about it together!



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