

Use of a Stress Induction Task to Study State Anxiety among Children Undergoing Cold Pressor Pain

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INTRODUCTION

- Many children undergo painful medical procedures (e.g., immunizations) and consider them to be one of their most feared experiences (Hart & Bossert, 1994)
- Anxiety has been shown to heighten children's pain perception (Rhudy & Meagher, 2003)
- Lab-based paradigms (e.g., cold pressor task) are frequently used to study pain in children and are ethically acceptable (Birnie, Noel, Chambers, von Baeyer, & Fernandez, in press)
- However, these approaches are limited in that they do not elicit the same level of state anxiety as clinical medical procedures do
- Stress induction tasks, such as the Trier Social Stress Test for Children (TSST-C), are frequently used to induce state anxiety in children in laboratory settings (Gunnar et al., 2009)
- This task has been shown to lead to heightened autonomic responses and self-perceptions of stress as well as a cortisol response (activation of the HPA axis; Gunnar et al., 2009)
- No study has examined the validity of the TSST-C among a sample of children also undergoing an experimental pain task

AIMS

The present study investigated:

- 1.) The validity of a novel stress induction technique for use with children prior to completing an experimental pain task (the cold pressor task)
- 2.) The impact of state anxiety on children's subjective pain experience

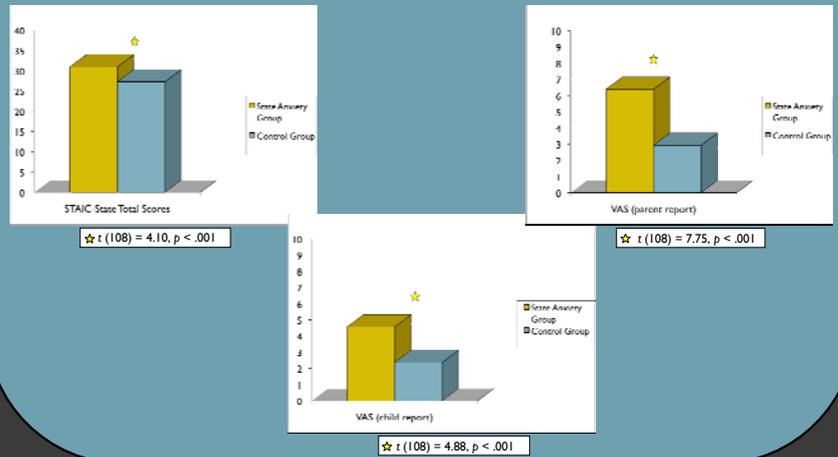
RESULTS

Validity of Modified TSST-C

- Prior to group assignment, children did not differ in baseline levels of state anxiety ($t(108) = .61, p > .05$)
- Following completion of the experimental and control tasks, children in the state anxiety induction group had higher levels of state anxiety on all measures (STAIC-s, VAS child, VAS parent)
- No participants withdrew from the study; no adverse events were reported
- 100% of participants agreed to complete follow-up telephone interviews 2 weeks later
- 99.1% of participants completed a second laboratory pain task 1 month later

State Anxiety and Pain

- Following the pain task, children in the state anxiety induction group did not report significantly higher levels of pain intensity, pain affect, or pain-related fear
- However, across groups, higher levels of state anxiety as measured by the STAIC-s were related to higher pain affect ratings ($r = .24, p < .05$)



METHOD

PARTICIPANTS

• 110 healthy children (60 males; 50 females) aged 8-12 years ($M_{age} = 9.45, SD = 1.35$) randomly assigned to experimental groups



PROCEDURE

- Children provided baseline ratings of state anxiety (VAS)
- Children were randomly assigned to complete either the:
 - 1.) State anxiety induction task (modified Trier Social Stress Test for Children; TSST-C): anticipated having to give a speech and perform difficult mental arithmetic in front of judges
 - 2.) Control task: anticipated watching a nature video
- Children's reactions were monitored, a registered psychologist was available if needed, children were later debriefed
- Measures of child state anxiety were completed by children (STAIC-s, VAS) and parents (VAS)
- Children completed the cold pressor task and pain measures
- Children were then told they did not have to complete the stress induction or control tasks and were fully debriefed
- Children completed follow up studies with the same research team 2 weeks (telephone interview) and 1 month later (lab visit)



MEASURES

- State Anxiety: State Trait Anxiety Inventory for Children (STAIC-s; Spielberger, 1973) and 10 cm Visual Analogue Scale (VAS)
- Pain Intensity: Faces Pain Scale-Revised (FPS-R; Hicks et al., 2001)
- Pain-related Fear: Children's Fear Scale (CFS; McMurtry et al, in press)
- Pain Affect: Facial Affective Scale (FAS; McGrath et al., 1985; McGrath, 1990)



Pain Intensity (FPS-R)



Pain-related Fear (CFS)



Pain Affect (FAS)

CONCLUSIONS

- Results suggest that the modified TSST-C is a valid and acceptable stress induction technique for use with children in an experimental pain context because:
 - 1.) It heightens state anxiety among children who complete the task
 - 2.) No adverse events were reported
 - 3.) All participants provided consent/assent and subsequently participated in follow-up studies with the same research team
- Across groups, children with higher levels of state anxiety tended to report higher levels of pain affect following the cold pressor task
- Future research should examine the impact of state anxiety in other experimental pain contexts (e.g., water load task, thermal pain, etc.) and on behavioral and physiological measures of pain