

# Parents' biological reactivity to child distress: Potential implications for pain management

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## Background and Objective

Parents' behavioural responses are a critical determinant of young children's pain-related distress regulation. However, parents' ability to accurately assess and appropriately respond to children's pain relies on their ability to manage their own stress responses, which are triggered by witnessing their child in distress.

To date, minimal research has explored parents' biological stress responses in pediatric pain contexts and how these stress responses relate to parents' soothing behaviours.

This systematic review aimed to synthesize the literature examining parents' biological stress responses to young children's (0-3 years) distress in pain and non-pain related distress contexts and examine concurrent associations between parents' biological stress responses and behaviours.

## Methods

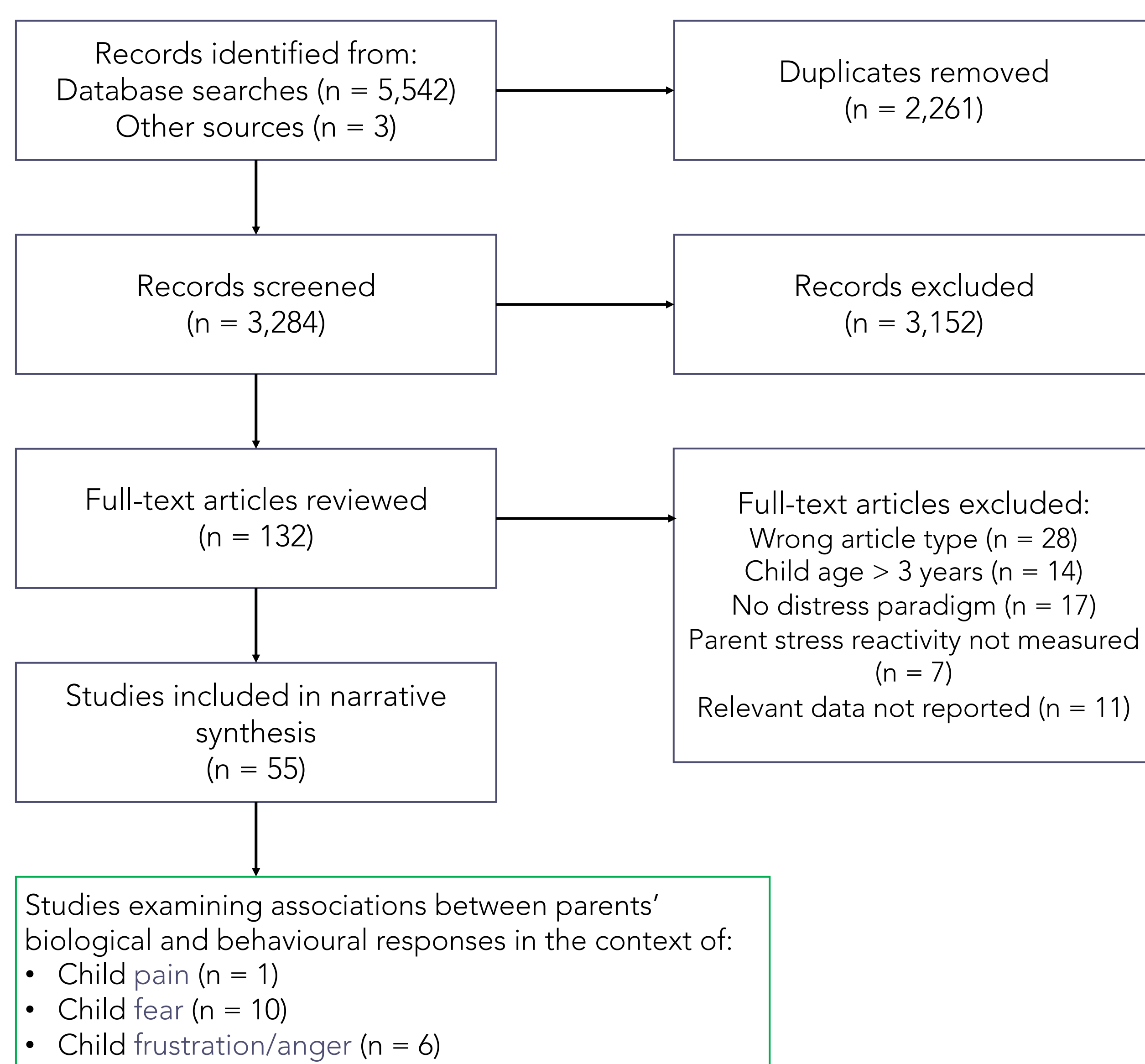
The study was pre-registered with the International Prospective Register of Systematic Reviews (#CRD42021252852). A systematic search of four databases (Medline, Embase, PsycINFO, CINAHL) was conducted. Studies that met inclusion criteria were reviewed using narrative synthesis techniques.

The following inclusion criteria were used:

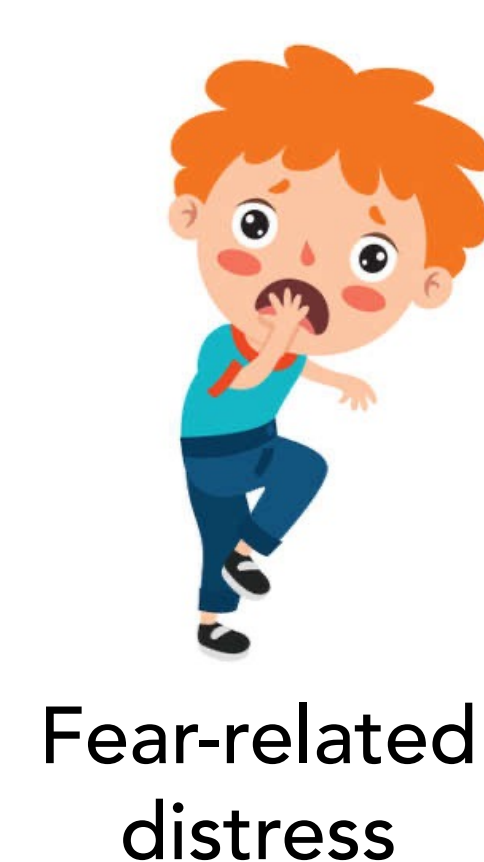
- Original peer-reviewed observational studies investigating young children (0-3 years) and parents during a dyadic pain-related (e.g., routine vaccination) or non-pain related (e.g., parental separation, Still Face Procedure, frustration paradigm) acute stressor
- Includes a measure of parents' biological response (e.g., autonomic nervous system, hypothalamic-pituitary-adrenal axis) to the stressor

## Results

Figure 1. Flow chart of included studies.



Are there associations between parents' biological and behavioural responses to their young children's distress?



Fear-related distress

- 10 studies examined biological indicators including respiratory sinus arrhythmia (RSA), heart rate, cortisol, and skin conductance in relation to parenting behaviours
- Few studies (2/13 analyses) identified significant concurrent associations between biological outcomes and **positive** caregiving behaviours (e.g., sensitivity, engagement, gaze synchrony)
- Parents' biological responses were more frequently (5/11 analyses) associated with **negative** parenting behaviours (e.g., disengagement, disrupted communication, insensitivity, hostility, intrusiveness, disengagement)



Anger-related distress

- 6 studies examined biological indicators including RSA, heart rate, cortisol, and skin conductance in relation to parenting behaviours
- A slightly higher proportion of studies linked parents' biological responses to **negative** parenting behaviours (4/7 analyses; overreactive discipline, expressed negativity) compared to **positive** parenting behaviours (3/8 analyses; collaboration, structuring, encouragement of self-regulation)



Pain-related distress

- 1 study examined parent cortisol in relation to parents' use of soothing behaviours pre- and post-vaccination
- This study found that parents who engaged in more soothing behaviours **pre-needle** had comparable cortisol responses to mothers who engaged in more soothing behaviours **post-needle**

## Discussion and Conclusions

- To date, only two studies have measured parents' biological stress responses during infants' pain (one of which measured associations with behaviour), and an understanding of the biological factors underlying parents' behavioural responses to child pain is lacking
- Research in non-pain related distress contexts provides preliminary evidence for associations between parents' biological and behavioural responses to child distress, and suggests that sub-optimal (vs. sensitive) parent behaviours may be reflective of parents' physiological stress
- The existing literature is limited by its focus on laboratory-based low- to moderately-stressful paradigms
- Additional research is needed to explore parents' biological and behavioural responses in the context of their child's pain, which has the potential to uncover the mechanisms through which parents' own experiences and self-regulation capacities can impact parents' ability to provide effective pain management for children