INTRODUCTION

- PD- movement is impaired at 2 Hz and above
  - Affects buttoning, writing, and other ADL’s
  - Not Improved with treatment
  - Find a therapeutic approach
Rate Dependence of Brain Activity

Studies have shown that brain activity depends on the rate of movement. Healthy young adults show altered brain activity at movement rates greater than 2 Hz, with movement unaltered. In PD, brain activity is altered to a greater extent, and festination is often seen at ~2 Hz and greater, with movement altered.

Use of EEG data, with the beta band important.
Music as a Therapy

• Recent study by Leman et al. - movement amplitude increased even at high movement rates

• Young healthy adults
  • Stride length increased with activating music compared to relaxing.
  • Music rate did not change between conditions
  • Rate of music above 2 Hz
  • Suggests that music as therapy has potential to enhance movement amplitude at high movement rates.

• Brain activity associated with music to facilitate movement amplitude at high rates not studied
• Examine fine motor movement performance and associated motor cortical activity completing repetitive finger movements to activating and relaxing music, and a tone at low and high movement rates in young healthy adults.

• Inform future studies in PD.

• We hypothesize that activating music will increase movement amplitude, therefore increasing beta band power.
**METHODS**

- Participant demographics

<table>
<thead>
<tr>
<th># Participants</th>
<th>Gender</th>
<th>Dominant Hand</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>67% Male</td>
<td>Right</td>
<td>20-33</td>
</tr>
</tbody>
</table>
## METHODS

<table>
<thead>
<tr>
<th>Condition (4 trials each presented randomly)</th>
<th>Listen (30 Seconds)</th>
<th>Move (30 Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tone 1.5 Hz</td>
<td>Tone 1.5 Hz</td>
</tr>
<tr>
<td>2</td>
<td>Tone 2.5 Hz</td>
<td>Tone 2.5 Hz</td>
</tr>
<tr>
<td>3</td>
<td>Activating Music 1.5 Hz</td>
<td>Activating Music 1.5 Hz</td>
</tr>
<tr>
<td>4</td>
<td>Activating Music 2.5 Hz</td>
<td>Activating Music 2.5 Hz</td>
</tr>
<tr>
<td>5</td>
<td>Relaxing Music 1.5 Hz</td>
<td>Relaxing Music 1.5 Hz</td>
</tr>
<tr>
<td>6</td>
<td>Relaxing Music 2.5 Hz</td>
<td>Relaxing Music 2.5 Hz</td>
</tr>
</tbody>
</table>
METHODS

• Data Collection
• Finger Sensor and Electromyography (EMG)
  • Measure position and Movement onset
• EEG
  • 64 electrode cap
  • Analyzed according to movement onset
  • .5s before and after onset
  • Fast Fourier Transform
  • Average Beta Band Power
  • Normalized to Rest
• Electrode C3 (Primary Motor Cortex)
Results

- Appears that relaxing and activating see a significant decrease in Beta band power
• Not significantly different
• Non-Parametric Mann-Whitney-U test to examine statistical differences
• Small number of participants

• Results suggest that relaxing music at 70 beats per minute reduces beta band power

• Data from this study may be useful for future PD studies to provide a baseline.