The Sound Mind Warrior Study

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Disclosures

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TriService Nursing Research Program (TSNRP)

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Research Team

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- **Research Coordinator**
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- **Research Mentor**
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- **Consultants**
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  - Dr Debra Burns
  - Dr Dale Glaser

- **Associate Investigators**
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  - Ms Geri Straber
  - CAPT George Ceremuga
The purpose of this study was to assess the efficacy of Binaural Beat Technology (BBT) on the cardiovascular stress response in a population of military service members with complaints of chronic stress following deployment.
What is Binaural Beat Technology?
Design, Setting and Study Population

**Design**: Prospective, randomized, double-blinded, repeated measures

**Recruitment Setting**:  
Walter Reed National Military Medical Center  
Fort Belvoir Community Hospital

**Participants**: 74 Participants  
Music with BBT (n=37)  
Music without BBT (n=37)
Inclusion Criteria

- Returned from deployment within the last 10 years (*initially 24 months)
- Eligible to receive healthcare at Walter Reed National Military Medical Center and Fort Belvoir Community Hospital
- 18 years and older
- Able to commit to 5-weeks
Exclusion Criteria

• Taking any medication in the anti-hypertensive anti-anxiety, and/or anti-seizure category
• Diagnosed with moderate to severe traumatic brain injury
• History of epilepsy
• Have a hearing deficit, wear a hearing aide, or have ear trauma
Wouldn’t it be great if you could use a sound technology to reduce stress, anxiety and possibly blood pressure?

Participate in our Sound Mind Warrior Study and find out!

Must have returned from deployment within the last 10 years.

Participants will receive two Exchange gift cards* ($100 value) and the innovative sound technology for free as a thank you!

*Fiscal employees must be well to receive any compensation.

Information Sheet
Pre-Screening Consent
Screening
Consent
Demographic Sheet
Randomized
Procedure
Procedure

Monroe Institute’s *Dreamland*
BBT (theta brainwave frequency)
minimum of 30 minutes
for 3 consecutive nights
for 4 weeks

*Daily Diary/Questionnaire*
At the end of 4 weeks...

- Participants were given...
  - An envelope letting them know which group they were in
  - CD with the audio files containing the music with BBT
  - Their pre and post HRV reports
  - Two $50 gift certificates
Demographics

Music Only = n 36
Music with BBT = n 38

<table>
<thead>
<tr>
<th></th>
<th>Music</th>
<th>Music with BBT</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61%</td>
<td>82%</td>
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<tr>
<td>Female</td>
<td>39%</td>
<td>18%</td>
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<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>37.94</td>
<td>38.29</td>
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<tr>
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</tr>
<tr>
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<td>Marital Status</td>
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<td>Single</td>
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<td>22%</td>
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<tr>
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<tr>
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<td>58%</td>
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<tr>
<td>Officer</td>
<td>31%</td>
<td>42%</td>
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HRV (Total Power)

\[ F(1, 57) = 4.39, \quad p = .041 \]
\[ (\eta^2 = .072) \]

Music Only (Pre = 2098.90; Post = 985.26) versus Music with BBT (Pre = 1249.75; Post = 1223.07).

< 1,000; Decrease in Total Power is observed in individual under chronic stress.
HRV (Low Frequency)

\[ F(1, 63) = 7.56, \quad p = .008 \quad (\eta^2 = .107) \]

Music Only (Pre = 66.42, Post = 74.41) versus Music with BBT (Pre = 77.83, Post = 75.33)

* Low Frequency is an indication of sympathetic activity
HRV (High Frequency)

\[ F(1, 63) = 7.56, p = .008 \]
\[ (\eta^2 = .107) \]

Music Only (Pre = 33.58, Post = 25.94) versus Music with BBT (Pre = 22.17, Post = 24.67)

* High Frequency is an indication of parasympathetic activity
Daily Diaries

**Tense at Work Yesterday**

- **Music Only**
- **Music with BBT**

The graph shows the proportion of 'yes' responses over different weeks for music only and music with BBT. The proportion remains relatively stable for music only, while music with BBT shows more variability.
Daily Diaries

Tense at Home Yesterday

- Prop 'Yes':
  - Week1/D1: 0.6
  - Week1/D2: 0.5
  - Week1/D3: 0.4
  - Week2/D1: 0.3
  - Week2/D2: 0.2
  - Week2/D3: 0.1
  - Week3/D1: 0.0
  - Week3/D2: 0.1
  - Week3/D3: 0.2
  - Week4/D1: 0.3
  - Week4/D2: 0.4
  - Week4/D3: 0.5

Lines:
- Music Only: Solid blue line
- Music with BBT: Dashed red line
Summary

- Those who used the technology exhibited less cardiovascular signs of chronic stress exposure when placed under a stressor.
- Those who used the technology stated that they felt less stressed when compared to the control group.
- If BBT (theta brainwave frequency) was able to decrease stress, could BBT (beta brainwave frequency) improve focus or BBT (delta brainwave frequency) improve sleep quality?
  - *The BEST Study (The Efficacy Brain Entrainment Sleep Technology in Military Healthcare Beneficiaries)*
- Better quality control measures and regulatory oversight are needed for this technology
Thank You!