

## Postoperative Pain in Children: Association Between Anxiety Sensitivity, Pain Catastrophizing, and Female Caregivers' Responses to Children's Pain

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**Abstract:** This study investigated the association between anxiety sensitivity and pain catastrophizing in children, caregivers' anxiety sensitivity and catastrophizing about children's pain and responses to children's pain, pain intensity reported by children, and pain intensity estimated by caregivers. The participants were 102 children scheduled for outpatient surgery and their female caregivers. Before the operation, caregivers' catastrophizing about children's pain, children's pain catastrophizing, and their anxiety sensitivity were assessed, as well as caregivers' responses to children's pain. Pain intensity reported by children and estimated by caregivers was evaluated after the operation and 24 hours afterward. Analyses were performed via path analysis. The results indicated that children and caregivers characterized by higher levels of anxiety sensitivity reported higher levels of pain catastrophizing and catastrophic thinking about children's pain, respectively. Caregivers with higher levels of catastrophic thinking about the children's pain reported higher levels of solicitousness and higher estimations of the children's pain intensity after the operation. Higher levels of children's pain catastrophizing were associated with more frequent responses of discouragement and higher pain intensity reported after the operation. These findings highlight the relevance of catastrophizing about children's pain and children's pain catastrophizing in the experience of postoperative pain in children.

**Perspective:** Path analysis was used to test a hypothetical model of the associations between anxiety sensitivity, catastrophizing, parental responses, and postoperative pain in children. The results highlight the association between children's and parents' pain catastrophizing and discouragement and solicitous responses and the role of anxiety sensitivity as a traitlike factor associated with catastrophizing.

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**Key words:** Pain catastrophizing, anxiety sensitivity, children, parental responses, postoperative pain.

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The experience of pain in children is influenced by the individual characteristics of the children and their caregivers. The theoretical model of pain empathy<sup>18,22</sup> proposed that perceiving others in pain is influenced by the characteristics of the person in pain ("bottom-up variables," eg, facial expressions) and by the individual characteristics of the observer ("top-down variables"). The observer's affective responses to facing the child's pain may consist of responses oriented to the self (eg, distress) and responses oriented to the other (eg, sympathy). Recently, the pediatric fear-avoidance model<sup>2</sup> has expanded the model of pain empathy<sup>18,22</sup> and has integrated the main findings of

research on pediatric pain into the theoretical framework of the fear-avoidance model.<sup>77</sup> This model emphasizes the reciprocal influences of child and parent factors in the development and maintenance of chronic pain. It establishes bidirectional relationships between parent psychological responses (eg, catastrophizing about child pain, anxiety sensitivity), child psychological responses (pain catastrophizing, anxiety sensitivity), and parent pain management behaviors in influencing child avoidance behaviors. The model also considers that child avoidance behaviors can directly influence parent psychological responses, which may indirectly influence parent pain management behaviors.

Among the personal characteristics of children and caregivers, anxiety sensitivity (AS) and pain catastrophizing play a central role in the child's experience of pain. AS is a traitlike personality construct defined as fear of anxiety-related sensations, specifically, fear of bodily sensations.<sup>54</sup> AS seems to amplify the intensity of experienced somatic sensations including pain.<sup>58</sup> Using experimental and clinical samples, several studies have investigated the association between AS and the experience of pain in children, showing that increased AS is associated with higher pain intensity,<sup>62-64</sup> impaired quality of life,<sup>65,41</sup> and increased disability.<sup>44</sup> The role of anxiety has been studied in the context of postoperative pain, finding that preoperative anxiety in children and adolescents was predictive of postoperative pain intensity<sup>50</sup> and analgesic consumption.<sup>35,40</sup> Also, children and adolescents who before the operation expected to have high levels of postoperative pain reported more pain after it.<sup>39,40</sup>

Pain catastrophizing is an exaggerated negative orientation toward pain experiences that comprises 3 elements: magnification, helplessness, and rumination thoughts.<sup>60</sup> Greater pain catastrophizing in children is associated with more pain intensity and disability,<sup>70,73</sup> increased pain expression, and social support seeking.<sup>69,74</sup> Only 1 recent study has investigated the role of AS and pain catastrophizing in relation to pediatric postoperative pain, finding that catastrophizing and pain anxiety, but not AS, predicted pain after the operation.<sup>49</sup>

Among the "top-down" influences, parent catastrophizing about children's pain has been associated with higher estimations of their children's pain<sup>24</sup>; for high-catastrophizing parents, observing their child in pain elicits an aversive state of increased self-oriented distress,<sup>9,26,67</sup> leading them to engage in solicitousness and discouragement responses.<sup>8,10,25,27</sup> Regarding AS, an experimental study found that parental AS predicted girls' AS, which in turn predicted the girls' pain intensity ratings.<sup>64</sup> In relation to postoperative pain, although a study found that parental anxiety and anticipated pain did not predict the adolescent's postoperative pain,<sup>40</sup> another study found that parental expectancy mediated the relationship between the child's expected and experienced pain during painful medical procedures.<sup>39</sup>

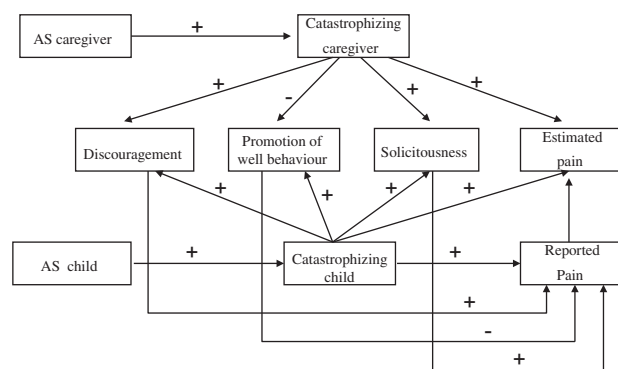
AS and pain catastrophizing are separate although highly related constructs. They share a common cognitive dimension—namely, a general tendency to cata-

strophize the meaning of unpleasant physical sensations.<sup>20</sup> One study has provided empirical support for the dimensional and componential structure of a hierarchical organization of pain-relevant negative emotional constructs.<sup>66</sup> This hierarchical model includes both pain catastrophizing and AS.<sup>66</sup> This conceptualization assumes that the componential constructs are interrelated and also considers that each component shows unique predictive variance for specific responses. In children and adolescents, AS has been found to be a unique predictor of pain catastrophizing.<sup>47,62</sup>

Parental behavior also influences the child's experience of pain. When parents focus on symptoms (solicitousness) and display negative responses (discouragement), their children show higher distress and report higher pain intensity.<sup>11,13,14,32,42</sup> Furthermore, children with high levels of emotional distress will be more affected by their parent's overprotective or critical behaviors.<sup>13,51,76,80</sup>

To our knowledge, the association between children's and caregivers' AS and pain catastrophizing, caregivers' responses to children's pain, pain intensity reported by children, and pain intensity estimated by caregivers has not been studied in relation to pediatric postoperative pain. The present study investigated associations between these variables in a sample of children who had undergone outpatient elective surgery.

A hypothetical model was tested (Fig 1). It was postulated that the higher the children's and caregiver's AS, the higher the children's pain catastrophizing and the caregiver's catastrophizing about children pain, respectively.<sup>20,47,62,66</sup> Children's and caregiver's AS were assumed to be correlated.<sup>64</sup> Also, higher caregiver's and children's catastrophizing were postulated to be associated with more frequent responses of solicitousness and discouragement and less frequent responses of



**Figure 1.** Hypothetical model. Abbreviations: AS caregiver: caregiver's anxiety sensitivity; AS child: child's anxiety sensitivity; Catastrophizing caregiver: caregiver's catastrophic thinking about child pain; Catastrophizing child: child's pain catastrophizing; Discouragement: caregiver response to child pain of discouragement; Promotion of well behavior/coping: caregiver response to child pain of promotion of well behavior/coping; Solicitousness: caregiver response to child pain of solicitousness; Reported pain-1: reported pain intensity by the child after the operation; Reported pain-2: reported pain intensity by the child 24 hours after the operation; Estimated pain-1: caregiver subjective estimation of child pain intensity after the operation; Estimated pain-2: caregiver subjective estimation of child pain intensity 24 hours after the operation.

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