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Emotion Regulation and Positive Affect in the Context of Salivary Alpha-Amylase Response to Pain in Children with Cancer: Physiology, Self-Report, and Behavior

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Abstract

Children with cancer are repeatedly exposed to aversive stimuli including painful procedures. Therefore, emotional regulation techniques may prove useful during such experiences and contribute to pain resilience. This study aimed to determine whether three different emotional regulation strategies (distraction, reappraisal and reassurance) impacted physiological, self- reported and behavioral pain responses in pediatric patients with cancer ages 6 to 18 years (N = 73). The cold pressor task (CPT), an experimental task in which pain is induced by having participants place their hand in cold water, was used to examine pain responses. Patients placed their hand in 7 degree Celsius water for up to 4 minutes. Saliva samples were collected 15 minutes before, immediately after, and then 15 minutes after the CPT. Saliva samples were assayed for alpha amylase, a proxy for sympathetic nervous system activation. Self-reported pain severity was measured upon hand removal. Pain tolerance was assessed by length of time participants kept their hand in the water. Children in the reassurance condition exhibited salivary alpha amylase levels that continued to rise post completion of the CPT as compared to children in the distraction (Beta = -1.68, SE = 0.73, z = -2.30, p = .021, 95% CI [-3.10, -0.25]) and reappraisal (Beta = -1.24, SE = 0.72, z = -1.73, p = .084, 95% CI [-2.65, 0.17]) conditions. However, when self-reported pain and behavior were examined, no differences in pain severity (Wald Chi-squared (2) = 2.47, p = .292), or pain tolerance (Wald Chi-squared (2) = 1.38, p = 0.502) among the emotional regulation strategies were observed. Thus, significant findings were present for physiological markers of distress, but not for self-reported and behavioral measures. These findings suggest that in terms of physiological measures, specific emotional regulation strategies, such as distraction and reappraisal, may be more beneficial in reducing stress responses to painful medical procedures in pediatric patients with cancer as compared to reassurance. These results also demonstrate the importance of examining physiological outcomes in addition to self-report and behavioral outcomes.

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Introduction

- Children with cancer are repeatedly exposed to aversive stimuli including painful medical procedures (Richardson et al., 2006).
- Emotional regulation techniques may prove useful during such experiences and contribute to pain resilience (Cohen et al., 2006).
- Distraction and reappraisal are commonly used emotion regulation techniques in interventions for pain management (Wolitzky et al., 2005; Bisignano et al., 2006).
- Reassurance is less commonly used in intervention work (Chorney et al., 2013).
- However parents regularly use reassurance with their children and this may be detrimental as it draws the child's attention towards their pain (Chorney et al., 2013).

Primary Question

How do emotion regulation strategies (distraction, reappraisal, and reassurance) impact physiological, self-reported and behavioral pain responses in pediatric patients with cancer?

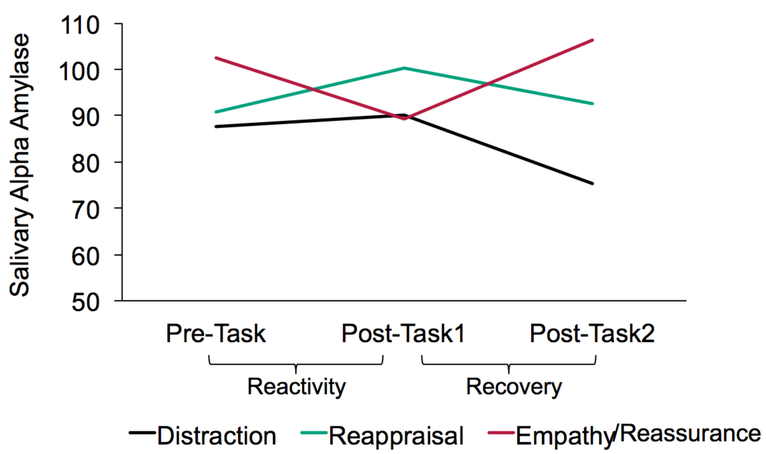
Study Design

sAA Pre-Task → Cold Pressor Task → sAA Post-Task 1 → Numeric Rating Scale → sAA Post-Task 2

Method

- 73 children (ages 6-18 years) undergoing treatment for cancer at Children's Hospital of Orange County (CHOC) participated in this study.
- Children were randomly assigned to one of three emotion regulation conditions: distraction (watched animal documentary), reappraisal (thought about how their participation will help other kids like them), or reassurance ("I'm really sorry you have to do this, I know how it feels").
- Cold Pressor Task (CPT)
  - Children placed their hand in a bucket of 7° C water.
  - Child removed their hand when they could no longer tolerate the pain.
- Main Outcomes
  - Physiological: Saliva samples were collected 15 minutes before CPT (pre-task), immediately after CPT (post-task 1), and 15 minutes after CPT (post-task 2). Saliva samples were assayed for alpha-amylase.
  - Self-reported pain: Children rated their pain using Numeric Rating Scale immediately upon hand removal.
  - Behavioral pain tolerance: Time of hand removal = pain tolerance

Emotion Regulation Strategies and Salivary Alpha-Amylase



Key Findings

- Children in the reassurance condition exhibited sAA levels that continued to rise post completion of the CPT as compared to children in the distraction condition (β = -1.68, p = .021).
- Children in the reassurance condition as compared to children in the reappraisal condition had a marginally significantly greater increase in sAA levels that continued to rise post completion of the CPT (β = -1.24, p = .084).
- No significant differences in self-reported pain severity (*Wald* $\chi^2(2) = 2.47$, p = .292) or behavioral pain tolerance (*Wald* $\chi^2(2) = 21.38$, p = .502) among the emotion regulation conditions.

Discussion

- Certain emotion regulation strategies such as distraction and reappraisal may weaken the stress response to painful medical procedures in pediatric patients with cancer.
- Reassurance directs the child's attention towards the pain without providing a way to reinterpret it.
- In the context of acute pain, reassurance may actually increase distress.
- Distraction and reappraisal may give the child a sense of self-control over the situation.
- Subjective and behavioral indicators of pain may not always match the physiological response to pain.
  - It is necessary to assess all three outcomes

References

- Bisignano, A., & Bush, J. P. (2006). Distress in Pediatric hematology-oncology patients undergoing intravenous procedures: Evaluation of a CD-ROM intervention. *Children's Health Care*, *35*(1), 61-74.
- Chorney, J. M., Tan, E. T., & Kain, Z. N. (2013). Adult–Child Interactions in the Postanesthesia Care Unit Behavior Matters. *Anesthesiology: The Journal of the American Society of Anesthesiologists*, *118*(4), 834-841.
- Cohen, S., & Pressman, S. D. (2006). Positive affect and health. *Current Directions in Psychological Science*, *15*(3), 122-125.
- Richardson, J., Smith, J. E., McCall, G., & Pilkington, K. (2006). Hypnosis for procedure-related pain and distress in pediatric cancer patients: a systematic review of effectiveness and methodology related to hypnosis interventions. *Journal of pain and symptom management*, *31*(1), 70-84.
- Wolitzky, K., Fivush, R., Zimand, E., Hodges, L., & Rothbaum, B. O. (2005). Effectiveness of virtual reality distraction during a painful medical procedure in pediatric oncology patients. *Psychology and health*, *20*(6), 817-824.

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