

Parental responses to pain in high catastrophizing children: the moderating effect of child attachment

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Abstract: Studies in adults have shown that the effects of pain catastrophizing upon others vary from positive to negative responses. There are no studies, however, on the impact of catastrophizing in children upon responses of others. In addition, little is known, why catastrophizing varies with both positive and negative responses. Attachment may be one important moderator explaining these variable relationships. The present study in 1332 school children investigated, by means of child-report questionnaires, the relationships between pain catastrophizing and parental responses to pain, and the moderating role of child attachment. Findings indicated that a child's pain catastrophizing had a small but significant positive contribution in explaining child reports of both positive and negative parental responses to pain. However, this relationship was moderated by child attachment; for less securely attached children, higher levels of catastrophizing were associated with more negative parental responses. On the contrary, for more securely attached children, higher levels of catastrophizing were associated with more positive parental responses. The present findings suggest that child attachment may partially explain the variable results regarding the impact of pain catastrophizing upon others' responses. The findings are discussed in terms of the function of pain catastrophizing in interactional processes between parents and children.

Perspective: This study in schoolchildren found preliminary evidence for the moderating impact of child attachment in understanding differential patterns of parental responses related to the child's pain catastrophizing. Further exploration of the mechanisms relating catastrophizing and attachment processes might contribute to a better comprehension of the interpersonal nature of pain catastrophizing

INTRODUCTION

Considerable research has indicated a robust association between pain catastrophizing and deleterious outcomes such as intensified pain and disability, both in adults and children^{47, 51}. Recent conceptualisations of pain catastrophizing as a communal coping strategy⁴⁷ have also focussed on the *interpersonal* nature of this construct. Specifically, studies in adults and children have revealed that high catastrophizers' appraisals of pain as extremely threatening and difficult to cope with may elicit attempts to seek support from others, for instance by overt and heightened display of their pain^{46, 47, 53}. In particular *emotional* support, which is assumed to have most impact upon alteration of threat appraisals⁵⁶, might be preferred²⁹. To the extent that heightened pain expression in high catastrophizers fosters help or care from others, this may, in essence, be conceived of as an adaptive orientation²¹. Studies in adults, however, have shown that an individuals' pain catastrophizing does not only elicit positive responses from others (e.g. the provision of emotional support)²⁰ but also negative responses (e.g. responding punitively)¹³. These latter type of responses have been found to be most important in explaining the negative impact of catastrophizing upon pain outcomes¹¹. Explaining this heterogeneity in social responses is therefore a challenge^{11, 13}.

Attachment processes may be particularly salient here. Specifically, considerable research has shown that secure attachment bonds have a positive influence on development throughout the life span by providing a sense of emotional support, closeness and continuity, especially during times of distress³⁶. Accumulating evidence also emphasises considering the importance of attachment as a developmental framework in the context of pain and pain catastrophizing^{37, 38, 43}. In particular, studies in adults have indicated that insecure attachment is associated with exaggerated negative appraisals of pain, feelings of incapability to deal with pain and excessive dependence upon others^{37, 43}, and may be considered as fundamental in

explaining why some individuals report higher pain catastrophizing³⁴. Following insecure attachment is characterized by a negative representation of the attachment figure in terms of unavailability and lack of responsiveness¹⁹, pain catastrophizing might therefore be more likely to elicit negative rather than positive responses from others. On the contrary, catastrophic reactions to pain in the context of secure attachment, although expected to occur to a lesser extent compared to insecurely attached persons, might elicit positive rather than negative responses from others.

These processes are particularly important in childhood. Specifically, previous findings have indicated that pain catastrophizing has an important role not only in understanding children's negative pain outcomes⁵¹ but also in understanding children's heightened pain expression^{52,53}. Communication of pain is particularly important in childhood; children are highly dependent upon parent attention and care and parents responses may thus fundamentally affect how the child experiences pain and how the child copes with the current pain and future pain⁴¹. Yet, to our knowledge, there are no studies on the impact of the child's pain catastrophizing upon others' responses, such as those of their parents. Therefore, a first aim of the present study was to explore the relationship between the child's pain catastrophizing and child-perceived parental positive and negative responses to pain. Following adult findings indicating pain catastrophizing elicits both positive and negative social responses and the importance of attachment for catastrophizing, a second aim was to explore the moderating role of child attachment in understanding differential parental responses associated with the child's catastrophizing. We expected that higher levels of the child's catastrophizing would be related to heightened parental negative responses in less securely attached children, but to heightened positive responses in more securely attached children.

METHOD

Participants

Twenty-three Flemish schools in grades 4 through 9^a were contacted. Eleven schools agreed to participate. Of the 2016 parents and children approached, parental informed consents and child assents were obtained for 1376 children^b. Three of these children did not participate because of school absence due to illness when questionnaires were administered (response rate = 68.11%; 673 boys, 700 girls). No data is available for non-responders, except for grade level which did not differ between those children who participated and those who did not participate. The mean age of the sample of children was 12.60 years (SD = 1.53, range 9.33 years to 16.58 years). 13.6 percent of the children (n = 187) were recruited from the fourth grade, 16.9% (n = 232) from the fifth grade, 14.6% (n = 200) from the sixth grade, 30.3% (n = 416), 17.3% from the seventh grade, (n = 237) from the eighth grade, and 7.4% (n = 101) from the ninth grade. The final sample for which complete data were available consisted of 1332 children: invalid composite scores (more than 25% of the items of a given questionnaire not answered) were coded as missing values. There were no other exclusion criteria specified.

Measures

Catastrophic thinking about pain was assessed with the Dutch version of the *Pain Catastrophizing Scale for Children (PCS-C)*¹⁵. This instrument is an adaptation of the adult Pain Catastrophizing Scale⁴⁵. The PCS-C consists of 13 items describing different thoughts

^a The rationale for selecting children from grades 4 through 9 is based upon age ranges for which questionnaires have shown to be reliable and valid

^b The present study was a larger study with multiple purposes; (1) Using a vignette methodology, part of the parents filled out a series of vignettes about parenting distress related to their child's pain and (2) To investigate the predictive value of the child's pain catastrophizing, part of the children were requested to fill out measures on pain, catastrophizing and disability six months later.

and feelings that children may experience when they are in pain. Children rate how frequently they experience each of the thoughts and feelings when they are in pain, using a 5-point scale (0 = 'not at all', 4 = 'extremely'). The PCS-C yields a total score that can range from 0 to 52, and three subscale scores for rumination, magnification and helplessness. The PCS-C has shown to be a reliable and valid instrument in children from grades 4 to 10¹⁵.

Pain severity was assessed by two *Visual Analogue Scales* (VAS). Children rated their 'most severe pain' in the past three weeks and their 'present pain severity' on a 100 mm VAS with the end points 'no pain' and 'a lot of pain'. The pain severity VAS has a good reliability and validity in children 9 to 15 years old³³. As the various forms of the VAS are usually correlated²⁷, we calculated, in line with previous studies (see e.g. 15), the mean score of 'present pain severity' and 'most severe pain' as an index of pain severity. Further, frequency of pain episodes (0 = 'none', 4 = 'constant') during the last two weeks was assessed.

Parental positive and negative responses for pain, as perceived by the child, were assessed by means of two subscales drawn from the *Social Consequences of Pain Questionnaire*: 'positive attention (PA)' and 'negative attention (NA)' (SCPQ)⁵⁴. The SCPQ is based upon the Illness Behaviour Encouragement Scale⁵⁵ (IBES) and stems from an operant conditioning model to pain. The SCPQ has been found to be valid and reliable in a clinical sample of children with abdominal pain⁵⁴. The PA and NA subscales, which tap *emotional* support, were administered as this type of support is hypothesized to be searched after in high catastrophizing individuals^{29, 47} and is assumed to have most impact upon alteration of threat appraisals and anxiety⁵⁶. For this study, some adaptations were made. First, the stem 'When I have a bad stomach ache...', was changed into the stem 'When you are in pain...' in order to be more applicable to children's general pain experience. Secondly,

items of the original positive attention (11 items; e.g. ‘... parents spend more time with you than usual) and negative attention (6 items: e.g. ‘...parents tell you not to make such a fuss about it’) subscales, which were translated into Dutch using the forward-backward method, were carefully reviewed. Only items that specifically referred to *parental emotional consequences* to the child’s pain were included. Therefore, items referring to consequences of teachers or peers (i.e. 3 items of the PA scale and 1 item of the NA scale), and items referring to instrumental consequences (2 items of the PA scale^c) were removed. In addition, 1 item was added^d to the NA scale (‘... parents tell you that you need to learn to be stronger’), resulting in a 6-item PA scale and 6 item NA scale. Consistent with the original scale, children rated how often parents engage in each item using a 5-point scale (0 =‘never’; 4 =‘always’). The PA and NA scale each yield a score that can range from 0 to 24. In the present sample, Cronbach’s alpha coefficients of the PA scale ($\alpha=.80$) and NA ($\alpha=.70$) scale were acceptable. As this scale was used for the first time, the factor structure of the two scales was examined by means of confirmatory factor analysis (CFA) using Amos 5.0^{2,3}, in order to investigate the construct validity of the PA and NA scale. The model fit was assessed using (a) χ^2 divided by the degrees of freedom (CMIN/DF); (b) the Root Mean Square Error of Approximation (RMSEA), (c) the Comparative Fit Index (CFI) and (d) the goodness of fit index (GFI). CMIN/DF ratios as low as 2 or as high as 5 indicate a reasonable fit³². A RMSEA value of 0.05 indicates a close fit and values up to 0.08 represent reasonable errors of approximation in the population¹⁰. CFI and GFI values greater than 0.90 indicate an adequate fit^{6, 48}. The two-factor model achieved acceptable fit for all fit measures at initial validation upon half of the present sample of children (i.e., CMIN/DF=3.42; RMSEA=.06; CFI=.92;

^c Pilot testing with the original SCPQ revealed that 2 items of the PA scale highly correlated with the ‘activity restriction’ scale.

^d This item stems from the ‘minimize’ subscale of the Adult Responses to Children’s Symptoms (ARCS) questionnaire⁵⁰, which is also based upon the IBES. Items of the minimize subscale discount and criticize the child’s pain, which falls within the content of the items of the NA scale. Careful inspection of both questionnaires (ARCS and SCPQ), however, showed that this item was not covered by any other NA item from the SCPQ.

GFI=.95) and cross-validation upon the remainder 50% of the present sample (CMIN/DF=3.48; RMSEA=.07; CFI=.92; GFI=.95). The standardized factor loadings and correlations between the two factors of the validated and cross-validated model are presented in Figure 1.

- Insert Figure 1 about here -

The Dutch version of the *Inventory of Parent and Peer Attachment (IPPA)*^{4, 44} was used to measure secure attachment of the child to mother and father. The IPPA consists of three subscales and provides an indication of reported security with specific attachment figures by measuring the child's trust in the availability and sensitivity of an attachment figure ('trust scale' e.g. 'My mother/father respects my feelings'), the quality of communication fostering comfort in the relationship with an attachment figure ('communication scale' e.g. 'I tell my mother/father about my problems and troubles') and the extent of anger, alienation and/or hopelessness resulting from an unresponsive or inconsistently response attachment figure ('alienation scale' e.g. 'I get upset easily at my mother/father')⁴. The IPPA is not designed to differentiate between attachment patterns, but measures a continuum of secure versus insecure attachment. The IPPA is 10-item self-report instrument using a 4-point likert scale (1= 'almost never' to 4 'almost always')¹². A total attachment score can be calculated by summing the communication and trust scale with the reversed scored items of the alienation scale. The IPPA has been administered twice, once in regards to fathers and a second time in regards to mothers. In the present study, peer attachment was not assessed. Separate scores were calculated for attachment to the mother and attachment to the father. In the present sample, these scores showed significant positive correlation ($r = .41, p < .0001$). For this reason, and because the PA and NA subscales (see above) also tap *parental* consequences as a unit, a mean attachment score to both parents was

calculated. A high score on the overall attachment scale (range 10-40) indicates higher levels of child secure attachment towards the parents. The IPPA has shown to be a reliable and valid instrument^{4, 12, 44}.

Procedure

Schools were contacted by research assistants, first by letter, then by phone or a visit. After consent was obtained from the school principal, teachers and parents received a letter in which the purpose of the study was explained. Written informed parental consent, and child assent, was obtained. Questionnaires were administered to the children during regular school hours. This study was approved by the ethical committee of the Faculty of Psychology and Educational Sciences of Ghent University.

RESULTS

Descriptive statistics

Mean scores, standard deviations, Cronbach's α coefficients and Pearson correlation coefficients between all child measures are presented in Table 1. Findings indicated that the child's mean pain intensity was low ($M= 27.73$; $SD = 22.98$). The mean level of catastrophic thinking about pain was also low 12.33 ($SD = 7.72$). The mean child attachment to both parents as a unit was 31.89 ($SD = 4.27$). Mean levels of child pain catastrophizing, pain intensity, and child attachment are comparable with findings in other samples of school children^{9, 12, 15, 51}. In addition, the majority of the school children (75 %) reported at least one pain experience in the past two weeks. Of these children, 22.7% reported having experienced pain 'only once', 40.2% 'sometimes', 9.6% 'often' and 2.5% reported experiencing 'constant' pain. These

findings are also in line with ones obtained previously⁴² and further indicate that pain is a common experience and complaint in childhood and adolescence.

- Insert Table 1 about here -

Correlations

Of particular interest for this study were the correlations between the child's pain catastrophizing, child-reported positive and negative parental responses, and child attachment (see Table 1 for an overview of all correlation coefficients). Correlation analyses revealed some small but significant correlations. Specifically, pain catastrophizing was positively related with child-reported negative parental attention, but not with positive parental attention. Of further interest, catastrophizing was significantly negatively correlated with child attachment, indicating that higher levels of catastrophizing were associated with lower levels of child secure attachment.

Explanatory value of pain catastrophizing

Two hierarchical regression analyses were conducted to examine the unique contribution of pain catastrophizing in explaining the child's report of parental emotional responses to pain; i.e. positive parental attention and negative parental attention to pain. A summary of these analyses is presented in Table 2. In each analysis, the child's sex (boys coded as 0, girls coded as 1) and age were entered in step 1 to control for possible effects of these sociodemographic variables. In the second step, the child's mean pain intensity was entered. In the final step, pain catastrophizing was entered. The variance-inflation factors (VIF) of these regression analyses were acceptable (range 1.01-1.14), suggesting that there was no problem of multicollinearity.

Value of pain catastrophizing in explaining child-reported parental responses to pain

Regression analyses (see table 2) indicated that child-reported *positive parental attention* to pain was related to the child's age and the child's mean pain level. In particular, older children reported less positive parental attention than younger children ($\beta=-.16$, $p<.0001$). Higher levels of pain were associated with child reports of less positive attention ($\beta=-.16$, $p<.0001$). In addition, when sex, age and pain intensity were controlled, the child's pain catastrophizing also ($\beta=.07$, $p < .05$) had a significant positive contribution in explaining positive attention to pain from the parents, indicating that higher levels of pain catastrophizing were associated with higher child reports of positive parental attention to pain.

The analysis with child-reported *negative parental attention* as dependent variable revealed a significant association with the child's sex ($\beta=-.10$, $p<.0001$), with girls reporting less negative attention than boys. The child's age ($\beta=.03$, ns) had no significant contribution. Mean pain level ($\beta=.16$, $p<.0001$) had a significant positive contribution, with higher levels of pain related to higher levels of negative attention. Similar to the analysis with positive attention, higher levels of child catastrophizing ($\beta=.07$, $p < .05$) were associated with higher child report of negative parental attention to pain.

- Insert Table 2 about here -

Catastrophizing and child-reported parental responses to pain: the moderating role of child attachment

Additional analyses were performed to investigate whether child attachment moderated the relationship between catastrophizing and child-reported parental responses (i.e. positive attention, respectively negative attention to pain). Similar to the regression analysis reporting on the explanatory value of pain catastrophizing, we also controlled for sex and age (step 1) and pain intensity (step 2) in these moderation analyses. To test for child attachment

as a moderator, it is necessary to enter the cross-product terms of attachment and pain catastrophizing in a separate block in a hierarchical regression analysis (step 4), following the entry of attachment and pain catastrophizing as first-order terms (step 3) ^{5, 25}. To reduce the effects of multicollinearity, continuous variables were centered ¹. The variance-inflation factors of the moderation analyses were acceptable (range 1.01-1.15), suggesting that there was no problem of multicollinearity. Statistically significant interactions were interpreted by plotting regression lines for high (+1SD above the mean) and low (1 SD below the mean) values of the continuous moderator variable ^{1, 25}.

The moderation analysis with child-reported *positive parental attention* indicated that the interaction child attachment x catastrophizing was a significant predictor ($\beta = .06$, $p < .05$; $\Delta R^2 = .01$; Adjusted $R^2 = .21$), revealing that the association between pain catastrophizing and child-reported positive attention was conditional on the values of child attachment. To illustrate the pattern reflected in this statistically significant interaction term, we plotted regression lines for high (+1 SD above the mean) and low (-1 SD below the mean) values of the moderator variable ^{1, 25} (see Figure 2). Significance tests for both slopes showed that the slope for the High Child Attachment (secure attachment) regression line was significant ($\beta = .17$, $p < .0001$); Child reports of positive attention from parents was more pronounced at higher levels of pain catastrophizing, but only for children who reported high secure attachment. The slope for the Low Child Attachment (insecure attachment) regression line did not reach significance ($\beta = .05$, ns), indicating that catastrophizing was not associated with child reports of more positive attention from parents when the child reported to be insecurely attached.

The analysis with child-reported *negative parental attention* also revealed a significant interaction between child attachment and catastrophizing ($\beta = -.08$, $p < .005$; $\Delta R^2 = .01$; Adjusted $R^2 = .13$), revealing that the association between pain catastrophizing and negative

attention was conditional on the values of child attachment. Significance tests of the regression lines for high (+1 SD above the mean) and low (-1 SD below the mean) values of the moderator variable (see Figure 3) indicated that the slope for the High Child Attachment (secure attachment) regression line did not reach significance ($\beta = -.04$, ns). Catastrophizing did not have an impact upon child-reported negative parental attention to pain when the child reported to be securely attached to the parents. However, the slope for the Low Child Attachment (insecure attachment) regression line did reach significance ($\beta = .11$, $p < .005$), indicating that child-report of negative attention from their parents was more pronounced at higher levels of pain catastrophizing, but only when the child reported to be insecurely attached.

- Insert Figure 2 about here –
- Insert Figure 3 about here –

DISCUSSION

The present study investigated the relationship between children's pain catastrophizing and child-reported parental responses to pain, and the moderating role of child attachment. The findings of this study revealed that children's pain catastrophizing had a small but significant effect upon enhanced child-reported parental attention to pain. The effect upon child-reported parental caregiving, however, varied from positive parental attention to negative attention to the child's pain. These findings are in line with studies in adults indicating positive associations between pain catastrophizing and both positive and negative responses from others^{8, 20, 28}. The present results extend previous findings by examining the moderating role of child attachment in the relation between pain catastrophizing and social responses. Although effects were small, the present findings indicated that catastrophizing was, as expected, more strongly related to child reports of parental negative responses in the

context of insecure child attachment, and to positive responses in the context of secure child attachment. Of further interest, and in line with previous research in adults ^{14, 35}, the findings of this study revealed that the level of child catastrophizing and pain is higher in children who are more insecurely attached to their parents compared to more securely attached children.

Although the effects obtained in the present study were small and warrant caution for drawing conclusions from them, they are consistent with recent conceptualisations of pain catastrophizing as a way of social communication about pain ⁴⁷. Previous studies, both in adults and children ^{46, 53}, have already shown that high catastrophizing individuals engage in higher levels of pain expression compared to low catastrophizers. To the extent that heightened pain expression in children elicits positive parental responses, this may be conceived of as an adaptive orientation. The present findings, however, provide some preliminary evidence that pain catastrophizing in children may not only enhance the child's report of positive parental responses, but also negative parental responses, particularly in insecurely attached children. Given that insecurely attached individuals are more prone to catastrophizing in response to pain than securely attached ones ¹⁴, our findings further corroborate the idea that insecure attachment may constitute a vulnerability for problematic adjustment to pain ^{16, 37, 38}. Negative social responses to pain may make high catastrophizers' pain experience even more ambivalent and threatening to them, ultimately increasing their vulnerability to dealing with pain ²⁶. Indeed, recent findings have indicated that punishing responses, but not solicitous responses, may be an important mechanism by which catastrophizing exerts its detrimental effects on pain outcomes; i.e. punishing responses partially mediate catastrophizing's relationship with pain-related disability and with depressive symptoms ¹¹. Insecurely attached individuals may therefore be at greater risk of escalation of the catastrophizing/pain intensity spiral. The effect of solicitous or supportive responses upon pain catastrophizing is less clear. Drawing on literature from operant

reinforcement of pain behaviours³⁹, one might expect that positive parental attention to pain might, over time, give rise to enhanced catastrophizing and symptom reporting. This may, however, not always be the case. For high catastrophizing children, who feel threatened and helpless in dealing with pain, obtaining parental positive attention and care may also be beneficial to them by, for instance, buffering the effect of catastrophizing upon deleterious pain outcomes²⁶. Clearly, the effects of parental responses cannot be viewed as an inherent quality of the response itself¹⁸. Other factors such as the child's level of pain catastrophizing may be relevant in further delineating the reinforcing or (mal)adaptive nature of these responses^{30, 39,54}. Catastrophic reactions to pain in the context of secure attachment may be less common and may only arise when one's ability to cope with pain is severely taxed (e.g. in case of acute intense pain or emergency situations). It is likely that in these instances catastrophizing might well serve an adaptive function by fostering adequate help and care from others which may, in turn, mitigate the negative effects of catastrophizing^{26, 30}.

An intriguing implication of our finding that child attachment within the child-parent relationship partially accounts for the different patterns of relationships between pain catastrophizing and child-reported parental responses is that the expression of pain in high catastrophizing individuals probably differs among securely versus insecurely attached individuals. In particular, for children who feel insecurely attached to their parents, catastrophizing may give rise to exaggerated expression of pain, in order to desperately try to obtain assistance and support. On the contrary, for securely attached children who are highly catastrophizing, a moderate amount of pain expression might provide sufficient cues to others in their social environment concerning the help they need⁴⁹.

Of further interest, there were also some sex and age effects upon child-reported parental responses to pain. Sex differences indicated that girls reported receiving less negative parental attention to pain than boys. This finding is consistent with previous findings and might reflect stereotypical sex-specific parental rearing practices⁵⁵ and/or the social consequences of greater pain expressiveness in girls^{31,53}. Age differences indicated that older children reported less positive parental attention to pain than younger children. This might suggest that parents adjust their behaviour towards their child as it grows older as a means to promote age-appropriate behaviour⁷.

A number of limitations deserve consideration, each of which point to directions for future research. First, the findings were based on cross-sectional and correlational data, and, hence, do not indicate causal effects. Longitudinal research is needed to identify the causal relationships between catastrophizing and its interpersonal correlates. Second, the findings were based solely upon child self-report. Provided that a positive and negative appraisal of others' responses is a defining characteristic of secure and insecure attachment, respectively, it would be preferable to conduct studies including parental report and/or observational methods to further investigate actual parental responses to their child's pain. In addition, the use of multiple informant perspectives or methods, as compared to child report only, reduces the possibility of shared method variance. Third, the sample consisted of school children who reported rather low levels of pain and pain catastrophizing. We know nothing about the clinical case of chronic pain where pain is likely to be much more severe and levels of pain catastrophizing likely to be higher and more persistent. Therefore, further research is needed to examine the generalizability of the results to samples of children with chronic or clinical pain. Fourth, comparison with other studies investigating the relationship between catastrophizing and attachment is difficult because of various measurement approaches of attachment. These measures differ fundamentally in their approach to attachment issues. In

the present study, attachment was assessed as a uni-dimensional construct (ranging from insecure to secure), whereas other studies have assessed attachment as a two-dimensional construct or as a categorical construct^{19, 24}. However, despite the lack of comparability between measures, catastrophizing has consistently been found to be related with what is generally be conceived of as insecure attachment³⁸. Finally, the effects of the child's pain catastrophizing upon child report of parental responses to pain were very small and instigate the need for further research addressing the clinical significance of the relationships obtained in the present study. In addition, research addressing the influence of other moderator variables is highly encouraged to further elucidate when and how catastrophizing and related pain expression is responded to by others. For example, the amount of parental catastrophizing about their child's pain might influence how they respond to their child's pain²². From within the cognitive-affective model of pain¹⁷, it is likely that highly catastrophizing parents may be more attentive to their child's pain and more likely to reduce their child's pain²³.

In spite of these limitations, the present study provides some preliminary evidence regarding the importance of attachment in different aspects of the pain experience. Further exploration of the mechanisms relating pain catastrophizing and attachment processes might contribute to a better comprehension of the interpersonal nature of pain catastrophizing and how specific interactional patterns might maintain or increase the pain problem.

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FIGURE LEGENDS

Figure 1: Standardized factor loadings of the two-factor model of child perceived positive and negative parental responses to pain as obtained with confirmatory factor analysis are shown (with standardized factor loadings of the cross-validated model between parentheses).

Figure 2: Regression lines for the relationship between Pain catastrophizing and Positive parental attention as moderated by child attachment. Standardized Beta's (β) are shown.

*** $p < .0001$

Figure 3: Regression lines for the relationship between Pain catastrophizing and Negative parental attention as moderated by child attachment. Standardized Beta's (β) are shown.

** $p < .005$

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Table 1

Means (M), Standard deviations (SD), Cronbach's α , and Pearson correlations of pain catastrophizing, pain severity, parental responses (positive attention and negative attention) and child attachment

	M (SD)	n	α	Min-Max	2	3	4	5
1. Pain catastrophizing	12.33 (7.72)	1371	.86	0-52	.32**	.03	.10**	-.07*
2. Pain Intensity	27.73 (22.98)	1373	---	0-100	---	-.13**	.17**	-.11**
3. Positive attention	16.01 (3.70)	1360	.80	0-24		---	-.35**	.42**
4. Negative attention	7.97 (3.58)	1360	.70	0-24			---	-.31**
5. Child attachment	31.89 (4.27)	1347	.84	10-40				---

* $p < .05$; ** $p < .0001$

Min = Minimum; Max = Maximum

Table 2

Results of hierarchical regression analyses explaining perceived positive attention and negative attention from parents. Standardized betas of the last step in the analysis are displayed

Criterion Variable	n	Step	Predictor	Beta	ΔR^2	Adjusted R ²
Positive parental attention	1322	1	Age	-.16**	.03**	.03
			Sex	-.04		
		2	Pain intensity	-.16**	.02**	.04
			4	Pain catastrophizing	.07*	.01*
Negative parental attention	1322	1	Age	.03	.01*	.01
			Sex	-.10**		
		2	Pain intensity	.16**	.04**	.04
			4	Pain catastrophizing	.07*	.01*

*p < .05; ** p < .0001