



# University of Central Florida research studies:

**NO and ADHD in college students**  
**NO and Anxiety in college students**

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## NF and ADHD study (brief overview)

- 11 participants with ADHD
- 16 sessions; no control group
- Assessments: *Conners Adult ADHD Rating Scale, BDI-II; BAI; Self-Efficacy for Learning Form-Abridged*
- Assessment points: pre, mid, post, and four week follow up.
- Friedman ANOVA



# Results for NO and ADHD study

- The results of the current study indicate that there were significant improvements in scores in inattention ( $X^2_{(3)} = 10.268, p = .016$ ), hyperactivity ( $X^2_{(3)} = 10.151, p = .017$ ), self-concept ( $X^2_{(3)} = 11.745, p = .008$ ), depression ( $X^2_{(3)} = 13.165, p = .004$ ), anxiety ( $X^2_{(3)} = 10.078, p = .018$ ), and academic self-efficacy ( $X^2_{(3)} = 18.361, p < .001$ ) over time. A significant difference in scores was not found in the participants' impulsivity scores ( $X^2_{(3)} = 3.284, p = .350$ ).



# NO and Anxiety study

# Statement of the Problem



**Increased rates  
of anxiety,  
stress, and  
depression**

**Suicide is 2nd  
highest cause  
of death for  
ages 15-29**

**Impacts mental  
and physical  
functioning;  
decreased  
academic  
success**

**Limited  
availability of  
MH services;  
universities are  
failing to meet  
the needs of  
students**

# Purpose

- Determine whether there is a difference between college students receiving NF training (*vs those who do not*) and anxiety, depression, and stress scores over time
  - *Treatment group*: 16 sessions of NF training
  - *Control group*: assessments/cortisol only; no NF training sessions



# Research Questions

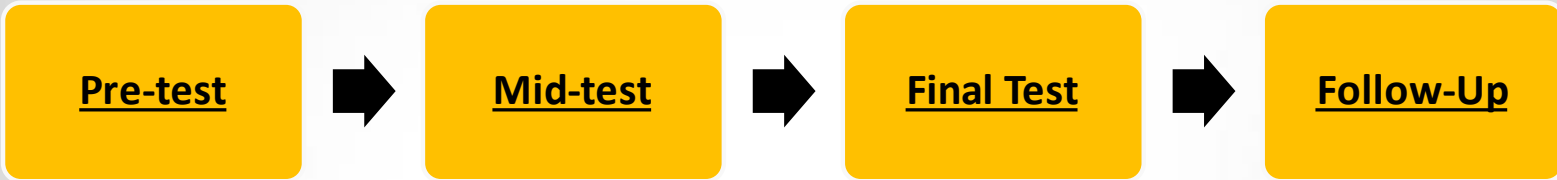
- **Primary Research Question:**
  - Does Neurofeedback (NF) training reduce anxiety, depression, and stress scores over time for the treatment group as compared to the control group? If yes, how much do participants' anxiety, depression, and stress scores decrease over time?
- **Exploratory Research Question 1:**
  - Does NF training reduce anxiety, depression, and stress scores for the treatment group over time? If yes, how much do **treatment group** participants' anxiety, depression, and stress scores decrease over time?
  - Does NF training reduce anxiety, depression, and stress scores for the **control group** over time? If yes, how much do control group participants' anxiety, depression, and stress scores decrease over time?

- **Exploratory Research Question 2:**
  - Is there a significant difference in mean scores over time between the treatment group and control group depending on specific demographic variables?
- **Secondary Research Question:**
  - Is there a significant difference in cortisol levels over time between the treatment and control groups?
- **Exploratory Research Question 3:**
  - Is there a relationship between treatment group and control group participants' BAI, PSS, BDI-II, and SAT scores and their cortisol scores at each time point?

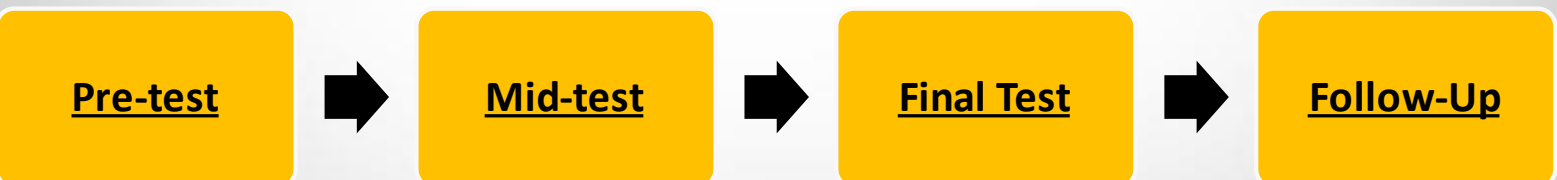
# Research Design

- Quasi-experimental, nonequivalent control group design

## Treatment Group (16 NF training sessions)



## Waitlist Control Group (assessments/saliva only)





# Sampling & Recruitment

- **Convenience sampling**, with inclusionary criteria
  - *For example*: no hearing impairment; at least part-time; self-report of anxiety/worry/nervousness/stress

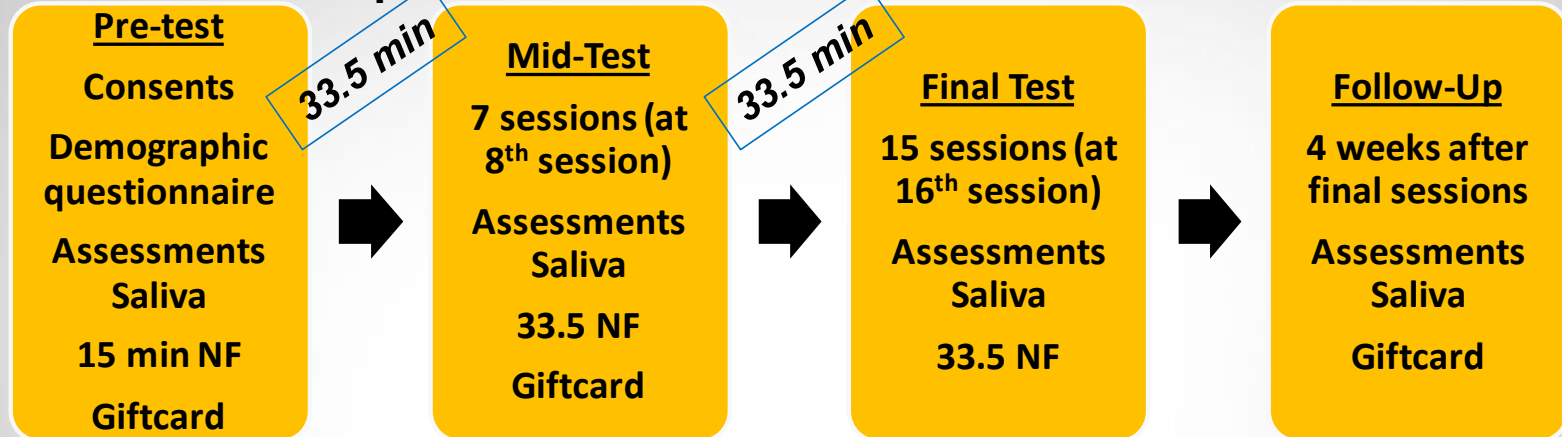
## Recruitment

- **Classrooms**
  - Psychology courses; Engineering & Computer Science; Health Sciences; Career
- **Flyer was created for advertising**
  - SARC, FYAE, Graduate Studies, & bulletin boards
  - Email to faculty and staff members
  - Social media pages for Counselors

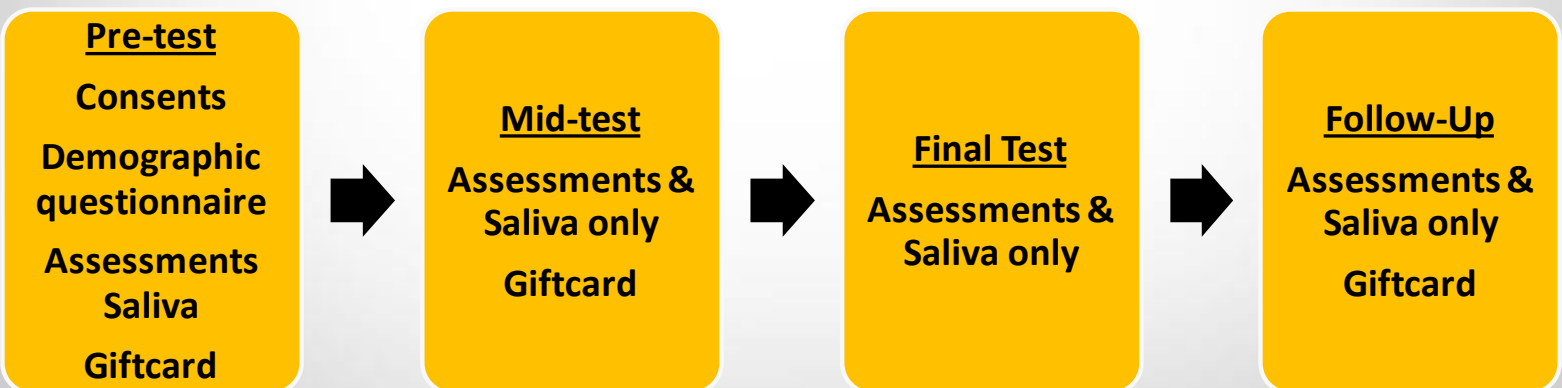
# Procedures

- IRB approval → Recruitment → Screening phone call

## Treatment Group



## Waitlist Control Group



# Results

## Exploratory RQ1: Treatment Group (RM-MANOVA)

### Multivariate Test (Within-Subjects)

Wilks' $\lambda$	$F$	$p$	partial $\eta^2$	Obs. Power
.290	$F_{(12, 37)} = 7.53$	< .001	.71	1.00

### Univariate Tests (Test)

Test	$F$	$p$	partial $\eta^2$	Obs. Power
<i>BAI</i>	$F_{(3, 144)} = 21.24$	< .001	.31	1.00
$\wedge$ PSS	$F_{(3, 144)} = 14.66$	< .001	.23	1.00
$\wedge$ BDI-II	$F_{(3, 144)} = 13.55$	< .001	.22	.99
<i>SAT</i>	$F_{(3, 144)} = 40.61$	< .001	.46	1.00

# Results

## Exploratory RQ1: Control Group (RM-MANOVA)

### Multivariate Test (Within-Subjects)

Wilks' $\lambda$	$F$	$p$	partial $\eta^2$	Obs. Power
.404	$F_{(12, 8)} = .985$	.526	.60	.239

### Univariate Tests (Test)

Test	$F$	$p$	partial $\eta^2$	Obs. Power
<i>BAI</i>	$F_{(3, 57)} = .907$	.443	.046	.237
<i>PSS</i>	$F_{(3, 57)} = .778$	.511	.039	.207
<i>^BDI-II</i>	$F_{(3, 57)} = .440$	.667	.023	.120
<i>^SAT</i>	$F_{(3, 57)} = 3.565$	.046	.16	.581

# Results

## Exploratory RQ2: Demographics (RM-MANOVA)

### Multivariate Test (Within-Subjects)

Demo. Variable	Wilks' $\lambda$	$F$	$p$	partial $\eta^2$	Obs. Power
Age	.585	$F_{(24,84)} = 1.075$	.389	.235	.769
Race/Ethnic.	.521	$F_{(24,84)} = 1.374$	.161	.278	.879
Gender	.553	$F_{(24,84)} = 1.207$	.261	.256	.829
Major	.446	$F_{(36,125)} = 1.091$	.353	.236	.894
Counseling	.546	$F_{(48,164)} = .581$	.985	.140	.630

# Limitations

- **Research Design**
  - Quasi-experimental
    - Lack of randomization
  - Different facilitators; pts may have developed rapport
  - Maturation effects (over 12 week period)
  - History effects
    - Hurricane Irma
    - Some pts reported beginning counseling/psychiatric care after beginning study
  - Music plays with audiofeedback; could make pts calm
- **Sampling**
  - Majority of participants from UCF (difficult to generalize)
  - Over 20% receiving current counseling
- **Instrumentation**
  - Social desirability (use self-report assessments)
  - Cortisol collection procedures



# Thank you!

## Questions?

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