

# PREDICTING PARENT PHYSIOLOGICAL AROUSAL DURING TODDLER VACCINATION: THE RELATIVE CONTRIBUTIONS OF SUBJECTIVE APPRAISALS AND CHILD BEHAVIOUR



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## Introduction

### Background:

- Parents play an important role in managing children’s pain-related distress, especially in the toddler years when children have limited capacity for autonomous self-regulation (Pillai Riddell et al., 2013).
- A key mechanism of the parental impact on child pain-related distress is through parents’ own physiological regulation (DiLorenzo et al., 2021) and it is critical to better understand predictors of parent physiological arousal during toddler vaccination.

### Aim of the Present Study:

Our objective was to examine how much of parent physiological arousal before and after the needle is based on child behavioural distress after accounting for parents’ subjective appraisal of distress and child pain.

## Methods

### Participants:

The study included a collapsed sample of children ( $n = 108$ ) who participated in two waves (18 and 24 months) of a longitudinal study (the OUCH Cardio Cohort). .

### Procedure

Physiological and behavioural measures were assessed immediately before the first needle and immediately, one and two minutes after the last needle. Parent heart-rate was averaged over 30-second epochs using the MindWare analysis system (HRV Analysis 3.1.3.). Videotapes of immunizations were recorded and coded and child behavioural distress was coded in 15-second epochs using the Face, Legs, Activity, Cry, Consolability Scale (FLACC; Merkel, Voepel-Lewis, Shayevitz, & Malviya, 1997). Parent subjective appraisal of distress and child pain were assessed through parent ratings of their pre- and post-needle worry as well as post-needle appraisals of children’s pain.

## Analyses & Results

### Analyses:

Three hierarchical linear regression models were estimated predicting parent heart rate at three timepoints (i.e., immediately post-needle, 1 minute post-needle, 2 minutes post-needle). Parent variables were entered in the first block (i.e., pre-needle worry, post-needle worry, post-needle pain appraisal) and child variables were entered in the second block (i.e., child FLACC).

### Results:

**Main Findings:** Child baseline behavioural distress predicted parent heart rate immediately post-needle, after accounting for parental subjective appraisals. At one- and two-minutes post-needle, parent heart rate was only predicted by their post-needle pain appraisal.

Table 1 – Summary of multiple regression analyses for parent heartrate throughout vaccination appointment

Variable	<i>B</i> ( <i>SE</i> )	$\beta$	Adjusted <i>R</i> <sup>2</sup>
Parent Heart Rate Immediately Post-Needle			
Step 1			0.00
Parent Pre-Needle Worry	0.22 (0.65)	0.04	
Parent Post-Needle Worry	-0.89 (0.79)	-0.14	
Parent Post-Needle Pain Appraisal	1.02 (0.67)	0.18	0.03
Step 2			
Child Baseline Behavioural Distress	1.05 (0.50)	0.25*	
Child Behavioural Distress Immediately Post-Needle	-0.43 (0.67)	-0.08	Parent Heart Rate 1 Minute Post-Needle
Step 1			
Parent Pre-Needle Worry	0.13 (0.63)	0.02	
Parent Post-Needle Worry	-0.48 (0.76)	-0.07	0.02
Parent Post-Needle Pain Appraisal	1.33 (0.67)	0.23*	
Step 2			
Child Baseline Behavioural Distress	0.42 (0.52)	0.10	0.00
Child Behavioural Distress Immediately Post-Needle	-0.28 (0.68)	-0.05	
Child Behavioural Distress 1 minute post-needle	0.29 (0.53)	0.07	
Parent Heart Rate 2 Minutes Post-Needle			
Step 1			0.01
Parent Pre-Needle Worry	-0.13 (0.6)	-0.02	
Parent Post-Needle Worry	-0.56 (0.73)	-0.09	
Parent Post-Needle Pain Appraisal	1.26 (0.63)	0.24*	0.00
Step 2			
Child Baseline Behavioural Distress	0.56 (0.48)	0.14	
Child Behavioural Distress Immediately Post-Needle	-0.52 (0.65)	-0.10	0.00
Child Behavioural Distress 1 minute post-needle	0.16 (0.54)	0.04	
Child Behavioural Distress 2 minutes post-needle	0.37 (0.56)	0.08	

Note. \*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .  
Note. *B* = unstandardized regression coefficient; SE = standard error of unstandardized regression coefficient;  $\beta$  = standardized regression coefficient

## Conclusions

- Our findings suggest that initial parent physiological arousal is based on immediately prior child behavioural distress. As the appointment progresses, parental subjective appraisals of distress are more impactful.
- Child distress prior to the needle appears to set off a cascade of physiological arousal in the parent that may be difficult to mitigate.
- The results underscore the importance of managing child distress prior to a needle.

## References

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