Children's Pain Threat Appraisal and Catastrophizing Moderate the Impact of Parent Verbal Behavior on Children's Symptom Complaints

Sara E. Williams,[1,2] PhD, Ronald L. Blount,[3] PhD, and Lynn S. Walker,[1,2] PhD
[1]*Department of Pediatrics, Vanderbilt University School of Medicine,* [2]*The Monroe Carell Jr. Children's Hospital at Vanderbilt, and* [3]*Department of Psychology, University of Georgia*

All correspondence concerning this article should be addressed to Dr Sara Williams, Pain Treatment Service, Children's Hospital Boston, 333 Longwood Avenue 5th Floor, Boston, MA, 02115, USA.
Email sara.williams@childrens.harvard.edu

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Objective We tested the hypothesis that pain threat appraisal and catastrophizing by children with functional abdominal pain (FAP) will moderate the relation between parent verbal behavior and children's symptom complaints following experimentally induced visceral discomfort. **Methods** Thirty-three pediatric patients with FAP and their parents participated. Children completed measures of pain threat appraisal and catastrophizing. Weeks later they completed the Water Load Symptom Provocation Test to induce visceral discomfort. Spontaneous parent–child interactions during child discomfort were audiotaped and coded for content. **Results** Parent symptom-related talk was associated with more child symptom complaints and parent non-symptom-related talk with fewer child complaints. The relation between symptom talk and complaints was greater for children with high catastrophizing. Non-symptom talk was associated with fewer complaints for children with high threat appraisals. **Conclusions** Child characteristics should be considered in research on the relation between parent behavior and children's symptom complaints.

Key words chronic and recurrent pain; coping; parents.

Introduction

This study draws on two theoretical traditions that have generated research on pediatric pain. First, the appraisal and coping framework advanced by Lazarus and Folkman (1984) has been applied to pediatric pain, demonstrating that dispositional styles of pain appraisal and coping reported by pediatric patients with chronic pain influence their distress during episodes of pain. Two specific child factors—high pain threat appraisal and catastrophizing—are consistently associated with negative health outcomes in pediatric pain patients (e.g., Claar, Baber, Simons, Logan, & Walker, 2008; Langer, Romano, Levy, Walker, & Whitehead, 2009; Lynch, Kashikar-Zuck, Goldschneider, & Jones, 2006; Walker, Smith, Garber, & Claar, 2005; Walker, Smith, Garber, & Van Slyke, 1997). Secondly, social learning theory (Bandura, 1977) has been applied to pediatric pain, demonstrating that parent behavior significantly relates to children's coping and distress during pain. Specifically, observational studies of painful pediatric medical procedures link parent behavior that focuses children on symptoms to increases in child distress, whereas parent behavior that focuses children away from symptoms leads to decreases in child distress (e.g., Blount et al., 1989; Chorney et al., 2009; Frank, Blount, Smith, Manimala, & Martin, 1995; Miller, Johanna-Murphy, &

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Zhelezniak, 2001; Sweet & McGrath, 1998). Thus, children's experience of a particular pain episode may depend on both children's own individual style of appraisal and coping with pain as well as the type of parent behavior children experience during pain episodes (cf. Blount, Bunke, & Zaff, 2000; Bustos, Jaaniste, Salmon, & Champion, 2008).

Building on this literature, the purpose of this study was to assess whether dispositional pain beliefs and catastrophizing thoughts of pediatric patients with functional abdominal pain (FAP) moderate the relation between parents' verbal behavior and patients' symptom complaints during an episode of visceral discomfort. To mimic an abdominal pain episode in a laboratory setting, visceral discomfort was induced in patients with FAP by means of the Water Load Symptom Provocation Test (WL-SPT; Walker et al., 2006a). Spontaneous vocalizations by parents and children were audiotaped for five minutes immediately following the induction of visceral discomfort. Audiotapes were coded for content and the proportion of parents' spontaneous vocalizations that could be classified as symptom-related versus non-symptom-related talk was calculated. Consistent with the literature on parent attention versus distraction in relation to children's pain (e.g., Chorney et al., 2009; Manimala, Blount, & Cohen, 2000; Schechter et al., 2007), we hypothesized that parents' symptom-related talk would be associated with more symptom complaints by their children and parents' non-symptom-related talk would be associated with fewer symptom complaints by their children during experimentally induced visceral discomfort.

Unique to this study, we evaluated the extent to which FAP patients' dispositional pain beliefs and coping behavior, assessed at a gastroenterology clinic visit several weeks prior to the WL-SPT, moderated the relation between spontaneous parent vocalizations and children's symptom complaints during experimentally induced visceral discomfort. Recent empirical research suggests that parent behavior does not function independently, but in interaction with child factors, to influence the symptoms and disability of patients with FAP (Claar, Simons, & Logan, 2008; Peterson & Palermo, 2004; Simons, Claar & Logan, 2008; Walker, Claar & Garber, 2002). Accordingly, we hypothesized that children's pain threat appraisal and pain catastrophizing would interact with parents' vocalizations to influence the somatic complaints of children with FAP. High pain threat appraisals and pain catastrophizing both have the potential to *increase* children's sensitivity and responsiveness to parents' behavior that may focus children's attention toward their somatic discomfort. Conversely, high pain threat appraisal and pain catastrophizing may *decrease* children's responsiveness to parental behaviors that may direct their attention away from somatic discomfort. Specifically, we hypothesized that the relation between parents' symptom-related talk and children's symptom complaints would be stronger for patients with FAP who endorsed higher levels of pain threat appraisal and catastrophizing. Elevated pain threat appraisal and catastrophizing may prime these patients to be vigilant to physical sensations, making them particularly sensitive to parents' symptom-related talk. Similarly, we hypothesized that the relation between parents' non-symptom-related talk and children's symptom complaints during visceral discomfort would be weaker for patients with FAP who previously had endorsed higher levels of pain threat appraisal and catastrophizing because these patients may focus on their symptoms even if their parents attempt to redirect their attention.

Methods

Participants

This study is based on pediatric patients with FAP and their parents who participated in the control (No Instruction) condition described in an earlier study by Walker et al. (2006b). In that study, visceral discomfort was induced in children by means of the WL-SPT. Parents were randomly assigned to one of two conditions that manipulated parent behavior (Parent Attention, Parent Distraction) or to a No Instruction control condition in which parents and children were observed interacting spontaneously during a 5-min period of child visceral discomfort. The present study focuses on 33 children with FAP and their parents who participated in the No Instruction control condition. Examination of the control condition offered the opportunity to evaluate whether patients' pain threat appraisal and catastrophizing moderate the relation of parents' spontaneous, unprompted symptom-related talk and non-symptom-related talk to children's symptom complaints during visceral discomfort.

Participants were 33 children between 8 and 15 years of age ($M = 11.24$; $SD = 2.08$) whose medical evaluation at a pediatric gastroenterology clinic revealed no evidence of organic disease. Seventeen patients were female, which represented 52% of the sample. Thirty participants described their ethnicity as Caucasian, two as African American, and one as Asian. The parent who self-identified as the child's primary caregiver during times of illness participated; 32 mothers, 1 father.

Recruitment

All study procedures were approved by the medical center's institutional review board. Recruitment procedures for the original study are described in detail by Walker et al. (2006b). Briefly, at the time of the initial evaluation at a pediatric gastroenterology clinic, pediatric patients with at least 3 months of abdominal pain and their parents were recruited to participate in a questionnaire study of children's coping with pain. Informed consent and child assent were obtained. Children whose medical evaluation revealed no evidence of organic disease were invited to return to the medical center several weeks after their initial clinic visit to participate in the WL-SPT laboratory study. Of the 198 patients invited to participate, 110 (56%) came to the laboratory; 33 (30%) were randomly assigned to the No Instruction control condition focused on in the present study. Informed consent and child assent were obtained for participation in the laboratory study.

Measures

Abdominal Pain Index (API)

The API assesses children's abdominal pain characteristics (Walker et al., 1997). Children respond to four items assessing frequency, duration, and intensity of abdominal pain episodes experienced during the previous 2 weeks. Participants rate weekly pain frequency on a six-point scale from ''not at all'' (0) to ''every day'' (5); daily pain frequency is rated on a six-point scale from ''not at all'' (0) to ''constant during the day'' (5). Duration of pain is rated on a 9-point scale from ''no pain'' (0) to ''all day'' (8). Children rate pain intensity on an 11-point scale from ''no pain'' (0) to ''the most possible pain'' (10). For all items, higher scores reflect more pain frequency, duration, and intensity. Responses are reported individually by item; therefore, no reliability score is calculated for the API.

Pain Beliefs Questionnaire (PBQ)

The PBQ assesses children's appraisals of their abdominal pain (Walker et al., 2005). The Primary Appraisal sub-scale was used for this study. This 20-item subscale assesses children's pain threat appraisals for the severity of their abdominal pain (e.g., ''My stomach aches mean I have a serious illness,'' ''I'm going to have stomach aches for the rest of my life''). Participants rate how true each statement is for them on a five-point scale from''not at all true''(0) to ''very true'' (4). Items are coded so that higher scores reflect greater pain threat appraisals. Responses are summed and averaged to create mean scores that can range from 0 to 4. Alpha reliability in this study was good at .83.

Pain Response Inventory (PRI)

The PRI assesses children's behavior and cognitions during abdominal pain episodes (Walker et al., 1997). The Catastrophizing sub-scale was the focus of this study. This 5-item subscale uses the stem, ''When I have a bad stomachache, I...'' followed by items reflecting catastrophizing cognitions (e.g., ''I think it's never going to stop''; ''I think it's going to get worse.''). Response categories range from ''never'' (0) to ''always'' (4). Items are coded so that high scores reflect high levels of catastrophizing. Responses are summed and averaged to create mean scores that can range from 0 to 4. Alpha reliability in this study was good at .80.

Procedure

Clinic Assessment

A trained interviewer administered research questionnaires to children in a private room prior to their medical evaluation.

Laboratory Assessment

Children and their parents returned to the clinic for the laboratory assessment several weeks after the initial evaluation. The experimenter administered the WL-SPT to the child to induce visceral discomfort while the parent waited in an adjacent room. Immediately thereafter, the parent was escorted into the laboratory and asked to keep the child company for 5 min. Parents were given no other instructions. After 5 min, the experimenter knocked on the door and the parent–child interaction session ended.

Interactions between parents and their children were audio taped. Parents and children were aware of the use of the audio recording system and were told it was necessary to monitor the correct execution of study procedures by experimenters. Parents and children were debriefed after the completion of the study that their interactions would also be reviewed for content.

Water Load Symptom Provocation Test (WL-SPT)

The WL-SPT (Walker et al., 2006a) asks children to drink water until they feel ''completely full.'' Children drink from a tube connected to a reservoir that is hidden from view so they do not have visual cues regarding the amount of water ingested, necessitating reliance on internal sensations to assess perceived fullness. The WL-SPT demonstrates convergent and discriminant validity in that it produces visceral sensations similar to the naturally occurring sensations experienced by children with FAP with significantly greater increases in gastrointestinal (GI) symptoms than non-GI symptoms (Walker et al., 2006a). Moreover, the severity of GI symptoms and disability at the time of the clinical

evaluation of patients with FAP is significantly correlated with increases in their GI symptoms following subsequent administration of the WL-SPT (Anderson, Acra, Bruehl, & Walker, 2008).

Coding Procedures and Variables

Audio tapes of the 5-min interaction between parents and children were transcribed and coded per the reliable coding procedures reported elsewhere (Walker et al., 2006b). Briefly, mutually exclusive codes were assigned to each utterance made by parents and children; parent and child codes were assigned independently of one another. A primary coder assigned codes for all transcripts; reliability was assessed by a second rater completing the same coding process for 25% of transcripts. Reliability calculations were made using intraclass correlations due to the event-coded, observational nature of the data (Bakeman, 2000). Reliability coefficients were excellent for all coding categories, ranging from .95 to .99.

For this study, codes for parents' utterances included (1) Symptom-related talk, defined as parent utterances about the child's symptoms (e.g., ''Your stomach must really be full'', ''Does your stomach hurt?'', ''You will be OK later''), (2) Non-symptom-related talk, defined as parent utterances that did not focus on the child's physical sensations or WL-SPT procedure (e.g., ''What do you want to do this weekend?''; ''Tell me what you did in school today''), and (3) Other, which included parents' inaudible utterances and technical utterances about the procedure. Codes for children's utterances included (1) Symptom Complaints, defined as statements about symptoms (e.g., ''I feel sick''; ''My stomach feels like it's going to burst''), and (2) Other, defined as all other utterances. Three proportion scores were created for data analysis: (1) Symptom Talk (number of parent utterances coded as symptom-related talk divided by the total number of parent utterances), (2) Non-Symptom Talk (number of parent utterances coded as non-symptom-related talk divided by the total number of parent utterances), and (3) Child Symptom Complaints (number of child utterances coded as symptom complaints divided by total number of child utterances).

Results

Children's Abdominal Pain Characteristics

By parent report, the duration of children's abdominal pain condition ranged from three months to a ''lifetime'' ($M = 39.73$ months; $SD = 55.14$). On the API, children reported having abdominal pain episodes an average of 5–6 days a week, 2–3 times a day. On average, children reported their pain episodes lasting between 30–60 min at an average intensity level of 5.45 ($SD = 2.49$, range 0–10). Pearson correlations were performed between pain characteristic variables and study variables; child pain threat appraisal was positively correlated with child-reported daily frequency ($r = .46$, $p < .01$), duration ($r = .44$, $p < .05$), and intensity of pain ($r = .35$, $p < .05$). Parent Non-Symptom Talk was negatively correlated with parent-reported pain condition duration ($r = -.52$, $p < .01$). No other study variables were correlated with pain characteristics; therefore, these variables were not controlled for in study analyses.

Characteristics of Parents' and Children's Utterances

During the 5-min interaction with their children, a greater proportion of parents' utterances were coded as Non-Symptom Talk ($M = 60\%$, $SD = 15\%$) than Symptom Talk ($M = 22\%$, $SD = 12\%$). However, there was considerable variability between individuals: the proportion of parent utterances coded as Non-Symptom Talk ranged from 25 to 79% and the proportion coded as Symptom Talk ranged from 4 to 61%. Nearly one-fifth of children's utterances were coded as Child Symptom Complaints ($M = 17\%$, $SD = 12\%$, range 0 to 57%).

Relation of Parent Behavior and Child Characteristics to Children's Symptom Complaints

The results of Pearson correlation analyses (Table I) indicated a positive correlation between Parent Symptom Talk and Child Symptom Complaints. Higher levels of Parent Non-Symptom Talk were inversely associated with Child Symptom Complaints. Parent Symptom Talk and Non-Symptom Talk also were inversely associated. Finally, dispositional measures of children's pain threat appraisal and catastrophizing were positively associated.

A multiple regression analysis was conducted to determine the combined influence of Parent Symptom Talk and Parent Non-Symptom Talk on Child Symptom Complaints (Table II). Child age and gender were entered as control variables on the first step of the analysis. Parent Symptom Talk and Parent Non-Symptom Talk were entered together on the second step to predict Child Symptom Complaints. Results indicated that the combination of Parent Symptom Talk and Parent Non-Symptom Talk accounted for a significant increment of 54% in the variance in Child Symptom Complaints, beyond that accounted for by age and gender (2%). Parent Symptom Talk was a significant predictor of Child Symptom Complaints. Parent

Table I. *Pearson Correlation Coefficients for Study Variables*

	1	2	3	4	5
1. Child pain threat appraisal	1.0	.57*	.04	−.05	.11
2. Child catastrophizing	–	1.0	.11	−.16	.09
3. Parent symptom talk	–	–	1.0	−.74*	.71*
4. Parent non-symptom talk	–	–	–	1.0	−.59*
5. Child symptom complaints	–	–	–	–	1.0

Note. *$p < .001$.

Table II. *Hierarchical Regression of Parent Symptom Talk and Parent Non-Symptom Talk Predicting Child Symptom Complaints*

Variable	R^2	ΔR^2	F	df	B	$SE\ B$	β
Step 1:	.02	.02	.26	2, 30			
Child gender					.05	.03	.20
Child age					−.01	.01	−.06
Step 2:	.56	.54**	8.95**	4, 28			
Parent symptom talk					.62	.21	.58*
Parent non-symptom talk					−.20	.17	−.24

Note. *$p < .05$. **$p < .001$. B, $SE\ B$, and β reflect values in the final step of the analyses.

Non-Symptom Talk, child gender, and child age did not have significant effects on Child Symptom Complaints.

Interaction of Parent Verbal Behavior and Children's Dispositional Factors on Children's Symptom Complaints

Hierarchical multiple regression analyses assessed the relation of parent verbal behavior, child dispositional factors, and their interactions to children's symptom complaints. Child age and gender were entered as control variables on the first step of each analysis; previous studies have demonstrated that these child demographic variables are significantly related to children's symptom complaints and parents' verbal behavior (e.g., Walker et al., 2006b). A type of parent utterance (Symptom Talk or Non-Symptom Talk) and a child dispositional factor (pain threat appraisal or catastrophizing) were entered in the second step. Finally, the interaction term for the type of parent utterance with the child factor was entered in the third step. The dependent variable in all analyses was the proportion of children's utterances during the parent–child interaction that were coded as symptom complaints (Child Symptom Complaints).

Results of regression analyses with Parent Symptom Talk are presented in Table III. Parent Symptom Talk and child catastrophizing accounted for a significant 52% increment in the variance in Child Symptom Complaints beyond that accounted for by gender and age. On the third step, the interaction effect between Parent Symptom Talk and child catastrophizing accounted for an additional significant 7% of variance in Child Symptom Complaints, with the final model accounting for 61% of the variance. Analysis of the slopes of the two regression lines revealed that the slope for the children who were high in pain catastrophizing was significant, $t(29) = 5.93$, $p = .001$, whereas the slope for children who were low in pain catastrophizing was not significant, $t(29) = 1.83$, $p = .08$. For children with high pain catastrophizing, higher levels of Parent Symptom Talk were associated with more Child Symptom Complaints (Figure 1). A separate regression analysis indicated that child pain threat appraisal and Parent Symptom Talk explained a significant 52% of the variance in Child Symptom Complaints beyond that accounted for by gender and age. Parent Symptom Talk and child pain threat appraisal did not have a significant interaction effect on Child Symptom Complaints.

Results of regression analyses with Parent Non-Symptom Talk are presented in Table IV. Parents' Non-Symptom Talk and child pain threat appraisal accounted for a significant 41% of the variance of Child Symptom Complaints beyond that accounted for by age and gender. The interaction effect of Parent Non-Symptom Talk and child pain threat appraisal accounted for an additional significant 12% of the variance in Child Symptom Complaints, with the final model accounting for 55% of the variance. Analysis of the slopes of the two regression lines revealed that the slope for the children who were high in pain threat appraisal was significant, $t(29) = -4.04$, $p = .001$, whereas the slope for children who were low in pain threat appraisal was not significant, $t(29) = -.40$, $p = .69$. For children with high pain threat appraisal, higher levels of Parent Non-Symptom Talk were associated with fewer Child Symptom Complaints (Figure 2). A separate analysis indicated that Parent Non-Symptom Talk and child catastrophizing also accounted for a significant 41% of the variance in Child Symptom Complaints beyond that accounted for by age and gender. The interaction of Parent Non-Symptom Talk and child catastrophizing did not account for significant variance in Child Symptom Complaints.

Discussion

Our results suggest that the relation of parents' verbal behavior to children's symptom complaints may differ as a function of children's pain threat appraisal and catastrophizing. Following induction of visceral discomfort in children, parent symptom-related talk had a stronger association with symptom complaints for those children with high levels of catastrophizing. Specifically, higher

Table III. *Hierarchical Regressions: Parent Symptom Talk Predicting Child Symptom Complaints*

Variable	R^2	ΔR^2	*F*	df	*B*	*SE B*	β
Child catastrophizing							
Step 1	.02	.02	.26	2, 30			
Child gender					.05	.03	.21
Child age					.01	.01	.07
Step 2	.54	.52**	8.20**	4, 28			
Parent symptom talk					.73	.14	.69**
Child catastrophizing					.01	.02	.10
Step 3	.61	.07*	8.42**	5, 27			
Interaction of parent symptom talk and child catastrophizing					.32	.15	.31*
Child pain threat appraisal							
Step 1	.02	.02	.26	2, 30			
Child gender					.05	.03	.18
Child age					−.01	.01	−.03
Step 2	.54	.52**	8.32**	4, 28			
Parent symptom talk					.74	.15	.70**
Child pain threat appraisal					.03	.03	.12
Step 3	.56	.02	6.95**	5, 27			
Interaction of parent symptom talk and Child pain threat appraisal					.35	.32	.17

Note. *$p < .05$. **$p < .001$. *B*, *SE B*, and β reflect values in the final step of the analyses.

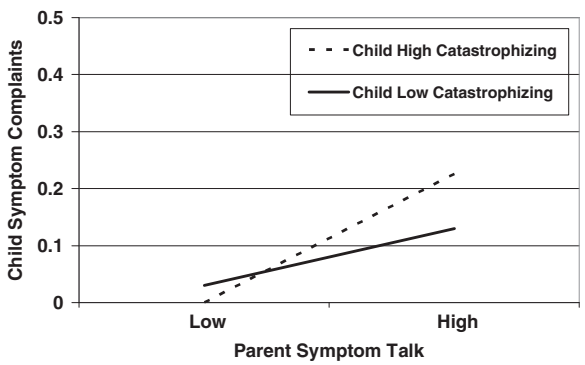

Figure 1. Regression lines showing the relation between level of Parent Symptom Talk and Child Symptom Complaints as a function of level of child catastrophizing. *Note.* Regression lines are depicted for children with high (+1*SD*) and low (−1*SD*) scores on the catastrophizing subscale of the PRI.

levels of parents' symptom-related talk were associated with more symptom complaints among children with a high disposition to catastrophize in response to pain. The association between parents' symptom-related talk and children's somatic complaints was weaker in children who were low in catastrophizing.

Several mechanisms may explain the link between parents' symptom-related talk and children's symptom complaints among children with higher dispositional tendencies to catastrophize. First, parent talk about child symptoms may increase children's complaints by means of operant reinforcement: child symptom reporting would be at least partially contingent on parental symptom related utterances (e.g., Chambers, Craig, & Bennett, 2002; Levy et al., 2004). This reinforcement may be moderated by the extent to which the child has catastrophic beliefs about pain. Secondly, parent symptom-related talk might serve as an antecedent, increasing symptom complaints by directing children's attention to unpleasant sensations (Blount et al., 2009). For children who tend to catastrophize about their pain, parents' symptom-related talk might trigger particularly threatening thoughts about their physical symptoms. This may lead to exacerbation of their discomfort and greater symptom complaints. Thirdly, it is possible that children with a tendency to catastrophize about pain may elicit parents' symptom-related talk. Finally, these possible explanatory mechanisms may work in tandem, rather than in a mutually exclusive manner. Future research with larger samples might evaluate these alternative explanations with sequential analyses of parent–child interactions during pain episodes in children with high versus low pain catastrophizing (e.g., Blount et al., 1989).

Our results also showed that parents' non-symptom-related talk was associated with fewer symptom complaints for children with high pain threat appraisals. It is possible that parents' non-symptom talk helps these children cope with visceral discomfort. The finding that parents' non--symptom-related talk was unrelated to symptom complaints in children with low pain threat appraisal is likely due to a floor effect. Children with low pain threat appraisal verbalized few symptoms regardless of parents' level of non-symptom-related talk.

Table IV. *Hierarchical Regressions: Parent Non-Symptom Talk Predicting Symptom Complaints*

Variable	R^2	ΔR^2	*F*	*df*	*B*	*SE B*	β
Child catastrophizing							
Step 1	.02	.02	.26	2, 30			
Child gender					.06	.04	.24
Child age					−.01	.01	−.11
Step 2	.43	.41**	5.23*	4, 28			
Parent non-symptom talk					−.52	.13	−.64**
Child catastrophizing					.01	.02	.08
Step 3	.48	.05	4.95*	5, 27			
Interaction of parent non-symptom talk and child catastrophizing					−.26	.16	−.28
Child pain threat appraisal							
Step 1	.02	.02	.26	2, 30			
Child gender					.06	.04	.24
Child age					−.02	.01	−.30*
Step 2	.43	.41**	5.30*	4, 28			
Parent non-symptom talk					−.43	.12	−.53**
Child pain threat appraisal					.09	.04	.40*
Step 3	.55	.12*	6.60**	5, 27			
Interaction of parent non-symptom talk and Child pain threat appraisal					−.75	.28	−.52*

Note. *$p < .05$. **$p < .001$. *B*, *SE B*, and β reflect values in the final step of the analyses.

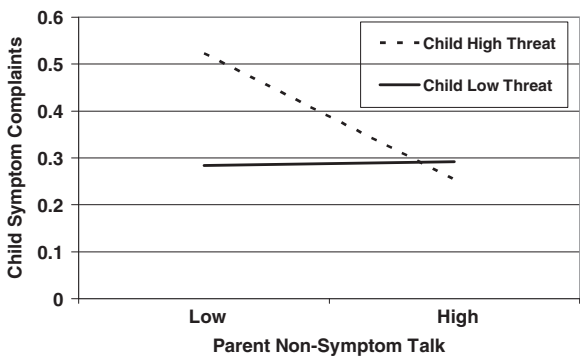

Figure 2. Regression lines showing the relation between level of Parent Non-Symptom Talk and Child Symptom Complaints as a function of level of child pain threat appraisal. *Note.* Regression lines are depicted for children with high (+1*SD*) and low (−1*SD*) scores on the primary pain threat appraisal scale of the PBQ.

Overall, parents' verbal behaviors accounted for 54% of the variance in children's symptom complaints following induction of visceral discomfort. The significant relation between parents' symptom-related talk and non-symptom related talk and children's symptom complaints highlights the important role of parent verbal behavior in children's experience of pain. Similar amounts of variance in children's distress and coping behaviors were found in investigations of preschool children undergoing immunization injections (Frank et al., 1995) and 2- to 8-year-old children undergoing mask anesthesia induction for outpatient surgery (Chorney et al., 2009).

Because this investigation was conducted with a small number of participants, statistical power was limited and the likelihood of detecting additional significant direct effects and interactions decreased. Also, it is possible that different patterns of associations between child dispositional factors and parent verbal behaviors might be found during more intense, natural episodes of abdominal pain than during the moderate level of discomfort produced by the WL-SPT. It should be noted that these data are correlational in nature and the direction of influence cannot be assumed. While parents' behavior no doubt influences their children, it is also likely that children's symptom complaints and other behaviors during the WL-SPT influenced parents' verbalizations. Most likely, as has been discussed in the pediatric procedural pain literature, there are mutual parent–child behavioral influences (Blount et al., 1989). We also should note that in this investigation the participating parent was the mother in all but one case; therefore, study results are most representative of mother–child interactions. Additionally, although this coding system was limited to verbal behavior; non-verbal communication is also significant in parent–child communication and this was not assessed in the current study. Finally, there were a small number of participants in this investigation and they were recruited from one clinic. Therefore, these results may not be representative of larger samples of children with FAP and their parents. As with most investigations, appropriate caution should be exercised when

generalizing from the results of this study to other situations in which children experience somatic discomfort.

In future research, direct replications of the current investigation, as well as systematic replications may be conducted in both experimental and naturalistic settings in which children experience pain and discomfort. These investigations, conducted with larger samples, would help to establish the generalizability of these findings. There are several additional dimensions that may be considered in future research in this area. First, additional child factors beyond those of pain threat appraisal and catastrophizing also might interact with parent behavior to influence children's somatic complaints. Secondly, the coding system for adult behaviors used in this investigation captured the broad categories of parent symptom-related talk, non--symptom-related talk, and children's symptom complaints; however, a more discrete coding system might be used to more precisely identify examples of these broader parent behavior categories that may be most highly associated with children's symptom complaints (Blount et al., 2008). Finally, research in this area might also assess parent characteristics, such as anxiety, depression, and the parent's history of somatic symptoms that may influence both the amount and type of parent vocalizations as they interact with their children during episodes of somatic discomfort. Research of this type might further expand our conceptualization of the factors that influence parents' and children's reactions during episodes of children's somatic discomfort.

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