Stress and Performance Anxiety Intervention for Musicians: A Biofeedback and Compassion Focused Therapy Intervention

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Previous Research and Meta-Analysis
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Psychopathology in Musicians: Help Musicians UK survey

- Depression: 65%
- Anxiety: 71%
- Relationship difficulties: 66%
- Panic attacks: 70%

Figure 1. Results from Help Musicians UK survey
Correlational Research

- Chronic cortisol elevation
  - Inflammation ([Kenny & Ackermann, 2015]).
  - Social – poor social contact (Pilger, Haslacher, Ponocny-Seliger, Perkmann, Böhm, Budinsky, & Winker, 2014).
  - White matter changes (McEwen, 2004)

- Negative Feedback Loop
  - Difficulties with performance lead to negative performance and then avoidance of performance

- Maladaptive coping strategies
  - 90% sought help,
    - Most widely used sources were friends and social networks (Dew and Williams, 1989).
    - Or excessive alcohol (Kenny, Driscoll, and Ackerman (2014)
    - These coping styles continue to be used, even when not successful (Langendörfer, Hodapp, Kreutz, & Bongard, 2006).

- Physiological:
  - Aim to change the physiological processes that increase the stress response

- Cognitive:
  - Intend to change thoughts that either increase anxiety or depressive symptoms or contribute to the maintenance of these thoughts

- Combination:
  - Address both the physical and cognitive symptoms and causes of performance anxiety.
Methods:

- 3 independent coders
- We identified 30 articles in English published between 1974 and 2018
- All 21 studies meeting the first two criteria (experimental design and use of classical musicians) were used to describe the types of studies.
- 17 studies that met full inclusion criteria were used to calculate effect sizes
- Effects sizes were compared for all studies, and then for studies by intervention category.
- Fail safe N analysis

Descriptive Statistics

Sample size
- The average sample size was 32 participants (range 14-66)
- The majority of the studies were done with college aged musicians currently attending music school (62%).

Recruitment
- Flyers hung in music department
- More homogenous samples not possible

Length
- Mode was 6 weeks (range 30 minutes to 15 weeks)

Outcome measures
- STAI, Music Performance Inventory
- 60% used biological marker
META ANALYSIS RESULTS

Overall effect Hedges g = -0.627 (95% CI [-0.926, -0.384], p<.0001)

- **Cognitive Interventions**
  - CBT, visualization, etc
  - Small effect size [Hedges g = -0.455]

- **Physiological Interventions**
  - Biofeedback, yoga
  - Moderate effect size [Hedges g = -0.638]

- **Combination Interventions**
  - Largest effect size [Hedges g = -0.813]

Dose Response

- Larger effects sizes were seen in the longest four studies (ranging between 8-14 weeks)
  - Hedges’ g = -0.776
  - Smaller effects in five shortest studies (ranging between 2-3 weeks) with an effect size of Hedges’ g = -0.528.

Meta regression:
- Each intervention reduced anxiety by $g = -0.33$
- Each additional week of intervention had continued reduction in anxiety of $g = -0.04$,
- though this finding is nonsignificant like due to sample size (95% CI [-0.089, 0.004]).

**However, more attrition in longer studies**


Common Confounds

- Pilot studies (lacking sufficient statistical power)
- Interventions not matched to population characteristics
- Outcome measures lacking ecological validity

NEXT STEP

- A large scale study to determine the effectiveness of these treatments.
- Evaluate the effectiveness and feasibility of a targeted treatment with college age musicians.
Study Aims and Questions:

1. Feasibility and acceptability of biofeedback intervention with classical musicians

2. Feasibility and acceptability of taking outcome measures in a already stressful situation

3. Examine perceived benefit of intervention from participant’s perspective
Study Design

- Two group pre and post assessment
- N = 5 HRV biofeedback
- N = 5 sham biofeedback
- 5 week intervention

Participants

Requirements:
- Music major
- Have an end of semester jury
- Be available for the visits

Exclusion Criteria:
- Use of beta blocker medication
- Use of cardiac medication
- Heart problems or high blood pressure
- Age over 40 years old
- Randomized before preliminary visit using online randomized
First and Last Visit (Same for all groups)

Preliminary Visit
• Fill out demographic surveys (measures to follow)
• Give initial cortisol sample
• Provide schedule for additional visits

Final Visit
• Will be scheduled for their required performance jury
• Cortisol sample and SPANE 15 minutes prior to scheduled time of performance
• Cortisol sample and SPANE 15 minutes post performance
• Thanked and debrief form

Heart Rate Variability (HRV) biofeedback
• The “process that enables individuals to learn how to change physiological activity for improving health and performance... The instruments then provide real time feedback to the user” (Schwartz, 2010)
• Heart rate variability- measuring the change in variability of time between heart beats (Lehrer, 2003)
• HRV Biofeedback increases variability by having participants breathe at resonant frequency and provides feedback about variation in HRV
Increasing HRV related to improvements in:

- asthma (Lehrer et al, 1997),
- heart disease (Cowan et al, 2001),
- irritable bowel syndrome (Humphreys & Gevirtz, 2000),
- major depressive disorder (Karavidas et al, 2007)
- headaches (Kang, Park, Chung, & Yu, 2009),
- generalized anxiety (Rice, Blanchard, & Purcell, 2013),
- panic disorder (Kim, Wollburg, & Roth, 2004)
- performance anxiety (Thompson, 2008; Vernon, 2005; Paul & Garg, 2012)

5 visit HRV biofeedback protocol (Lehrer et al, 2013):

- Focuses on teaching about HRV
- Establishing resonance frequency
- Teach low and slow diaphragmatic breathing
- Empirically supported for asthma, pain, anxiety, depression, and other psychophysiological disorders.

Sham biofeedback:

- Same session length as HRV group
- Not evaluated for RF
- Pacer set to 13 BPM
Mood and Personality:

BDI: Mean 7.6 (range 0-18) **Minimal Depression**

BAI: Mean 11.6 (2-25) **Mild Anxiety**

Almost Perfect Scale- Standards: Mean 44.1 (range 35-49)
- Standards score 42 and above = **perfectionist**

Almost Perfect Scale- Order: Mean 22 (range 11-28)

Almost Perfect Scale- Discrepancy: Mean 57.5 (37-78)
- Discrepancy score 42 and above = a **maladaptive perfectionist**
  (Rice & Ashby, 2007)

• Feasibility:
  - All 10 pilot spots filled up in less than 1 hour from being announced

• Acceptability:
  - High levels of both session attendance and homework completion
  - All 10 participants agreed to have cortisol collected at jury session
Mood during performance

15 minutes prior to jury performance, 50% of HRV group described their emotions are pleasant compared to 35% of sham group on SPANE.

• Despite increase stress near performance, HRV group maintained lower heart rate.
Full Study

Study purposes:

1. Compare primarily cognitive intervention to primarily physiological intervention

2. Look at ecological validity of intervention
   • Outcome measure in real life stressor (performance jury)
Groups

HRV biofeedback (as previously outlined)

Compassion focused therapy

Compassion Focused Therapy (CFT) is a multidisciplinary psychotherapeutic framework aimed at helping individuals develop compassionate mindfulness and cultivate feelings of inner warmth, safeness, and soothing (Gilbert, 2009).
• It is based on scientific principles found in evolutionary psychology, attachment theory, behaviorism, and cognitive behavioral therapy (Kolts, 2016).
• CFT draws heavily from Buddhist psychology and emphasizes both compassion to self and others.
• CFT uses mindfulness as a tool to deliberately train compassion and calm physiology.

Humans brain evolved at different times

Include an vigilant and elementary threat system WITH

The advanced ability to think and reason (Gilbert, 2010).
• CFT is guided by a specific model of affect regulation, which involves three systems, the threat system, drive system, and the soothing system (Gilbert, 2009).

• While each system is important, environment, psychopathology can contribute to overactivation of threat and underactivation of soothing systems
Our CFT protocol

- 5 visits
- Each visit consists of psychoeducation, discussion, and meditation
- Each participant will receive a handout packet with additional resources
- More of CFT “light”, so additional resources will be available online and in the handout packet

Preliminary Findings

- 15 HRV biofeedback participants
- 15 CFT participants
- Recruited from music classes and posters
- 57 asked for details and 30 were able to commit to the study
- 27 females, 3 males
- Mean age was 21
Pre Study Personality and Mood:

Dass-21:
- Stress: Mean 24 (range 8-40) Moderate
- Anxiety: Mean 19 (range 6-40) Severe
- Depression: Mean 13 (range 2-34) Moderate

Kenny Music Performance Anxiety Inventory
- 75% report “from early in my music studies, I remember being anxious about performing”
- 60% report excessive family worry and parental anxiety
- Most common symptoms were feeling sick prior to performance (hands shaking, nauseous, short of breath) and generalized anxiety
  - 90% said “Prior to, or during, a performance, I feel sick or faint or have a churning in my stomach”
  - 80% report being anxious for no reason
Compassionate Engagement and Action Scales:

Self compassion average 33.17
- US norms average was 59.13

Compassion for others average 44.55
- US norms average was 70.34

Compassion from others average 34.76
- US norms average was 54.91

• Higher visit and homework adherence in the CFT group
  • 80% CFT group completed all visits
  • 33% biofeedback group completed all visits
• 100% of participants agreed to have cortisol collected
• Common CFT themes: perfectionism, not being enough, family modeling imperfection is not acceptable, eating disorders

• Very little of the CFT discussion was about performance or performance related anxiety

• Several CFT participants requested continued therapy or physician referrals following study completion

Reactions to Biofeedback:

Overall, participants rated the intervention highly, even if they did not complete all visits

“Helped me sleep”

“It was hard to remember to do my homework, but when I did it, it didn’t take long and really helped me feel less anxious”

“It was easy to do before performances”
• Many musicians have clinically significant stress, anxiety, and mood disorders

• Personality characteristics (e.g. low self compassion) also make them susceptible to mood disorders

• Biofeedback, especially when combined with therapeutic interventions fits

• Both effect size and adherence higher when addressing cognitive components, e.g. adding CFT to biofeedback or referral to therapist

Next Steps:

• Continue CFT and HRV study

• Study biofeedback within CFT framework to increase adherence and address low levels of compassion and high levels of shame
Questions?