POSITIVE EMOTION & PAIN: DOES AROUSAL MATTER?

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Why do we care about pain?

- Impact
- Complexity
- Mood’s contribution
Pain and emotion findings

- **Negative Affect (NA):**
  - NA induction leads to decreased pain tolerance times, increased sensitivity, and decreased threshold

- **Positive Affect (PA):**
  - PA leads to longer tolerance time, decreased sensitivity, and increased threshold
Mood is complex

Activated

Deactivated

PA

NA

Excited

Relaxed

Tense

Depressed

Feldman Barrett & Russell, 1998
Purpose

- Generally, pain studies are not controlling for complexity of arousal levels
  - Only one study investigating influence of high arousal PA (laughter) and low arousal PA (relaxation) on experimental pain reports (Cogan, Cogan, Waltz, & McCue, 1987)

- How is PA influencing general aches and pains in a healthy sample?
Study objectives

- Test whether subcomponents of PA can predict a measure of experimental pain
  - High arousal (active, intense, lively, enthusiastic)
  - Mid arousal (cheerful, happiness)
  - Low arousal (calm, relaxed)
Study design

- BL
- Mood
- *BP every 1-2 min.
- STRESS
- Recovery
- Pain
Pain intensity scale

- During the BP cuff inflation…
  - What was your highest level of pain? (0-10)
  - How much unpleasantness did you feel? (0-10)

- Write the number of the most appropriate word in the space beside the questions below.

<p>| | | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Mild</td>
<td>Discomforting</td>
<td>Distressing</td>
<td>Horrible</td>
<td>Excruciating</td>
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</table>

- Which word describes your pain right now?

- During the BP cuff inflation:
  - Which word describes your pain at its worst?
  - Which word describes your pain when it was at its least?

(Campbell et al., 2008; Mitchell & MacDonald, 2006)
Participants

- 115 undergraduate students
- 79.3% White, 5.0% Black or African American, 5.0% Asian, 5.0% Hispanic, 0.8% Multi-racial
- 54.8% Female, 45.2% Male
- Age $M=19.3$ years (SD=1.5 years, range 17-25 years)
- Pain Intensity Scale $M=10.2$ (SD=5.6, range 0-26)
Results

- **Covariates**
  - No associations with the outcome variable were found for age, ethnicity, BMI, or PSS10
  - Sex was associated with pain intensity ($r=0.27$, $p<.01$)
Controlling for sex…

\[ t = -2.20, \ p < .05 \]
Controlling for sex…

\[ t = 0.61, \ p = .55 \]
Controlling for sex…

![Graph showing pain intensity for low and high well-being groups with a t-statistic of -2.00, p < .05.](graph.png)
Controlling for sex…

![Graph showing pain intensity comparison between Low Calm and High Calm conditions. The graph indicates a statistically significant difference with t = -3.91, p < .001.](image)
Results

- Is it the absence of NA and/or stress from the task?
  - PA ($t=-2.21, p<.05$) and low arousal PA ($t=-3.15, p<.01$) remain significant predictors of less pain intensity even while controlling for sex, NA, and feelings of stress
  - Mid arousal PA ($t=-1.97, p=.05$) is marginally significant
Results

- Looking on the three components of PA...

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
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<tbody>
<tr>
<td>Pain Intensity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>2.72</td>
<td>1.00</td>
<td>0.24</td>
<td>2.71*</td>
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<tr>
<td>NA</td>
<td>0.12</td>
<td>0.09</td>
<td>0.13</td>
<td>1.29</td>
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<tr>
<td>PA_Hi</td>
<td>0.23</td>
<td>0.24</td>
<td>0.10</td>
<td>0.98</td>
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<tr>
<td>PA_Mid</td>
<td>-0.46</td>
<td>0.30</td>
<td>-0.16</td>
<td>-1.55</td>
</tr>
<tr>
<td>PA_Lo</td>
<td>-0.88</td>
<td>0.32</td>
<td>-0.26</td>
<td>-2.70*</td>
</tr>
</tbody>
</table>

Note: *p<.01
Conclusions

- High arousal PA not associated with pain intensity
  - Inconsistent with preliminary findings that the opioid system can be influenced through high-arousal PA pathways

- Low arousal PA findings support use of successful clinical interventions practicing relaxation techniques

- Future studies should use measures that include low arousal PA adjectives
  - Scales following circumplex model (Russell, 1980)
  - PANAS-X (Watson & Clark, 1999)
  - POMS-R (McNair, Lorr, & Droppleman, 1992)
References


Thank you!

Questions?
Extra Information
Sample characteristics

- BMI $M=24.9$ (SD=6.4)
- PSS10 $M=21.6$ (SD=3.0, range 14-29)
- POMS-Stressed item $M=0.8$ (SD=1.1, range 0-4)
- POMS-NA $M=11.9$ (SD=5.7, range 2-32)
- POMS-PA $M=19.1$ (SD=4.9, range 7-30)
- POMS-High Arousal $M=3.1$ (SD=2.6, range 0-10)
- POMS-Mid Arousal $M=4.2$ (SD=2.0, range 0-8)
- POMS-Low Arousal $M=6.3$ (SD=1.6, range 1-8)
Men vs. Women

- Men:
  - None of the variables were significant (high, mid, or low arousal PA in addition to NA)

- Women:
  - Mid arousal PA and NA were the only significant predictors
  - Low arousal PA was marginally significant ($t = -1.91$, $p = 0.06$)