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How Positive and Negative Affect Relate to Postoperative Pain in Children Undergoing Surgery

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INTRODUCTION

• The relationships between positive and negative affect and health outcomes have been investigated in a variety of conditions (Pressman et al., 2019). Positive affect has been shown to be correlated with lower levels of pain, and negative affect has been correlated with higher levels of pain (Finn et al., 2015; Janssen, 2002).

• Additionally, affect has been shown to be associated with pain postoperatively, in contexts such as knee, spinal, and heart surgery (Seebach et al., 2012). However, these studies primarily consist of adult self-reported pain, while few studies have examined child postoperative pain as it relates to positive and negative affect.

• Recent studies have looked at positive and negative affect particularly postoperatively, in contexts such as knee, spinal, and heart surgery (Hoggart et al., 2019). Positive affect has been shown to be correlated with depression and lower scores on depression, anxiety, and pain (Alper & Skoner, 2003).

METHOD

Participants: 56 patients from the Children’s Hospital of Orange County between the ages of 2 and 12 (Mean = 5.79, SD = 2.74); 61% male and 39% female; 56% Hispanic, 31% White, and 13% other

Procedures:

• Parents were recruited for a 12-week longitudinal study and were told they would fill out surveys both preoperatively and postoperatively.

• Parents reported on demographic characteristics before surgery on tablets in the hospital.

• On days 1, 3, and 7 after surgery, parents were emailed a Qualtrics survey link where they reported on their child’s pain and state affect.

MEASURES

Pain

Using the Numerical Rating Scale (NRS), parents rated their child’s pain from 0 (No Pain) to 10 (Severe Pain) from the prompt, “Please mark the number that shows how much pain or hurt your child has had.” The NRS is a reliable and valid measure used extensively in clinical settings (Williamson & Hoggart, 2003).

Affect Subscales

Affect was measured using a modified version of the Profile of Mood States Questionnaire (POMS) developed by Usala and Herzog (1989). The POMS has been used in past studies examining relationships between emotion and health (e.g., Cohen, Doyle, Turner, Alper, & Skoner, 2003; Pressman et al., 2009). The modified measure used in the current study consisted of 18 adjectives (see Table 1) assessing state negative and positive affect, which can be further divided into six subscales (three for both positive and negative). Participants respond to how their child has felt during the past 24 hours using the following intensity rating scale (0 = Not at all; 1 = A little; 2 = Moderately; 3 = Quite a Bit; 4 = Extremely).

Table 1. POMS

<table>
<thead>
<tr>
<th>POSITIVE AFFECT</th>
<th>NEGATIVE AFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>At ease</td>
</tr>
<tr>
<td>Well-behing</td>
<td>Calm</td>
</tr>
<tr>
<td>Vigor</td>
<td>Full of pep</td>
</tr>
<tr>
<td>HOSTILE</td>
<td>Hostile</td>
</tr>
<tr>
<td>ANGER</td>
<td>Anxious</td>
</tr>
<tr>
<td>ANXIETY</td>
<td>On edge</td>
</tr>
<tr>
<td>DEPRESSION</td>
<td>Unhappy</td>
</tr>
</tbody>
</table>

Analysis

Primary analyses were performed using linear regression for each subscale with pain as the dependent variable. Controls for type of surgery, age, ethnicity, and income were included in the models. Additional analyses including all the positive subconstructs, negative subconstructs, and both the positive and negative subconstructs were conducted to provide a more complete understanding of the relationships among the variables.

RESULTS

Table 2. Regression Coefficients Between Affect Subconstructs and Post-Surgery Pain

<table>
<thead>
<tr>
<th>Pain Model</th>
<th>Calm</th>
<th>Well-Being</th>
<th>Vigor</th>
<th>Anger</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>1</td>
<td>-1.141**</td>
<td>-1.352**</td>
<td>-1.08*</td>
<td>1.358</td>
</tr>
<tr>
<td>Day 2</td>
<td>1</td>
<td>-1.352**</td>
<td>-1.08*</td>
<td>1.358</td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td>1</td>
<td>-0.302</td>
<td>-0.713</td>
<td>-0.558</td>
<td>0.930</td>
</tr>
<tr>
<td>Day 4</td>
<td>1</td>
<td>-0.351</td>
<td>-0.217</td>
<td>-0.737</td>
<td>0.930</td>
</tr>
<tr>
<td>Day 5</td>
<td>1</td>
<td>-0.222</td>
<td>0.016</td>
<td>-0.312</td>
<td>-0.287</td>
</tr>
<tr>
<td>Day 6</td>
<td>1</td>
<td>0.202</td>
<td>-0.242</td>
<td>-0.794</td>
<td>-0.772</td>
</tr>
<tr>
<td>Day 7</td>
<td>1</td>
<td>-0.010</td>
<td>-0.249</td>
<td>-0.329</td>
<td>0.437</td>
</tr>
<tr>
<td>Day 8</td>
<td>1</td>
<td>0.659*</td>
<td>-0.528</td>
<td>-0.309</td>
<td>-0.472</td>
</tr>
<tr>
<td>Day 9</td>
<td>1</td>
<td>0.684*</td>
<td>-0.502</td>
<td>-0.206</td>
<td>-0.394</td>
</tr>
</tbody>
</table>

Analysis

• As shown in models 1–3 for positive affect, calm and well-being were related to less pain in the short-term, but the association faded by day 7. Mean pain intensity decreased by 78% (2.98 to 0.67) by day 7, suggesting that the influence of positive affect on pain is minimized when pain intensity is low.

• For models 4–6 examining negative affect and pain, depression accompanied higher levels of pain, even as pain waned.

• For models 7–9, in which multiple subconstructs were included, the influence of single subconstructs becomes less clear, highlighting the need for diverse and nuanced operationalizations of the positive and negative affect subconstructs.

• Due to the correlative nature of this study, causality cannot be determined; high levels of pain could be the primary factor in altering state affect.

CONCLUSION

REFERENCES


