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## Maternal Attributions for the Causes and Remedies of Their Children's Abdominal Pain

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### Abstract

**Objective**—To examine mothers' attributions for the causes and remedies of their children's abdominal pain, specifically whether attributions differed according to child diagnosis, reflected a dualistic or multidimensional view of pain, and changed following medical evaluation.

**Methods**—Mothers of children whose medical evaluation indicated peptic disease ( $n = 55$ ) or unexplained pain without identifiable organic disease ( $n = 98$ ) participated in telephone interviews prior to their children's medical evaluations and one year later.

**Results**—About half of the mothers in each group endorsed both psychosocial and physical factors as important in the etiology of their children's abdominal pain. Following medical evaluation, mothers in both groups tended to maintain their attributions regarding the importance of psychosocial factors.

**Conclusions**—Many mothers acknowledged the contribution of psychosocial factors to their children's abdominal pain. They may be receptive to behavioral interventions if physicians present these remedies as an integral component of treatment.

### Keywords

attributions; pain

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Research on illness beliefs suggests that patients' understanding of their illness influences their health-related behavior (Cameron, Leventhal, & Leventhal, 1993; Chalder, Power & Wessely, 1996; Lau & Hartman, 1983; Leventhal, 1986; Leventhal, Meyer, & Nerenz, 1980). Beliefs about the causes of illness are a particularly important aspect of illness cognition because they provide a sense of control by giving personal meaning to bodily discomfort and by suggesting actions to pursue (Stoeckle & Barsky, 1980). For example, whether one attributes chest pain to heartburn or to angina will influence the decision to consult a physician about the pain.

In addition to attempting to understand the reasons for their own illnesses, individuals seek explanations for the illnesses of others. Beliefs regarding the causes of another's illness, in turn, influence responses to that person. For example, there is evidence that individuals are more likely to help a person whose illness is attributed to an uncontrollable cause (e.g., AIDS due to a blood transfusion) than one whose illness is attributed to a controllable cause (e.g., AIDS due to unprotected sexual activity) (cf. Weiner, Perry, & Magnusson, 1988).

Little is known about the causal explanations that parents hold for their children's illnesses. However, related literature on parents' attributions for their children's social and academic behavior suggests that parents form attributions for their children's behavior and that these attributions may affect both parents' behavior and children's development (Miller, 1995). Parents, particularly mothers, are responsible for treatment decisions and medical regimen adherence for their children. Ethnographic interviews with women suggest that their beliefs about the cause of an illness directly affect their help-seeking behavior (Blaxter, 1983). Thus, an understanding of mothers' perceptions of the causes of their children's illnesses is crucial for understanding the treatment decisions that they make on their children's behalf.

This study examined mothers' perceptions of the causes and potential remedies for their children's abdominal pain. Abdominal pain was selected as the target symptom for several reasons: it is one of the most common pediatric complaints (Starfield et al., 1980); it is associated with many possible organic etiologies (Oberlander & Rappaport, 1993); and recurrent abdominal pain frequently occurs without identifiable organic etiology (Apley, 1975). Furthermore, causal attributions for abdominal pain may be particularly subject to individual interpretation because the sensation is in a part of the body that is not directly observable (Barsky & Klerman, 1983). Finally, attributions regarding the etiology of pain are of particular interest due to recent shifts in scientific and clinical models of pain. Whereas traditional dualistic models represented pain as either organic or functional, more recent multidimensional models represent pain as resulting from the interaction of biological, psychological, and social factors (Dworkin, Von Korff, & LeResche, 1992; McGrath, 1990). One of the goals of this study was to assess the extent to which mothers' views of the causes of their children's pain reflected a dualistic or multidimensional model of pain. We also examined mothers' beliefs about remedies for their children's pain, as cure is another important component of illness representations (e.g., Lau & Hartman, 1983), and beliefs about cure likely influence treatment acceptability.

In this study, mothers whose children were scheduled for a medical evaluation for abdominal pain were asked to rate the probability that each of several causes contributed to their children's pain, and the probability that each of several potential remedies would relieve the pain. To explore how the medical evaluation may have influenced mothers' beliefs, we contacted mothers one year after the clinic visit and again asked for their perceptions of the causes and remedies for the pain that had brought the child to the clinic a year earlier. We expected that prior to the initial clinic visit, before they knew the outcome of the medical evaluation, most mothers would endorse physical causes and remedies for their children's pain. This prediction was based on the assumption that mothers' decisions to seek medical consultation reflected a belief in an organic etiology and the need for medical treatment. One year later, after results of the evaluation were known, we expected mothers of children who had received an organic diagnosis for pain to endorse more physical causes and remedies than mothers for whom the medical evaluation had yielded no organic diagnosis. We expected mothers of children for whom the medical evaluation yielded no organic diagnosis to endorse more psychosocial than physical causes and remedies for their children's abdominal pain, because symptoms without an identifiable organic pathology commonly are attributed to emotional distress or to an attempt to obtain social goals associated with maintaining the sick role (Skelton, 1991).

## Method

### Participants

Participants were 153 mothers or stepmothers of consecutive new patients who presented with abdominal pain at the pediatric gastroenterology clinic of Vanderbilt University Medical Center. Patients met the following criteria: (1) abdominal pain of a least one

month's duration; (2) between the ages of 6 and 18; (3) no chronic health condition, physical handicap, or mental retardation; and (4) mother or stepmother living in the home. Mothers were predominantly Caucasian (95%). The majority (84%) had at least a high school education.

Patient medical records were reviewed after the clinic visit and the medical diagnosis for each patient was recorded.<sup>1</sup> The chart review was conducted by a physician who did not have access to the research protocol. Two groups of children were the focus of the current investigation: those who were diagnosed with some form of peptic disease (e.g., peptic ulcer, esophagitis, gastritis) ( $n = 55$ ), referred to as the peptic disease (PD) group, and those for whom the medical evaluation revealed no organic disease or dysfunction ( $n = 98$ ), referred to here as the unexplained abdominal pain (UP) group. The percentage of females was 52.7% in the PD group and 61.2% in the UP group; this gender difference was not significant,  $\chi^2(1) = 1.05$ , ns. The mean age was 10.3 ( $SD = 2.4$ ) for the PD group and 10.5 ( $SD = 3.1$ ) for the UP group; this difference was not significant,  $t(151) = .34$ , ns. The mean pain duration was 22.8 months (median duration = 12.0 months) for the PD group and 25.3 months (median duration = 12.0 months) for the UP group; this difference was not significant,  $t(151) = .51$ , ns.

## Procedure

Patients' mothers were contacted by telephone prior to their children's scheduled clinic appointments so that we could describe the study, screen for eligibility, and enlist participation.<sup>2</sup> The participation rate was approximately 95%; those families who decided not to participate did so primarily due to time constraints. After obtaining informed verbal consent, the interviewer administered the questionnaires by telephone. One year following the patient's clinic appointment, the mother was contacted by telephone for a second interview. A 1-year follow-up interval was selected so that the child would be in the same month of the school year as in the initial assessment. If school-related stress was a factor in the child's pain complaints, a 1-year follow-up would minimize the impact of time of the year (e.g., school versus vacation) on measures of child recovery.

## Measures

This study was part of a larger project in which a battery of instruments was administered to mothers, fathers, and their children (Walker, Garber, & Greene, 1993). These analyses are based on data obtained from mothers using the measures described below.

**Causes of Abdominal Pain**—Mothers completed the Inventory of Causes for Abdominal Pain (ICAP) several days prior to the clinic visit and one year following the clinic visit. The ICAP assesses mothers' attributions regarding the causes of their children's abdominal pain. The instrument lists both physical and psychosocial causes of abdominal pain because both of these broad categories of illness causation have been found in studies of illness representations (Blaxter, 1983; Swartzman & Lees, 1996). The 20 items constituting the ICAP were generated in consultation with medical and mental health professionals who had extensive clinical experience with children with both functional and organic gastrointestinal disorders. Among the psychosocial causes listed were items reflecting stress, secondary gain, family conflict, and other factors that have been linked

<sup>1</sup>In the few cases in which the medical evaluation was incomplete (e.g., when the child did not return for a scheduled endoscopic procedure), the patient's diagnostic classification was obtained by chart review, discussion, and consensus by two of the clinic physicians.

<sup>2</sup>Mothers were interviewed because in nearly every case the mother was listed as the contact person when the appointment was scheduled. This suggested, consistent with the literature, that mothers were the primary gatekeepers for their children's health care. We would have liked to obtain fathers' attributions, but we were constrained by limited resources and time available for the interview.

with pediatric pain complaints in the literature (cf., McGrath, 1990). Physical and psychosocial causes are presented in random order. Examples of the 10 physical items include “a virus or disease,” and “stomach producing too much acid or gas.” Examples of the 10 psychosocial items include “stress,” “being nervous, worried, or tense,” and “stomach aches getting him/her a lot of attention from the family.” For each item, mothers indicate whether they think it contributes to the child’s pain. The 3-point response categories are “probably no” (scored 0), “maybe” (scored 1), and “probably yes” (scored 2).

Before completing the ICAP at the 1-year follow-up, mothers were asked an open-ended question: “What do you think was the *main* or most important cause of the stomach aches/abdominal pain that [child’s name] was having then [at the time of the initial clinic visit]?” Responses were recorded verbatim. These responses were reviewed and 16 categories of causes were identified. These included both physical causes (e.g., ulcers) and psychological causes (e.g., stress). Two psychology graduate students classified the responses into the 16 categories; 91% interrater reliability was achieved ( $\kappa = .88$ ). In the 17 cases where discrepancies occurred, a consensus was achieved by discussion.

**Remedies for Abdominal Pain**—The Inventory of Remedies for Abdominal Pain (IRAP) was completed by mothers in the telephone interview prior to the initial clinic visit. This inventory assesses mothers’ attributions regarding potential remedies for their children’s abdominal pain. The 20 items include 10 physical and 10 psychosocial remedies for abdominal pain, presented in random order. These items were selected based on consultation with medical and mental health professionals. Physical remedies on the IRAP include “change in diet” and “medicine for healing inflammation of the stomach or gastrointestinal system.” Psychosocial remedies include “counseling” and “knowing how to relax and not get worried or tense.” For each potential remedy, mothers are asked whether they think it will help relieve the child’s pain. The 3-point response categories are “probably no” (scored 0), “maybe” (scored 1), and “probably yes” (scored 2).

At the 1-year follow-up, mothers were asked if their children’s abdominal pain had gotten worse, stayed the same, or gotten better and “*if better*, why do you think your child has gotten better?” Their responses were recorded verbatim. These responses were reviewed and 12 categories of remedies were identified, including physical remedies (e.g., medication) and psychosocial remedies (e.g., change in school situation). Maternal responses were coded by two graduate students in psychology with 86% agreement ( $\kappa = .83$ ). For the 22 cases in which a discrepancy occurred, a consensus was achieved by discussion.

## Results

### Maternal Perceptions of Children’s Pain Prior to the Clinic Visit

We dichotomized responses to the ICAP (“probable” causes versus uncertain or not probable causes). We conducted chi-square analyses to identify any significant differences between the UP and PD groups in the proportion of mothers who, prior to the medical evaluation, endorsed each of the 20 ICAP items as a probable cause of the child’s pain. Table 1 shows, for each group, the percentage of mothers who endorsed each cause and presents results of the chi-square analyses. As expected, prior to the medical evaluation, there were no significant differences between the UP and PD groups with respect to the proportion of mothers endorsing each cause. Surprisingly, the cause most commonly endorsed by mothers in both groups was not physical in nature but was psychosocial—“being nervous, worried, or tense.”

Table II presents items on the IRAP that were endorsed as “probable” remedies for each group. There were no significant differences between the UP and PD groups in the

proportion of mothers endorsing each of the potential remedies for abdominal pain. The most commonly endorsed remedies in both groups were psychosocial in nature and included “less stress,” “not putting pressure on him/herself,” and “knowing how to relax and not get worried or tense.” The most frequently endorsed physical remedies were “change in diet” and various types of medication.

### **Maternal Perceptions of Children’s Pain at the 1-Year Follow-up**

One year after the initial clinic visit, the ICAP again was administered to mothers regarding the causes of the abdominal pain that led to their children’s clinic visit. Table I shows the percentage of mothers in each group who endorsed each cause and presents results of chi-square analyses assessing differences between the groups in the percentage of mothers who endorsed each cause. At the 1-year follow-up, psychosocial causes still predominated; specifically, the majority of mothers in both groups endorsed “being nervous, worried or tense” as a probable cause of the child’s pain. Other psychosocial causes frequently endorsed included “stress,” and “putting too much pressure on him/herself.” The most frequently endorsed physical causes at the follow-up were “a sensitive or nervous stomach,” “stomach producing too much acid or gas,” and “irritation or inflammation of the stomach or gastrointestinal system.” Significant differences emerged between the UP and PD groups for only two causes at the follow-up. Specifically, mothers of children who had received a diagnosis of peptic disease were more likely than mothers of children with unexplained pain to have endorsed “stomach producing too much acid or gas” and “irritation or inflammation of the stomach or gastrointestinal system.” No other significant group differences were obtained for causes endorsed at the 1-year follow-up.

Mothers’ responses to an open-ended question regarding the cause of the child’s abdominal pain were coded according to the classification system described earlier. The percentage of mothers identifying each type of cause is presented in Table III and is similar to percentages obtained using the ICAP in that the category of cause most frequently offered by mothers of both groups was psychosocial in nature, {i.e., “nerves, worry, and/or emotional problems”). Due to the small percentage of mothers who mentioned each type of cause, chi-square analyses would not be meaningful and thus were not conducted to compare the categories of open-ended responses endorsed by the UP and PD groups.

Mothers also were asked whether their children’s abdominal pain had gotten worse, stayed the same, or had gotten better in the year since the clinic visit. Eighty-seven mothers in the UP group (89%) and 48 mothers in the PD group (87%) reported that their children’s condition had improved. Mothers who reported that their children had improved were asked an open-ended question concerning probable remedies for their children’s abdominal pain. Their responses were classified as described earlier and are presented in Table IV. For both groups, the most commonly identified remedy involved medication, surgery, or a medical procedure. The most commonly identified psychosocial remedies included a change in the child’s school situation and a change in the child’s environment. Because only a small percentage of mothers identified each remedy, chi-square analyses cannot be used to analyze whether the groups differed significantly in the proportion endorsing individual remedies.

### **Medical versus Psychosocial Causes and Remedies**

Mothers had been allowed to endorse multiple items on the ICAP and the IRAP. For the next analyses, mothers were classified according to whether they had endorsed only physical factors, only psychosocial factors, both physical and psychosocial factors, or neither type of factor (the latter occurred for mothers who rated no items as “probable” causes or remedies). Analyses were performed separately for mothers of children with unexplained pain and mothers of children with peptic disease. Table V presents, for each group, the proportion of

mothers who endorsed physical, psychosocial, or both types of causes of their children's pain on the ICAP at the initial assessment and at the 1-year follow-up. In both groups at both assessments, the majority of mothers endorsed both physical and psychosocial causes. In the UP group, the proportion of mothers endorsing both physical and psychosocial causes was significantly greater than the proportion endorsing only one type of cause or neither at the initial assessment,  $\chi^2(1) = 7.62, p < .01$ , and at the 1-year follow-up,  $\chi^2(1) = 10.40, p < .001$ . In the PD group, this proportion did not reach statistical significance at the initial assessment,  $\chi^2(1) = 1.77, p < .18$ , or at the 1-year follow-up,  $\chi^2(1) = .74, ns$ .

Mothers' endorsements of potential remedies on the IRAP at the initial assessment are presented in Table VI. Approximately half of the mothers in each group endorsed both physical and psychosocial factors as potential remedies for their children's pain at the initial assessment. In the UP group, the proportion of mothers endorsing both types of factors was significantly greater than the proportion endorsing only one type of factor or neither type,  $\chi^2(1) = 12.21, p < .001$ . In the PD group, this proportion was not statistically significant,  $\chi^2(1) = 1.81, p < .18$ .

### Stability of Causal Attributions

Finally, we examined the extent to which mothers' causal attributions changed following their children's medical evaluation and treatment. Mothers' endorsements of ICAP items were examined at the initial assessment and at the 1-year follow-up. In order to have sufficient responses for meaningful analyses, these analyses focused on the three most common physical causes and the three most common psychosocial causes. For each of the six causes, mothers were grouped according to whether they endorsed each of these causes as "probable" at both the initial assessment and at the follow-up, or whether they endorsed the cause as "probable" at the initial assessment but not again at the 1-year follow-up. Table VII presents, for each group, the percentage of mothers who endorsed each cause at both assessments. In general, the majority of mothers who endorsed a cause prior to the clinic evaluation endorsed that cause again at the follow-up. There was one exception: in the UP group, less than half (45.8%) of the mothers who endorsed "irritation or inflammation of the stomach or gastrointestinal system" prior to the clinic evaluation continued to endorse this cause at follow-up. In contrast, in the PD group, 76.5% of the mothers who endorsed this cause prior to the evaluation also endorsed it at the follow-up. This difference between the groups was statistically significant  $\chi^2(1) = 5.37, p < .02$ .

### Discussion

Results of this study indicated that, prior to the clinic visit, mothers seeking medical evaluation for their children's abdominal pain were more likely to endorse psychosocial than physical factors as probable causes of their children's pain. In addition, even though they had scheduled a medical visit for their children, mothers were more likely to endorse psychosocial interventions than medical treatments as probable remedies for their children's pain. Thus, one cannot assume that seeking medical help reflects organic disease attributions for pain; parents may seek medical treatment for their children yet attribute pain to both physical and psychosocial factors. They may expect health care professionals to address psychosocial as well as physical aspects of their children's illness. It also is possible that parents seek medical treatment because they believe that medical treatments will alleviate their children's pain, even though they regard psychosocial factors as contributing to the onset and maintenance of the pain. The origins of these psychosocial attributions regarding children's pain are unknown. Parents' attributions may be influenced by previous personal experience or by suggestions of psychosocial causes made by the referring pediatrician, family members, or other sources.

A prior unpublished study found that, 9 months following the clinic evaluation, mothers of patients with RAP attributed their children's pain primarily to psychosocial causes (von Baeyer & Bruce, 1994). The authors inferred that the mothers had accepted medical reassurance that there was no underlying organic problem. Results of this study suggest that many mothers may consider psychosocial causes even before the medical evaluation has ruled out an organic etiology.

These findings raise questions about how mothers view the role of psychosocial factors in their children's abdominal pain. Are psychosocial factors proximal or distal causes of pain? How important are psychosocial factors relative to physical factors? Some parents may view psychosocial factors as distal contributors to physical disease that, in turn, cause the child's pain. Others may view psychosocial factors as more direct causal agents of abdominal symptoms. Another possibility is that parents view psychosocial and organic factors as interrelated facets of a process that results in chronic pain (cf. Novy, Nelson, Francis & Turk, 1995). Another question raised by this study concerns the strength of parents' attributions. For example, mothers in this study who endorsed several attributions may regard one of these attributions as more important than the others. Finally, parents may believe that a psychosocial factor, such as emotional distress, contributes to the child's subjective experience of pain, regardless of whether it plays a role in any underlying disease process.

Rather than endorsing exclusively physical or exclusively psychosocial causes for their children's pain, about half of the mothers in each group endorsed both physical and psychosocial causes. Even after results of the medical evaluation were known, the majority of mothers continued to endorse both physical and psychosocial causes for the pain. Thus, mothers appear to view both psychosocial and physical factors as important in the etiology of abdominal pain. This view is consistent with recent theoretical models of pain that suggest that pain involves the interaction of biological, psychological, and social factors (Dworkin et al., 1992). Although a recent investigation of lay perceptions revealed a "physical" versus "nonphysical" causal dimension in lay attributions for physical symptoms (Swartzman & Lees, 1996), results of this study suggest that mothers do not conceptualize physical and psychosocial factors as mutually exclusive contributors to their children's abdominal pain.

These findings have implications for the way in which pediatric gastroenterologists evaluate and treat their patients. Physicians who are aware of parents' attributions regarding their children's pain may be better equipped to provide appropriate and acceptable treatment options for their patients. Physicians may find it useful to inquire about these attributions or to have parents complete questionnaires, such as those used in this study, that assess parental attributions for children's abdominal pain at the time of their clinic visit. This parental input may be used as a guide for identification of psychosocial interventions that may be incorporated into patient treatment.

A large percentage of mothers endorsed psychosocial remedies that may be provided by mental health services—for example, less stress, knowing how to relax and not get worried or tense, and not-putting pressure on oneself. However, only a small percentage of mothers endorsed counseling as a potential remedy. This discrepancy suggests that some mothers may have been unaware of the nature of services available through counseling and therefore did not endorse these as potential remedies. Alternatively, perhaps mothers believed that counseling would alleviate their children's pain, yet the stigma associated with seeking such treatment may have deterred them from endorsing it. An implication of this finding is that referrals for counseling should be framed as assistance for specific psychosocial problems that the family views as contributing to the pain. These referrals should be presented as an

integral component of the child's treatment. Furthermore, referrals should be for specific services (e.g., relaxation training) that the family perceives as important. This strategy emphasizes the relevance of counseling services for the individual child and may increase the likelihood that families will pursue these services.

Results of the medical evaluation only partially affected mothers' attributions regarding the etiology of their children's pain. Prior to and following the evaluation, mothers endorsed psychosocial causes more frequently than physical causes regardless of whether their children received an organic or functional diagnosis. Furthermore, following the evaluation, approximately two-thirds of the mothers in both groups maintained their attributions regarding psychosocial causes of their children's abdominal pain. In contrast, the stability of mothers' attributions for physical causes of their children's pain differed significantly by group; mothers of children with peptic disease were more likely to maintain physical attributions of pain causality than were mothers of children with unexplained pain. Thus, medical evaluation and treatment seemed to affect mothers' attributions regarding physical causes of abdominal pain but not their attributions concerning psychosocial causes of pain.

The high frequency and stability of endorsements of psychosocial causes of abdominal pain, despite an organic diagnosis for some patients, suggests that mothers do not view the identification of organic factors as ruling out the contribution of psychosocial factors. However, this study focused on the types of attributions held by mothers, rather than the strength of these attributions. It is possible that the medical evaluation altered the strength of maternal attributions rather than the overall pattern. Because mothers endorsed multiple causes and did not rate their relative importance, it was not possible to assess whether the strength of their attributions changed following medical evaluation. Thus, for example, while some mothers may continue to view psychosocial causes as contributory, they may view a medical cause as predominant following medical evaluation and treatment.

One year following the medical evaluation, the majority of mothers regarded their children's condition as improved. Mothers whose children had received an organic diagnosis tended to cite a physical remedy as responsible for the improvement, even though they continued to regard psychosocial factors as important in the etiology of their children's pain. This finding may reflect a belief that physical symptoms can be treated effectively with medical interventions without addressing psychosocial factors that contributed to these symptoms.

Limitations of the study should be considered in interpreting the results. Participants had chronic or recurrent pain and were referred to a tertiary care center for treatment. Previous research indicates that psychosocial factors may be more influential in the maintenance of pain for patients with chronic pain than for patients with acute pain (e.g., Gatchel, 1996; McGrath, 1996). Thus, psychosocial factors may have been more likely to contribute to mothers' causal attributions for pain among children in this study than would be the case for children with pain in a primary care setting. Furthermore, although this study did not detect differences in the frequencies with which mothers endorsed psychosocial causes of their children's pain, the small number of mothers endorsing each cause did not provide the power necessary to detect small group differences. Replication of the study with a larger sample size is needed to address the possibility of more subtle group differences.

This study contributes to the literature on illness attributions in several ways. First, results demonstrated that mothers of pediatric patients with abdominal pain attributed their children's pain to both psychosocial and physical factors, suggesting that mothers have a multidimensional rather than dualistic view of pain causality. Second, results indicated considerable stability in mothers' beliefs regarding psychosocial causes of their children's pain, regardless of the results of medical evaluation. The high percentage of mothers who



endorsed psychosocial causes and remedies indicates that mothers may be receptive to referrals that address these factors. Although parents may initially seek medical treatment for their children, they may be receptive to behavioral interventions (cf. McGrath, 1990) as an integral component of their children's medical treatment.

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Percentage of Mothers Indorsing Each. Item as a Probable Cause for Children's Abdominal at Initial Assessment and at 1-Year Follow-up

Table 1

Causes	Initial assessment		1-Year follow-up		P
	UP (n = 98)	PD (n = 55)	UP (n = 98)	PD (n = 54)	
<b>Physical causes</b>					
Sensitive or nervous stomach	38.8	34.5	44.4	42.9	–
Stomach producing too much acid or gas	31.6	38.2	32.7	64.8	.001
Irritation of inflammation of stomach or GI system (ulcer)	27.6	30.9	25.5	53.7	.001
Eating junk food or improper diet	21.4	25.5	20.4	20.4	–
Virus or disease	19.4	16.4	19.4	18.5	–
Constipation	14.3	9.1	16.3	14.8	–
Eating too fast or too much	12.2	18.2	12.2	13.0	–
Food allergies	9.2	5.5	8.2	9.3	–
Blockage in intestines	3.1	0.0	1.0	0.0	–
Tumor or cyst	2.0	1.8	2.0	0.0	–
<b>Psychosocial causes</b>					
Nervous, worried, tense	50.0	49.1	54.1	55.6	–
Stress	31.6	36.4	45.9	42.6	–
Putting too much pressure on him/herself	29.6	34.5	39.8	35.2	–
Being overly sensitive or overreacting to pain	28.6	16.4	19.4	16.7	–
Stomachaches getting him/her lots of attention from family	12.2	9.1	15.3	11.1	–
Having personal or emotional problems	12.2	14.5	27.6	16.7	–
Teacher at school is too harsh or demanding	10.2	14.5	19.4	16.7	–
Problems with other kids at school	8.2	12.7	9.2	11.1	–
Using sickness to get out of doing things	8.2	5.5	13.3	7.4	–
Family members not getting along with each other	4.1	10.9	7.1	9.3	–

UP = unexplained pain; PD = peptic disease. The change in the PD sample at the 1-year follow-up is due to missing data for one subject.

**Table II**

Percentage of Mothers Endorsing Each Item as a Probable Remedy for Their Children’s Abdominal Pain at Initial Assessment

<b>Remedies</b>	<b>UP (n = 98)</b>	<b>PD (n = 55)</b>
Physical remedies		
Medicine to reduce acid or gas	31.6	30.9
Medicine for healing inflammation of the stomach or GI system	27.6	40.0
Change in diet	26.5	29.1
Medicine to help digestion or settle the stomach or intestines	26.5	29.1
Eating more slowly	16.3	18.2
Getting more exercise	12.2	7.3
Remembering to try to have a BM	9.2	5.5
Laxatives	5.1	1.8
Painkiller medicine	3.1	1.8
An operation or surgery	0.0	0.0
Psychosocial remedies		
Knowing how to relax and not get worried or tense	53.1	41.8
Less stress	43.9	45.5
Not putting pressure on him/herself	35.7	38.2
Doing regular activities even when not feeling well	20.4	12.7
Learning not to be so sensitive to pain; learning to ignore it	20.4	12.7
Counseling	18.4	12.7
Family members getting along better with each other	14.3	20.0
Better relationship with kids at school	8.2	10.9
Family members giving him/her less attention when he/she is feeling bad	7.1	1.8
Having a different teacher at school	4.1	5.5

**Table III**

Primary Causes of Children's Abdominal Pain as Reported in Response to Open-ended Questions at 1-Year Follow-up (in percentages)

Causes	UP (n = 98)	PD (n = 55)
Physical causes		
Ulcers/inflammation of stomach	2.0	12.7
Improper diet	5.1	9.1
Food allergies	6.1	3.6
Viral or bacterial infections	5.1	3.6
Constipation	3.1	3.6
Sinus drainage	4.1	1.8
Eating habits	1.0	5.5
Excessive acid in stomach	1.0	5.5
Reflux	0.0	5.5
Side effects of medication	2.0	1.8
Other medical problems (e.g., menstrual problems, problems with colon, problems with pancreas, parasites)	15.3	5.5
Psychosocial causes		
Nerves, worry, emotional problems	21.4	14.6
Stress	14.3	12.7
Stress at school	13.3	7.3
Other		
Don't know	2.0	5.5
Uncodable	4.1	1.8

**Table IV**

Primary Remedy for Abdominal Pain Reported by Mothers of Children Who Had Improved at the 1-Year Follow-up (in percentages)

Remedies	UP ( <i>n</i> = 87)	PD ( <i>n</i> = 48)
Physical remedies		
Medication, surgery, or medical procedure	23.0	47.9
Change in diet	11.5	12.5
Psychosocial remedies		
Change in school situation	13.8	8.3
Change in environment	11.5	8.3
Maturation and time	6.9	2.1
Counseling	5.7	0.0
Learning to deal with stress	4.6	4.2
Understanding problem	3.4	4.2
Dealing with emotional problems	3.4	4.2
Learning to cope with pain	2.3	0.0
Other		
Uncodable	6.9	4.2
Don't know	6.9	4.2

The sample size for these analyses is based on the number of subjects reporting recovery at the 1-year follow-up; 11 mothers in the UP group and 7 mothers in the PD group did not believe that their children had improved, and therefore the sample size decreased.

**Table V**

Percentage of Mothers Endorsing Physical versus Psychosocial Factors as Probable Causes of Their Children's Abdominal Pain at Initial Assessment and 1-Year Follow-up

	Initial assessment			1-year follow up		
	Physical	Psychosocial	Neither <sup>a</sup>	Physical	Psychosocial	Neither <sup>a</sup>
UP group	13.3	18.4	16.3	19.4	8.2	59.2
PD group	10.9	25.5	50.9	23.6	7.3	63.6
						5.5

<sup>a</sup>“Neither” refers to mothers who rated neither physical nor psychosocial factors as “probable” causes of their children’s pain.

**Table VI**

Percentage of Mothers Endorsing Physical versus Psychosocial Factors as Probable Remedies for Their Children's Abdominal Pain at Initial Assessment

	Physical	Psychosocial	Both	Neither <sup>a</sup>
UP group	20.4	9.2	52.0	18.4
PD group	14.5	21.8	49.1	14.5

<sup>a</sup>“Neither” refers to mothers who rated neither physical nor psychosocial factors as “probable” remedies of their children's pain.



**Table VII**

Percentage of Mothers Endorsing the Most Common Physical and Psychosocial Causes at Both Initial Assessment and at Follow-up

Cause	UP group	PD group	<i>P</i>
Physical cause			
Sensitive or nervous stomach	71.1	57.9	ns
Stomach producing too much acid or gas	51.4	81.0	.08
Irritation or inflammation of the stomach or GI system (ulcer)	45.8	76.5	.02
Psychosocial cause			
Being nervous, worried, or tense	67.2	70.4	ns
Stress	63.9	65.0	ns
Putting too much pressure on him/herself	65.7	63.2	ns

Mothers were allowed to endorse more than one cause.