Introduction:

- Physiology and Therapy
  - Physiological measurements are used by social scientists to gain insight into individual and couple experiences both inside and outside of the therapy room (Gottman, 1999)
  - Physiological linkage between the therapist and client has been found to result in higher client ratings of therapist empathy (Marci & Riess, 2009; Marci & Orr, 2006)

- The electroencephalogram (EEG)
  - Measures electrical brain activity, including brain activity that occurs during interpersonal interactions (Rowan, 2003)
  - EEG signals are recorded in wave form (Othmer, 2009)
  - Frontal alpha asymmetry is a measurement used to measure approach motivation and disengagement (Davidson, 2003; Harmon-Jones, 2007)
    - Greater activation in the left frontal lobe is indicative of approach motivation
    - Greater activation in the right frontal lobe is indicative of disengagement

- Empathy
  - Therapists are thought to reach empathic attunement with their clients by resonating with their clients' experiences (Johnson, 2004)

Hypotheses:

H1: Greater electrical activity in the left frontal region of the therapist's brain (indicative of approach motivation) is associated with higher client ratings of therapist empathy
H2: Greater electrical activity in the left frontal region of the therapist's brain (indicative of approach motivation) is associated with higher client ratings of the therapeutic relationship

Method:

- Participants were recruited from a marriage and family therapy clinic at a large southern university. A total of 8 couples and 5 therapists participated. Due to artifact in the EEG data, the sample was reduced to 9 individuals and 4 therapists.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Therapist</th>
<th>Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6(66.6%)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>Female</td>
<td>3(33.3%)</td>
<td>4(100%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>9(100%)</td>
<td>4(100%)</td>
</tr>
</tbody>
</table>

*Note. Sample percentages are included in parentheses.*

- Therapist frontal alpha asymmetry was monitored using the EEG during recorded therapy sessions. Each participant was fitted with an EEG cap manufactured by Media Factory that includes 21 channels of EEG. Electrodes were placed according to the International 10-20 system. The EEG recording included a resting, eyes closed baseline measurement as well as the 40-minute couple's therapy session. Data from the EEG was exported to Neuroguide for analysis and artifact removal.
Immediately following the therapy session, the client participants were asked to complete assessments about the therapist as well as the therapeutic relationship. The Barrett-Lennard Relationship Inventory (BLRI) was administered to rate therapist empathy (Barrett-Lennard, 1962) and the Working Alliance Inventory (WAI) was administered to rate the therapeutic alliance (Horvath & Greenberg, 1986).

Results:

Pearson correlations were calculated between therapist scores of frontal alpha asymmetry, client ratings of therapist empathy, and client ratings of the therapeutic alliance. The major findings revealed:

- A strong association between therapist alpha asymmetry and client ratings of therapist empathy ($r = .73, p < .05$)
- A strong association between therapist alpha asymmetry and client ratings of the therapeutic bond dimension of the therapeutic alliance ($r = .94, p < .01$)

<table>
<thead>
<tr>
<th></th>
<th>Empathy</th>
<th>Tasks</th>
<th>Bonds</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fp1/Fp2</td>
<td>-.44</td>
<td>.23</td>
<td>-.03</td>
<td>-.55</td>
</tr>
<tr>
<td>F3/F4</td>
<td>-.21</td>
<td>.18</td>
<td>-.23</td>
<td>.39</td>
</tr>
<tr>
<td>F7/F8</td>
<td>.73*</td>
<td>.35</td>
<td>.94**</td>
<td>.53</td>
</tr>
</tbody>
</table>

*Significant at *$p < .05$, **Significant at $p < .001$

Discussion:

The use of physiological measurements in therapy presents a unique way of increasing our understanding of therapeutic processes. The results of this study suggest a physiological component to empathy and to the therapeutic relationship. These results agree with earlier literature discussing physiological responses as they relate to therapy, but adds to the literature in that the physiological component measured in this study is electrical activity within the brain. Specifically, the results of the current study indicate that frontal alpha asymmetry is related to empathy and to the therapeutic relationship.

References: