THE INFLUENCE OF MATERNAL ANXIETY, CLINICAL DIAGNOSIS, AND PRESENTATION OF MEDICAL INFORMATION ON MOTHERS' RESPONSES TO CHILDREN'S ABDOMINAL PAIN

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CHAPTER I

INTRODUCTION

Overview

When a child complains about physical symptoms, a parent's usual response is to inquire about the child's symptoms and seek ways to help the child feel better. If the symptoms persist, often the parent will take the child to the pediatrician, where the parent and doctor seek an explanation for an underlying cause and adopt a treatment plan to target symptoms and alleviate suffering. When a child's symptoms can be clearly linked to organic disease, such as strep throat, ear infection, or virus, the parent's expectations of the medical encounter are generally met—a diagnosis is made and a treatment plan implemented, with a good possibility of the child's recovery in the near future. However, when a child's symptoms do not have an identifiable organic cause, as is the case for functional symptoms such as functional abdominal pain, the outcome of the visit to the doctor may be unexpected—there is no organic diagnosis, the treatment plan does not address the cause of the symptoms, and most importantly, the child's symptoms may not be alleviated. How are functional symptoms accounted for in pediatrics and how does the experience of having a child with functional symptoms affect parents?

Functional symptoms are broadly defined as symptoms without disease (Stone, Carson, & Sharpe, 2005a). Functional symptoms are very common, accounting for up to 85% of ambulatory care visits each year for children and adults (Kroenke & Mangelsdorff, 1989). In pediatric tertiary care, functional symptoms are observed in nearly every medical specialty, such as unexplained heart palpitations in pediatric cardiology and functional abdominal pain in

pediatric gastroenterology (c.f., Campo & Fritsch, 1994). Within the existing healthcare system, it is common for pediatric patients with functional symptoms to undergo multiple, costly medical procedures to rule out disease and return for multiple follow-up medical visits in continued pursuit of the cause of the symptoms (Belmaker, Espinoza, & Pogrund, 1985; Kaplan, Ganiats, & Frosch, 2004). This pattern of increased health care utilization by patients with functional symptoms has economic importance, as these patients constitute a majority of those seeking medical care and the cost of healthcare continues to increase in the United States (Levant, 2005; Kaplan et al., 2004; Kroenke & Mangelsdorff).

Pediatric patients with functional symptoms experience high levels of disability and psychological distress (e.g., Campo & Fritsch, 1994). Moreover, patients who experience functional symptoms as children report higher levels of pain, functional disability, and health service utilization as adults compared to those without functional symptoms in childhood (Walker, Garber, Van Slyke, & Greene, 1995). Such correlates and long term emotional and behavioral outcomes underscore the negative impact of functional symptoms on patients' lives, adding to the importance of improving the understanding and treatment of patients with these conditions.

The traditional conceptual model of symptoms and disease does not explain functional symptoms nor provide treatment guidance for patients (Engel, 1977). A paradigm shift is taking place in medicine toward the adoption of a biopsychosocial model of symptoms and disease that better accounts for and provides a foundation for treatment of patients with functional symptoms (Drossman, 1998). Whether physicians approach the treatment of patients with functional symptoms from the biomedical or biopsychosocial approach likely influences the experience of patients and parents of pediatric patients (Engel, 1980). Because parents initiate health care

utilization on behalf of their children and parents' experience in the health care system influences children's experience, it is important to study parents when seeking to understand implications of different treatment approaches for pediatric patients with functional symptoms.

Health care providers' inability to explain and provide treatment for patients with functional symptoms has been associated with frustration for parents of pediatric patients (Walker, Katon, Keegan, Gardner, & Sullivan, 1997). Parents exhibit increased perceptions of symptom severity, emotional distress, and protective parenting behavior when they do not have a diagnosis, treatment plan, or prognosis for their children's symptoms and uncertainty about children's illness is high (Stewart & Mishel, 2000). This situation is often encountered when pediatric patients with functional symptoms are evaluated by providers who practice within a biomedical model (Drossman, 1998). Parents' personality characteristics, such as trait anxiety, influence their perceptions of their children's health and likely influence their interpretations of medical information about children's diagnoses (Eysenck, 1997; Hatcher, Powers, & Richtsmeier, 1993). Understanding parent and provider characteristics that influence parents' responses to a functional diagnosis has the potential to improve the clinical encounter and thereby enhance health outcomes for pediatric patients with functional symptoms.

This work addresses the following areas pertaining to functional symptoms in pediatrics. First, functional symptoms will be defined and described. Next, two questions pertaining to functional symptoms will be examined. How do biomedical and biopsychosocial models of illness explain and treat symptoms? How are parents likely to respond to information regarding children's functional symptoms when their children are treated within a biomedical versus biopsychosocial approach? Finally, directions for research will be discussed and a proposed study will be presented. Specifically, a theoretical model will be used as a framework in which

to examine the responses of mothers with high versus low anxiety to receiving a functional versus organic diagnosis of children's symptoms from a biomedical versus biopsychosocial framework.

Functional Symptoms

Definition

In defining functional symptoms, it is important first to distinguish between symptoms and disease. "Symptoms are the patient's subjective experience of changes in his or her body, whereas disease is objectively observable abnormalities in the body" (Sharpe & Carson, 2001, p. 926). Symptoms comprise the patient's *experience* of physical phenomena whereas disease represents *objective physical evidence* explaining the collection of symptoms (Aronowitz, 2001; Mayou & Sharpe, 1995; Stone et al., 2005a). Thus, symptoms and disease are separate constructs, making it possible for disease to occur in the absence of symptoms and conversely, for symptoms to occur in the absence of disease (Eisenberg, 1977; Mayou & Sharpe). Symptoms without disease, or *functional symptoms*, are the focus of this examination.

Several theoretical explanations have been offered for functional symptoms. One possibility is that an underlying disease is present that is not detectable with modern medical techniques (Aronowitz, 2001). Alternatively, individual differences in physiology, attention, and sensitization to symptoms may account for onset and maintenance of functional symptoms (Rief & Sharpe, 2004). Behavioral factors, such as reinforcement and secondary gain from the sick role, may also contribute to functional symptoms (Walker & Zeman, 1992). Environmental and psychosocial factors, such as stress from internal or external sources, also influence functional

symptoms (Mayer, Naliboff, Chang, & Coutinho, 2001; Tache, Martinez, Million, & Rivier, 1999). Specifically, research on patients with functional symptoms has demonstrated that in predisposed individuals, stressors activate *and* change the reactivity of the central nervous system, such that individuals may become vulnerable to develop functional symptoms which are re-triggered or exacerbated in reaction to subsequent stressors (Mayer et al., 2001). Thus, psychosocial factors, such as stress, interact with physiology to produce and maintain functional symptoms.

Prevalence

Functional symptoms are prevalent in both primary and specialty care settings (Stone et al., 2005a; Campo & Fritsch, 1994). A report from primary ambulatory care indicated that 85% of pediatric and adult patients had no identifiable disease to account for the symptoms for which medical treatment was sought (Kroenke & Mangelsdorff, 1989). In pediatric specialty care, the proportion of patients who present with symptoms that cannot be explained by organic disease ranges from 15% to 90% depending on the specialty area (Carson et al., 2000; Fleisher, 1999). Pediatric patients with functional abdominal pain and bowel disorders account for up to 50% of gastroenterology clinic referrals, patients with unexplained chest pain account for 92% of pediatric cardiology referrals, patients with fibromyalgia account for 25% to 40% of pediatric rheumatology referrals, and patients with chronic fatigue syndrome account for 15% of pediatric infectious disease referrals (Anthony & Schanberg, 2005; Carter, Edwards, Kronenberger, Michalczyk, & Marshall, 1995; Fleisher, 1999; Malleson, Al-Matar, & Petty, 1992; Stone et al., 2005a; Tunaoglu et al., 1995; Yunus & Masi, 1985).

One of the most common functional symptoms in pediatric patients is abdominal pain (Campo & Fritsch, 1994). Functional abdominal pain is defined as "abdominal pain that occurs in the absence of anatomic abnormality, inflammation, or tissue damage" (American Academy of Pediatrics Subcommittee on Chronic Abdominal Pain, 2005, p. e371). Chronic abdominal pain occurs in 10% to 15% of school-aged children, is more common among females than males, and is most prevalent during the middle childhood years (Apley, 1975; Apley & Naish, 1958). Most children with chronic abdominal pain do not have organic disease and meet criteria for a functional gastrointestinal disorder, such as irritable bowel syndrome (Rasquin-Weber et al., 1999; Walker et al., 2004).

Correlates and Outcomes

Functional symptoms in pediatric patients have been associated with high levels of functional disability, psychopathology, school absence, and health care utilization (Belmaker et al., 1985; Campo et al., 2004; Hodges, Kline, Barbero, & Woodruff, 1985; Liakopoulou-Kairis et al., 2002). Functional symptoms are rarely later found to be associated with organic disease (Kroenke & Mangelsdorff, 1989). A review of the pediatric literature cited that less than 10% of children initially presenting with functional symptoms were later found to have organic disease that could have accounted for those symptoms (Campo & Fritsch, 1994).

Several studies of children with functional abdominal pain have examined concurrent and long term medical and psychological outcomes in these patients. Functional abdominal pain patients demonstrate more anxious, depressive, and somatic symptoms, experience more stressful life events, and have more school absences than well children (e.g., Campo et al., 2004; Hodges et al., 1985; Walker, Garber, & Greene, 1993; Walker & Greene, 1989; Wasserman,

Whitington, & Rivara, 1988). Furthermore, children with functional GI symptoms have increased depression, more somatic symptoms, and greater functional impairment compared to children with organic GI disease (Gold, Issenman, Roberts, & Watt, 2000; Kaufman et al., 1997; Walker, Garber, & Greene, 1991). A long-term follow-up study demonstrated that patients with FAP continued to have more abdominal pain episodes, greater disability, more functional impairment, and greater health service utilization five years after initial evaluation compared to a well sample (Walker et al., 1995; Walker, Guite, Duke, Barnard, & Greene, 1998). In the same study, examination of patients' subsequent medical diagnoses revealed that only one child out of 31 was later diagnosed with an organic condition that may have accounted for his symptoms (Walker et al., 1995).

Limitations of Studies of Functional Symptoms

The study of functional symptoms in pediatric patients is hampered by difficulties in terminology, sampling, and measurement. Functional symptoms have received less research attention in children than adults, despite their common occurrence among youth (Campo & Fritsch, 1994). The use of many different terms and definitions to refer to functional symptoms makes comparison between patient populations or even between studies of the same functional symptom difficult or impossible (Aaron & Buchwald, 2001; Kroenke, 2001). Inconsistency in the instruments used to measure functional symptoms as well as variability in the medical evaluation also pose problems in this area of research (Campo & Fritsch; Kroenke). Finally, heterogeneity in the sources of recruitment—from the community, primary, and/or specialty care—makes comparison across studies difficult (Kroenke).

The Biomedical and Biopsychosocial Models

Health care providers use different models to understand, explain, and treat symptoms. The biomedical and biopsychosocial models of symptoms and disease will be reviewed.

Conceptual Models of Symptoms and Disease

The biomedical model of symptoms and disease is founded in the physical sciences of molecular biology, physics, and chemistry (Engel, 1977). There are two main assumptions underlying the biomedical model: reductionism, that symptoms can be explained by one underlying cause, and dualism, that symptoms can be dichotomized into those that can be explained by an organic etiology and those that cannot (Drossman, 1998; Engel). The biomedical model distinguishes mental processes from physical processes (Wade & Halligan, 2004). Physical medicine focuses on organically based symptoms, in which disease fully accounts for the symptoms in a direct cause and effect relationship (Drossman). Physical medicine does not have a mechanism to explain or treat symptoms without organic etiology, which are considered mental or emotional in causality. Patients with these symptoms are referred for treatment by other specialties, such as psychiatry or psychology.

Clinical practice in the biomedical model is physician-centered, with a focus on assessing symptoms as signs of disease, assigning a disease label to the collection of signs, and enacting a treatment plan to manage and ideally to cure the disease (Engel, 1977; Suarez-Almazor, 2004). Medical decision making focuses primarily on disease oriented diagnostic hypothesis testing, such as differential diagnosis (MacBryde & Blacklow, 1970). Patients are interviewed about physical factors in order to diagnose the organic cause of the symptoms (Collins, 1981).

The biopsychosocial model is similar to the biomedical model in that it is grounded in the physical sciences; however, the biopsychosocial model also incorporates behavioral and psychological sciences (Engel, 1977). In contrast to the assumptions of reductionism and dualism of the biomedical model, the biopsychosocial model is based on an assumption of multicausality; symptoms can be explained by multiple causes and can come from both mental and physical processes (Engel; Halpert & Drossman, 2005). The biopsychosocial model "integrates biological science with the unique features of the individual and determines the degree to which biological and psychosocial factors interact to explain the disease, illness, and outcome" (Drossman, 1998, p. 262). Specifically, in addition to organic disease, psychological, social, environmental, behavioral, and physiological factors also are recognized as potential contributing and interacting factors in patients' subjective experience of symptoms (Drossman; Engel; Gatchel & Maddrey, 2004; Stone et al., 2005a; Wade & Halligan, 2004). Thus, disease is only one way in which symptoms may arise (Stone et al., 2005a).

Clinical practice within the biopsychosocial model is patient-centered, with the physician relying on the patients' account of the subject experience of symptoms in order to label and heal symptoms (Engel, 1977; Suarez-Almazor, 2004). Whereas the biomedical model employs differential diagnosis in patient evaluation, the biopsychosocial model utilizes a multidimensional hypothesis testing framework (Engel, 1997). Physicians must consider multiple causes of the symptoms, including physical, social, emotional, and behavioral factors. Physicians gather data by patient interview and observation, develop hypotheses to make connections between the psychosocial factors and their interaction on the physical system, and integrate all of these data to inform diagnosis and treatment (Engel, 1980; 1997).

Application to Functional Symptoms

The differing assumptions of the biomedical and biopsychosocial models are reflected in different approaches to explaining and treating functional symptoms. In the biomedical model, the assumptions of reductionism and dualism lead to conceptualization of symptoms as coming from a single source; that is, either a physical *or* a mental process (Engel, 1977). Physical medicine focuses primarily on symptoms with organic etiologies; therefore, symptoms in the absence of disease are not explained or treated (Drossman, 1998; Sharpe & Carson, 2001; Wade & Halligan, 2004). Because functional symptoms are viewed as originating in mental processes by default, they are considered outside the realm of explanation and treatment by biomedically oriented physicians (Gatchel, 2004). Patients with functional symptoms likely would be told they are physically fine or referred to psychiatry or psychology (Engel; Fleisher, 1999).

In contrast, the biopsychosocial model's assumption of multicausality explains symptoms as coming from a variety of sources, comprising *both* physical and mental processes (Engel, 1977). Within this model, the practitioner focuses on symptoms from both organic and non-organic causes; functional symptoms are viewed as coming from one of the non-physical factors underlying illness (Engel). Thus, the biopsychosocial approach "provides the rationale and support for explanations and treatments that direct their focus to the non-medical reasons why people may feel ill" (Wade & Halligan, 2004, p. 1400). In patient care, when disease is not present, physicians look to other factors that may contribute to symptoms (e.g., behavioral, environmental, physiological, social or psychological), make a positive diagnosis to explain the symptoms, and employ a corresponding course of treatment (Stone, Carson, & Sharpe, 2005b).

Critical Summary

The biomedical model is the basis for Western medicine and dominates medical education, research, and practice (Drossman, 1998; Levant, 2005). The dominance of the biomedical model likely is based on its success in guiding major advances in biological research and evidence based medicine, successfully identifying and treating disease, and providing significant innovations in medical techniques, technologies, and therapies (Alonso, 2004; Larson, 1999). In recent years, the biopsychosocial model has been lauded for its emphasis on patient-centered care and its theoretical approach of symptom multicausality, which is supported by empirical evidence of the interaction of psychology and physiology in symptom production (Drossman, 1998; Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Mayer et al., 2001; Suarez-Almazor, 2004). A recent randomized controlled trial examining efficacy of treatment for adult back pain patients demonstrated greater improvements in symptoms and increased rates of recovery among patients who received a biopsychosocially oriented treatment compared to patients who received a biomedically oriented treatment (Schiltenwolf et al., 2006).

The conceptual distinctions between the biomedical and biopsychosocial models translate into differences in clinical practice that are magnified for the treatment of patients with functional symptoms. Research comparing the biomedical and biopsychosocial model in clinical practice for patients with functional symptoms is lacking. Research efforts have been hampered by the presence of multiple factors on which the models differ as well as the fact that many physicians do not practice in extreme forms of either model but somewhere in the middle (Roter et al., 1997). Operationalizing individual components on which the models differ, especially in the explanation of functional versus organic diagnoses, testing extreme forms of the models, and controlling those factors experimentally offer possible solutions to research challenges.

Parents' Responses to Children's Functional Symptoms: Differences in the Clinical Application of the Biomedical versus Biopsychosocial Model

Parents generally expect to receive information about diagnosis, treatment, and prognosis when seeking medical care for their children (Korsch, Gozzi, & Francis, 1968). When parents' expectations go unmet, uncertainty exists in diagnostic, treatment, and prognostic information about children's medical conditions. Uncertainty about children's illness has been associated with perception of greater symptom severity, emotional distress, and protective parenting behavior in parents of pediatric patients (Stewart & Mishel, 2000).

For parents of patients with functional symptoms, the theoretical model within which their child is treated likely impacts whether their expectations for medical care are met and the degree of uncertainty they perceive about the child's medical condition based on the information provided. Specifically, parents' expectations likely go unmet when their child has functional symptoms that are treated within the biomedical rather than biopsychosocial model, because the biomedical model offers explanations that are less likely to address parents' questions and may contribute to increased perceptions of uncertainty about children's medical condition in the case of functional symptoms.

Research on parents' cognitive, emotional, and behavioral responses to expectations of pediatric medical encounters and uncertainty about children's illness provides a foundation from which differential effects on parents of children treated within the biomedical versus biopsychosocial models can be conceptually extended.

Parents' Responses to Uncertainty in Illness

Uncertainty regarding illness has been conceptualized as the "inability to determine the meaning of illness-related events" (Mishel, 1988, p. 225). Empirical studies of parents of pediatric patients have identified sources of uncertainty about children's illness that correspond to unmet expectations in pediatrician visits. Specifically, not knowing the underlying cause of the child's condition, the absence of a treatment plan, and lack of prognostic information is associated with high parental uncertainty (Murray, 1993; Sharkey, 1995; Simon & Smith, 1992; Turner, Tomlinson, & Harbaugh, 1990). Inability to make sense of children's symptoms due to lack of context in which to interpret the information also has been associated with high uncertainty (Horner, 1997; Turner et al., 1990). Uncertainty has been shown to influence parents' cognitive, emotional, and behavioral responses to children's illnesses (Stewart & Mishel, 2000).

Several investigations have examined the cognitions associated with parents' uncertainty about children's illness. Parents of children with functional abdominal pain described themselves as feeling helpless in dealing with their children's symptoms and identified threat of serious disease as their most central concern (Van Tilburg et al., 2006). In the same study, parents' perception that something was seriously wrong with their child was associated with a strong desire to obtain a clear diagnosis and treatment plan from the physician. Parents' appraisal of the seriousness of children's conditions also has been related to children's own appraisal of the condition, symptom reporting, and passive coping behavior, such that more serious parental perceptions of illness related to poorer outcomes for children (Van Slyke, 2001). Although parental catastrophizing has not been examined specifically in relation to uncertainty about children's illness, high levels of parental catastrophic thinking about children's illness is

related to parental stress, anxiety, and depression as well as increased functional disability and poorer school attendance in children (Goubert, Eccleston, Vervoort, Jordan, & Crombez, 2006).

Investigations of uncertainty in parents pre- and post-diagnosis of children's conditions have demonstrated a decrease in parental uncertainty and perception of symptom severity once health information has been received (Hatcher, Richtsmeier, & Westin, 1989). Parents perceived the diagnosis of the child's condition as a relief compared to the high uncertainty of not knowing the underlying condition and course of treatment for the child (Horner, 1997; Murray, 1993). Parents' relief was interpreted as a function of the diagnosis providing a definitive answer for the underlying problem and outlining a solid course of treatment, enabling the parent to perceive the condition as understandable and manageable (Horner; Murray).

Uncertainty has been related to increased parental emotional distress, including anxious, depressive, and general psychiatric symptoms (Hatcher et al., 1989; Jessop & Stein, 1985; Schepp, 1991). Parental emotional distress decreases when understanding of children's condition increases (Hatcher et al.). Even parents whose children are eventually diagnosed with serious illnesses describe the period of diagnostic ambiguity as associated with the most emotional distress (Horner, 1997). The experience of not knowing what is wrong with a child while watching the child suffer resulted in parents feeling overwhelmed and frustrated (Horner).

Research also has demonstrated links between illness uncertainty and protective parenting behavior. Parents have reported that uncertain illness information undermines their confidence as a parent (Cohen & Martinson, 1988). Increased levels of uncertainty have been related to difficulties in promoting children's independence (e.g., increases in protective behavior), confusion regarding academic placement decisions, and ambivalence about assigning developmentally appropriate responsibilities (Sparacino et al., 1997). Researchers have

suggested that illness uncertainty results in parents becoming more invested in their own actions to help children overcome symptoms due to the lack of information or assistance from other sources, possibly offering an explanation for increased protective parenting (Anderson & Coyne, 1993). Although parents may have good intentions, protective parenting behavior has been associated with more school absence and higher levels of pain-related disability in pediatric patients (e.g., Brace, Smith, McCauley, & Sherry, 2000; Peterson & Palermo, 2004). In contrast, distracting parenting behavior, serving to draw children's attention away from symptoms and encourage participation in regular activities, is associated with fewer symptom complaints (Blount et al., 1992; Walker et al., 2006).

Although most studies have linked illness uncertainty to negative emotional and behavioral responses in parents, positive parental outcomes are also observed (Stewart & Mishel, 2000). Even when uncertainty is high, some parents regard the situation as an opportunity to take a new approach to life, adopt the 'one day at a time' approach, accept the realities of unpredictable outcomes, or look forward to future possibilities (Simon & Smith, 1992).

Uncertain Health Information

Several experimental studies examining effects of uncertainty in health information are relevant to the experience of parents of pediatric patients with functional symptoms (Cioffi 1991; 1994). In the first of two studies, adults took a lab test and subsequently received an indication of disease marker presence or absence and test result certainty or uncertainty (Cioffi, 1991). Participants given unclear information demonstrated increased uncertainty about the test compared to those given clear information. Participants given unclear information also demonstrated higher levels of perceived vulnerability and disease severity, and were more

convinced that they had the disease compared to participants given clear information. Moreover, participants given unclear information of disease absence *did not differ* in levels of perceived vulnerability or disease certainty from participants who were given a clear diagnosis of disease presence. That is, being told they were 'probably well' was similarly distressing to participants as being told they were 'certainly unwell.'

In a similar study, participants submitted a lab test and received results indicating either a moderate well diagnosis, indicating that everything was 'probably fine,' or a moderate disease diagnosis, indicating that they 'probably had' the disease marker (Cioffi, 1994). Again, findings suggested that participants who were told that everything was 'probably fine' demonstrated lower confidence in their health status, increased levels of worry, and greater willingness to seek treatment for the disease compared to participants who were told that they 'probably had' the disease marker. Overall, the effect of receiving uncertain health information was consistently associated with increased levels of disease certainty, disease severity, perceived vulnerability, emotional distress, and health seeking behavior compared to receiving certain health information. Notably, uncertain health information of disease absence was just as distressing to participants as was certain information of disease presence. The author of these studies concluded that "the pronouncement of 'it's probably nothing' may produce effects quite opposite of the prudent optimism it is meant to convey" (Cioffi, 1991; p. 978). Participants' uncertainty of diagnostic, treatment, and prognostic information likely contributed to results of these experimental studies.

Critical Summary

The empirical literature on parents of pediatric patients associates diagnostic, treatment, and prognostic uncertainty with perceptions of serious symptoms, emotional distress, and protective parenting behavior. Experimental research on adults demonstrated similar effects in reaction to uncertain health information. Although these findings can be linked to differences in the clinical application of the biomedical versus biopsychosocial model, no study has tested differences in parental responses to children's symptoms as a function of treatment approach.

In the biomedical model, parents of pediatric patients with functional symptoms often do not receive a diagnosis, treatment plan, or prognosis for their children's conditions and medical information is often ambiguous. Parents' encounter with this model likely would result in high levels of illness uncertainty, perceptions of severe symptoms, emotional distress, and protective parenting, which is associated with poor outcomes in children with chronic illnesses. In the biopsychosocial model, parents of pediatric patients with functional symptoms would likely receive an explanation, treatment plan, and prognosis for their children's symptoms. Parents' encounter with this model likely would result in lower levels of illness uncertainty, seriousness appraisals, and emotional distress, which in turn might lead to distracting parenting behavior, which is associated with positive outcomes in children with chronic illnesses.

Parents' Responses to Children's Functional Symptoms: The Influence of Parental Personality Factors

In addition to factors pertaining to the medical encounter, personality factors of the parent also play an important role in parents' responses to children's symptoms. Trait anxiety may influence parents' responses not only to children's symptoms, but also parents' responses to the medical information received about children's symptoms. Also, parents' beliefs about factors

that contribute to children's health likely influence parents' responses to receiving information about children's symptoms.

Trait Anxiety

Anxiety at the trait level has been described as a "stable proneness to apprehension, worry, and heightened autonomic activity" (Cameron, 2003, p. 169). High trait anxiety relates to increased attention to threatening stimuli, interpretation of ambiguous stimuli as threatening, and biased recall of information that was perceived as threatening rather than neutral (Eysenck, 1997; Spielberger, 1972). People with low trait anxiety have been shown to turn attention away from threatening stimuli, interpret ambiguous situations neutrally, and have difficulty recalling threatening information (Cameron; Wenzel, Finstrom, Jordan, & Brendle, 2005).

Anxiety is a factor that has been examined in the context of parents seeking health care for their children primarily as a function of state anxiety, or parents' feelings at a particular moment. High levels of parental state anxiety have been associated with increased health care seeking behavior and impaired judgment regarding the severity of children's symptoms (Hatcher et al., 1993). Parents with high state anxiety perceive their children's symptoms as more threatening and demonstrate poorer understanding of children's conditions than parents with low state anxiety at the time of the medical encounter (McCarthy et al., 1991; Richtsmeier & Hatcher, 1994). Several studies measuring levels of both state and trait anxiety have demonstrated higher levels of both types of anxiety in parents of children with functional abdominal pain compared to parents of well children (Garber, Zeman, & Walker, 1990; Walker & Greene, 1989). Thus, high state anxiety has been shown to negatively influence parents'

experience with children's symptoms and medical encounters, and high trait anxiety is more prevalent among parents of children with functional symptoms than parents of well children.

Accounting for personality factors of parents, such as trait anxiety, is an important first step to understanding children's experience with illness (Bonner & Finney, 1996).

> "Illness-related anxiety is not only a quality of life concern; its influence on the cognitive and behavioral processes involved in managing illness underscore its potential health consequences and further justify the development of interventions that facilitate anxiety regulation for ill or at-risk individuals" (Cameron, 2003, p. 173).

With parents' primary role in managing illness in children, understanding the influence of parental trait anxiety on their cognitive, emotional, and behavioral responses to children's symptoms has the potential to inform interventions to improve outcomes in children's health.

Symptom Attribution

Symptom attribution refers to beliefs about the cause of physical symptoms (Robbins & Kirmayer, 1991). Three styles of symptom attribution have been empirically supported; normal or transient factors, psychological or affective causes, and somatic factors, such as disease (Robbins & Kirmayer). Symptom attributions are conceptualized as one kind of illness representation in the illness schema that is activated when thinking about illness (Leventhal, Meyer, & Nerenz, 1980).

Patients' history with physical and psychiatric illness is predictive of symptom attribution style; previous physical illness is associated with more somatic attributions and psychiatric history is associated with more psychological and fewer normalizing attributions (Robbins & Kirmayer, 1991). In addition, anxiety, depression, worry, alexithymia, and neuroticism have been associated with a psychological symptom attribution style (Aronson, 2006; Robbins & Kirmayer, 1996; Wise & Mann, 1995). A somatic attribution style predicted worry in patients

with a chronic illness (Taillefer, Kirmayer, Robbins, & Lasry, 2003) and related to daily reports of somatic symptoms and frequency of doctors office visits (Aronson, 2006). Normalizing attributions have been associated with "'healthy' aspects of personality" (Aronson, p. 807).

Illness representations, including attributions, are associated with behavior in medical encounters among patients with chronic illnesses, such as likelihood of seeking medical care for symptoms and treatment adherence (Kraaimaat & Van Schevikhoven, 1988; Matthews, Siegel, Kuller, Thompson, & Varat, 1983). In the general population, symptom attribution style predicted symptom reporting behavior during medical encounters; patients with a somatic attribution style reported more physical symptoms to physicians and had more somatic symptoms that received no diagnosis whereas patients with a psychological attribution style made more psychological complaints associated with health symptoms (Robbins & Kirmayer, 1991). The authors concluded that "behaviors of patients in clinical settings are also associated with attributions" (p. 1041). A recent study of parents' illness representations for their chronically ill children demonstrated better health outcomes for children when the parent and provider shared the same illness representation style (Yoos et al., 2007).

Critical Summary

Anxiety and symptom attribution influence parents' behavior and interpretation of information during medical encounters. State anxiety influences parents' responses to children's symptoms; high anxious parents have negative responses to children's illness and the pediatric medical encounter. While this association is well documented, it is not known how trait anxiety influences parents' responses to children's functional symptoms or to the presentation of medical information by the pediatrician. Because trait anxiety is associated with a bias to interpret

uncertain information as threatening, trait anxiety may be particularly influential in parents' responses to a functional diagnosis of children's symptoms, especially when that information is presented from a biomedical approach. Trait anxiety combined with uncertain health information may be a particularly lethal combination, negatively impacting parents' cognitive, emotional, and behavioral responses to children's functional symptoms. Given the prevalence of high trait anxiety among parents of children with functional symptoms, this is a particularly important personality factor to consider when examining parental responses to children's functional symptoms.

Symptom attribution style is an important predictor of patients' behavior during medical encounters. Congruence of parents' attribution style with the health care provider is predictive of health outcomes in children, highlighting the importance of accounting for this variable in examinations of parents' responses to information received in pediatric medical encounters.

Research addressing parents' responses to children's symptoms would benefit from a theoretical framework in which to examine the influence of such personality and situational factors reviewed in these sections.

A Conceptual Model of Stress and Coping

The Lazarus and Folkman (1984) model of stress and coping provides a theoretical framework for understanding the influence of trait anxiety, clinical diagnosis, and presentation of medical information on parents' cognitive, emotional, and behavioral responses to children's symptoms.

The Stress and Coping Model

Stress is conceptualized as "a relationship between the person and the environment that is appraised as taxing or exceeding resources and endangering well being" (Lazarus & Folkman, 1984, p. 21). By this definition of stress, a situation is not inherently stressful or benign; stress results *only* when the individual appraises the encounter as threatening. Thus, cognitive components mediate the relationship between the person and the environment, such that stress is entirely accounted for by appraisal. When an encounter is appraised as threatening, the cognitions, emotions, and behavioral responses determine an individual's experience with the stressor. In the application of this framework to the current examination, children's symptoms are defined as the stressor.

Person and situational factors, consisting of characteristics of the person as well as contextual factors particular to the encounter, interact to influence a person's cognitive, emotional, and behavioral response to an encounter. Applying this framework to the current examination, trait anxiety serves as a person factor of the parent, and clinical diagnosis and presentation of medical information are situational factors pertaining to the medical encounter.

Although the appraisal, emotion, and coping process is conceptualized to follow a temporal, linear path, the model is defined as transactional to emphasize the reciprocal roles of the components. Appraisals are defined as "cognitive processes that intervene between an encounter and the reaction" (Lazarus & Folkman, 1984, p. 23). Emotions are defined as a "distinctive and organized pattern of reactions" (Lazarus, 1991, p. 208) and are conceptualized to be paired with specific appraisals (Lazarus, 1982; 1991; Smith, 1991). Emotion motivates coping, defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the internal resources

of the person" (Lazarus & Folkman, p. 141). Starting with children's symptoms as the encounter with the environment that represents the stressor, the transactional model of stress and coping (Lazarus & Folkman) provides a useful framework for guiding research on the influence of person and situational factors on parents' cognitive, emotional, and behavioral responses to children's symptoms.

Empirical Research in Parents of Pediatric Patients

There is substantial empirical support for the stress and coping model in adults with chronic illnesses (e.g., Jensen, Turner, Romano, & Karoly, 1991; Smith & Wallston, 1992). Although not as widely investigated, empirical evidence supports the stress and coping model in parents of pediatric patients as well. Primary appraisals have been shown to predict emotional distress in parents of children with a variety of health conditions (Vollrath, Landolt, & Ribi, 2004). Negative appraisals of the impact of the child's condition on the family have been associated with maternal mental health distress cross-sectionally and longitudinally (Ireys & Silver, 1996). These findings lend support to the central role of appraisal in determining distress among parents of pediatric patients.

Two studies have explicitly tested the mediating role of appraisal in parents of pediatric patients. Lustig and colleagues (1996) examined maternal appraisal of the impact of the child's condition on the family as a mediator between condition parameters (e.g., situational factors) and emotional distress in mothers of children with juvenile rheumatoid arthritis. Condition parameters were defined as characteristics of the child's illness severity, characteristics of the child's course of illness (i.e., predictability, visibility, condition duration, and prognosis) and medical service utilization. Results suggested that the relation of both the biological severity and

functional disability of the child's condition to maternal emotional distress were partially mediated by appraisal in the expected direction. That is, threatening appraisals of the child's condition severity and functional impairment, and not just objective medical severity, were associated with emotional distress in mothers.

Investigating a more comprehensive model, Thompson and colleagues (1992) tested the mediational relations between primary and secondary appraisals, depressive and anxious symptoms, and coping responses in parents of children with muscular dystrophy. Results indicated that parents' appraisal of perceived incapacity to emotionally deal with children's illness was related to higher parental emotional distress and greater use of palliative coping strategies, including escape and avoidance. Neither appraisal of the severity of children's condition nor appraisal of parents' capacity to problem-solve to deal with children's condition were significant mediators. The authors did not discuss the possible reasons for the lack of association of these appraisals to the emotional distress and coping responses. A potential explanation is that all parents found their children's condition to be threatening and only perceived emotion-focused coping potential discriminated parents with high and low emotional distress and associated maladaptive coping strategies.

Critical Summary

The literature examining the stress and coping model in parents of pediatric patients is small. Many studies focus on parents' emotion and coping responses without accounting for parents' appraisals (Hauser et al., 1993; Vollrath et al., 2004). A major difficulty for researchers in studying appraisal is in its measurement (Monroe & Kelly, 1997; Vollrath et al.). Capturing general appraisal patterns versus appraisal of a specific illness encounter accounts for a large

source of variability in the literature (Cohen, Kamarck, & Mermelstein, 1983). Measurement technique also has varied across studies, lacking a standardized questionnaire and relying upon qualitative interviewing techniques (e.g., Thompson et al., 2002). Measuring appraisal of specific illness encounters with a standardized questionnaire is important in the measurement of appraisal in parents of pediatric patients.

The Lazarus and Folkman (1984) model of stress and coping is a useful theoretical framework in which to study the influences of person and situational factors on parents' cognitive, emotional, and behavioral responses to children's symptoms.

The Current Study

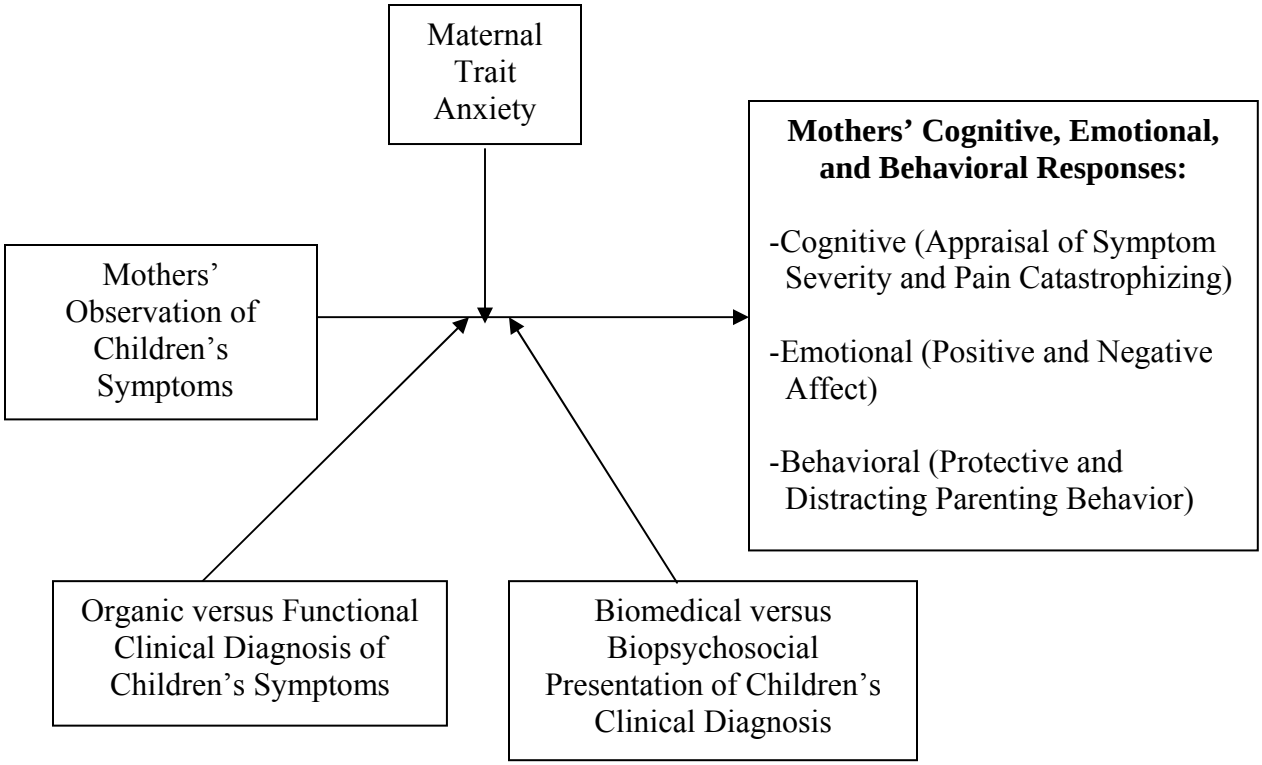
No study to date has examined differences in the application of the biomedical versus biopsychosocial model in the treatment of patients with functional symptoms. The present study used an experimental design to initiate research in this area by examining mothers' responses to receiving medical information for children's functional versus organic diagnosis presented from the biomedical versus biopsychosocial model. Maternal trait anxiety also was examined, as it was expected to influence mothers' responses to children's symptoms and interpretation of medical information and it is an important factor to consider given the strong association of trait anxiety among parents of children with functional symptoms. Symptom attribution was measured and controlled for. The stress and coping model (Lazarus & Folkman, 1984) provides a theoretical framework from which to predict effects of low versus high trait anxiety, functional versus organic diagnosis, and biomedical versus biopsychosocial presentation on mothers' cognitive, emotional, and behavioral responses to children's abdominal pain. The framework was applied to the factors under examination in the current study in the following manner.

First, mothers' observation of children's symptoms is an encounter with the environment that represents the stressor. Maternal trait anxiety is a person factor. Physician presentation of a functional versus organic diagnosis and use of a biomedical versus biopsychosocial approach are situational factors from the medical encounter. These person and situational factors interact to directly influence mothers' cognitive, emotional, and behavioral responses.

Then, mothers' beliefs about children's symptoms represent their cognitions, maternal affect is the emotional response, and parenting behavior toward the child is conceptualized as the coping response. Specific cognitive, emotional, and behavioral responses were selected for examination in the current study based on the review of the literature. Mothers' cognitive responses include appraisal of the seriousness of symptoms and catastrophic thinking. Emotional responses include positive and negative affect. Behavioral responses were focused on parenting and include both protective and distracting (e.g., focusing attention away from symptoms) parenting behavior. Although the Lazarus and Folkman (1984) model defines appraisal as a mediator between the stressor and emotional and coping responses, the design of the current study did not allow for testing of mediation. Based on empirical research, cognitive, emotional, and behavioral variables were expected to be associated with one another.

It was beyond the scope of the current study to include mothers' symptom attribution as a fourth independent variable. However, mothers' symptom attributions for children's symptoms were measured and controlled for by random assignment. It was important to ensure that mothers were evenly distributed between conditions to account for the possibility that preexisting beliefs of symptom attribution could potentially influence mothers' responses to receiving an organic versus functional diagnosis from a biomedical versus biopsychosocial perspective. Figure 1 illustrates the stress and coping model applied to the variables in the current study.

Figure 1. The Stress and Coping Model Applied to Study Variables.



Research Question and Hypotheses

Do mothers' cognitive, emotional, and behavioral responses to children's abdominal pain differ as a function of high versus low maternal trait anxiety, whether the clinical diagnosis is functional versus organic, and whether the medical information is presented from a biomedical versus biopsychosocial perspective? Based on the literature review, three main effects were predicted for anxiety, diagnosis, and presentation. Because these effects were anticipated to be strongest in the high anxious, functional, and biomedical group, a three way interaction also was expected; that is, each main effect was predicted to be moderated by the other two factors.

Main effect of trait anxiety on mothers' cognitive, emotional, and behavioral responses. Controlling for baseline, mothers with high trait anxiety will demonstrate more serious symptom appraisals, more catastrophizing, more negative affect, less positive affect, more protective parenting behavior, and less distracting parenting behavior after receiving medical information regarding children's symptoms compared to mothers with low trait anxiety.

Main effect of functional versus organic diagnosis on mothers' cognitive, emotional, and behavioral responses. Controlling for baseline, mothers presented with a functional diagnosis for children's symptoms will demonstrate more serious symptom appraisals, more catastrophizing, more negative affect, less positive affect, more protective parenting behavior, and less distracting parenting behavior compared to mothers receiving an organic diagnosis of children's symptoms.

Main effect of presentation of medical information from a biomedical versus biopsychosocial approach on mothers' cognitive, emotional, and behavioral responses. Controlling for baseline, mothers receiving a biomedical presentation of the clinical diagnosis will demonstrate more serious symptom appraisals, more catastrophizing, more negative affect, less positive affect, more protective parenting behavior, and less distracting parenting behavior compared to mothers receiving information from a biopsychosocial approach.

Interaction of trait anxiety, organic versus functional diagnosis, and biomedical versus biopsychosocial presentation on mothers' cognitive, emotional, and behavioral responses. Controlling for baseline, mothers with high trait anxiety who receive a functional diagnosis from a biomedical presentation will demonstrate the most negative pattern of responses, with more serious symptom appraisals, more catastrophizing, more negative affect, less positive affect, more protective parenting behavior, and less distracting parenting behavior compared to all other groups, which are not expected to differ from one another.

CHAPTER II

METHOD

Overview

This study was conducted in two phases. Phase one was an online screener to select participants based on level of trait anxiety (high versus low). Phase two was the actual study presented in an online format for eligible participants. Both phases of the study were approved by the medical center's Institutional Review Board and participants completed informed consent documents prior to participation.

Participants

Power Analyses

Power analyses were conducted to determine the number of participants needed to ensure adequate statistical power. The conventions of $r^2 = .25$, .09, and .01 for large, medium, and small effect sizes in correlational research were used in a series of power analyses (Cohen, 1988). These analyses revealed that power will be 1.00, .95, and .21 for large, medium, and small effects with a sample of 160 participants. Thus, a sample of 160 participants for the current study will result in adequate to excellent power to detect hypothesized effects.

Recruitment

Participants were mothers of children ages 8 through 17 years. Mothers were selected for participation because of their usual higher involvement in children's health care compared to fathers. Mothers were recruited for the screening through an email advertisement for research opportunities sent to all employees with an email address at the University's medical center. Eligibility criteria to complete the screening included (a) having a child between the ages of 8 and 17 years, and (b) internet access for study participation.

To maximize the effect of trait anxiety in the study, only mothers with high and low trait anxiety were selected for participation. Mothers who scored one-half of a standard deviation above or below the mean of published norms for adult women on the State-Trait Anxiety Inventory (STAI) were eligible for participation (Spielberger, Gorsuch, & Lushene, 1970). The mean of the STAI for adult women is 34.79 and the standard deviation is 9.22 (Spielberger et al., 1970); one-half of the standard deviation is 4.61. Mothers with scores of 30 and lower were selected for the low trait anxiety group and mothers with scores of 40 and higher were selected for the high trait anxiety group. Eligible mothers were invited to participate in the study.

Screening. Of the 393 interested mothers who responded to the email invitation, 348 participated (88%), 19 (5%) did not respond, 11 (3%) submitted incomplete surveys, and 15 (4%) declined. Scores for the STAI were calculated for the 348 participants with complete data. Scores for this sample were consistent with published STAI norms; $M = 34.90$, $SD = 9.31$. Participants were then divided into high, low, and mid level anxiety groups using the criteria described above to determine study eligibility. Roughly, this resulted in selection of participants in the top and bottom third of trait anxiety level from the screening sample; 100 participants in

the high anxiety tier and 128 participants in the low anxiety tier were eligible for study participation. The remaining 120 participants in the mid anxiety tier were not contacted.

Study. All 228 screening participants in the high and low anxiety groups were invited to participate in the study. Of those, 160 (70%) participated, 34 (15%) were interested but did not complete the study within the timeframe, 21 (9%) did not respond to the study invitation, 11 (5%) were unable to be contacted, and 2 (1%) declined. An equal number of mothers from the high and low anxiety groups participated; $N = 80$ in each group.

Measures

Screening

Two measures were administered in the screening; they are presented in Appendix A.

Trait anxiety. The State-Trait Anxiety Inventory (STAI) was used to assess mothers' trait anxiety (Spielberger et al., 1970; Spielberger, 1983). The STAI is a widely used self-report measure designed to assess levels of state and trait anxiety. In the current study, only the trait scale was used, consisting of 20 items that measure dispositional response to psychological stress (Spielberger et al., 1970). Participants rate how they generally feel on a four-point numerical scale with responses ranging from "almost never" (coded "1") to "almost always" (coded "4"). Responses are summed and can range from 20 to 80. Nine items are reverse-scored so that high scores reflect higher levels of trait anxiety.

The STAI trait scale has good psychometric properties. Two forms of the STAI trait scale have been developed; Form X is the original version (Spielberger et al., 1970) and Form Y is a revision (Spielberger, 1983). Although the two versions are highly correlated, Form Y has

demonstrated better psychometric properties and a more reliable factor structure; thus, Form Y was chosen for use in the current study (Barnes, Harp, & Jung, 2002). Alpha reliabilities ranging from .73 to .95 have been reported (Barnes et al., 2002; Spielberger, 1983). Test-retest reliabilities range from .73 to .95 (Barnes et al.; Spielberger, 1983). Alpha reliability in the current study was excellent at .91.

Symptom attribution. The Symptom Interpretation Questionnaire (SIQ) was used to assess mothers' attributions of children's health symptoms (Robbins & Kirmayer, 1991). The SIQ is a 13-item, reliable, valid measure of attributional style specific to health symptoms that yields three distinct dimensions; psychological, somatic, and normalizing (Aronson, 2006; Robbins & Kirmayer). Participants rate the degree to which they believe health symptoms in different body systems are caused by the three dimensions on a four-point numerical scale, with responses ranging from "not at all" (coded "0") to "a great deal" (coded "3"). Responses are summed by scale and means for each scale can range from 0 to 39. Alpha reliability in the current study was good for all three scales; psychological .84, somatic .82, and normalizing .83. One change was made to the original SIQ for administration in the current study. The questionnaire was reworded to reflect mothers' attributions of their children's symptoms; the original SIQ was worded such that participants responded about their own symptoms.

The SIQ was administered to assess mothers' preexisting beliefs about the contribution of psychological, somatic, and normalizing factors to children's symptoms in order to control for the potential confound of mothers' symptom attribution style in study hypothesis testing. Symptom attribution was controlled for by random assignment. While the SIQ was not used to determine study eligibility, this measure was administered in the screening to eliminate the possibility that participants' responses on the SIQ were affected by their study participation.

Study Vignettes

Vignettes are presented in Appendix B.

Child vignette. To experimentally control for mothers' observation of children's symptoms and provide a standard baseline from which to measure mothers' responses, a vignette describing a child with severe, chronic abdominal pain and pain-related disability was developed for use in the current study. The use of vignettes in this manner has been cited as a scientifically rigorous way of setting up a hypothetical situation to control study conditions and provide information for future naturalistic testing of similar constructs (Hakim-Larson, Dunham, Vellet, Murdaca, & Levenbach, 1999). Abdominal pain was chosen because of the prevalence of those symptoms in children (Apley, 1975; Campo et al., 2004) and because either a functional or an organic diagnosis can result from that symptom presentation (Fleisher, 1999). An 11-year-old female was chosen to represent the mean age and most represented gender among abdominal pain patients (Apley; Apley & Naish, 1958). Empirical research on children's complaints and correlates of abdominal pain informed the content of the vignette (e.g., Campo et al.). In the vignette, mothers were told that the child had received an examination from her primary care physician (with negative findings) and was referred to a sub-specialist for further examination, as this is a typical process for this symptom presentation (Fleisher). Mothers read the description of the child's abdominal pain and were told to imagine that this was their own child. Mothers were instructed to complete study measures while imagining themselves as the mother of the child described in the vignette.

Medical evaluation vignette. Four video vignettes of a physician presenting information from a medical evaluation of the child in the vignette were developed for use in the current study. A video format was chosen in order to make the vignettes more realistic and engaging for

participants and to best simulate the situation of mothers receiving medical information from a physician. A male pediatrician was chosen to be the physician in the medical evaluation vignette based on a recent study of the workforce in pediatric gastroenterology in the United States showing that 73% of physicians practicing in this specialty area are male (NASPGHAN, 2005).

Four different medical evaluation vignettes were developed, varying the presentation of an organic versus functional diagnosis from a biomedical versus biopsychosocial model. Participants were evenly and randomly distributed to the medical evaluation vignette conditions in a 2 x 2 between-subjects design, so that $N = 40$ viewed each vignette with an equal number of participants from high ($N = 20$) and low anxiety groups ($N = 20$) in each condition (see Table 1).

Table 1. Study Design and Participant Distribution.

	Presentation:	
Diagnosis:	**Biopsychosocial**	**Biomedical**
Organic	**Vignette 1** High Anxiety $N = 20$ Low Anxiety $N = 20$	**Vignette 2** High Anxiety $N = 20$ Low Anxiety $N = 20$
Functional	**Vignette 3** High Anxiety $N = 20$ Low Anxiety $N = 20$	**Vignette 4** High Anxiety $N = 20$ Low Anxiety $N = 20$

The medical evaluation vignettes were developed in a systematic, evidence-based manner. This process began with a review of the literature on illness schema to determine the illness representations involved in thinking about illness (Leventhal et al., 1980). Research has supported five main components of illness representations; identity, consequences, timeline,

cause, and treatment (Hagger & Orbell, 2003). These components correspond to parents' expectations for medical visits, consisting of receiving diagnostic, treatment, and prognostic information of children's symptoms (Korsch et al, 1968). This information guided the structure of the vignettes and identified areas in which to develop content.

Next, literature on the clinical application of the biomedical and biopsychosocial models was consulted. Specifically, information on addressing patients' concerns and patient education was reviewed to develop the content of the vignettes. In the biomedical model, education is focused on explaining one single underlying cause of symptoms, disease is identified as the cause of symptoms, and treatment focuses on the removal of the disease (Drossman, 1998; Wade & Halligan, 2004). For organic diagnoses, physicians practicing in the biomedical model would label the disease, explain how the disease is related to symptoms, prescribe medication to alleviate symptoms and cure the disease, follow-up with the patient, and make activity recommendations. For functional diagnoses, physicians practicing in the biomedical model would label the patient as healthy, explain that symptoms must be due to a psychiatric cause, not offer treatment or follow-up, and recommend normal activity levels due to absence of disease.

In the biopsychosocial model, physicians make a positive diagnosis, educate the patient about the condition using biological, psychological, and social contexts, explain the link between stress and symptoms, and enact a multidimensional treatment plan that addresses causes of symptoms in addition to physical factors (Chang & Drossman, 2002; Engel, 1980; Gatchel, 2004; Like & Reeb, 1984; Wade & Halligan). In contrast to the biomedical model, physicians' presentations do not differ significantly between organic and functional diagnoses. For *both* organic and functional diagnoses, physicians practicing in the biopsychosocial model would label the disease, explain how the disease is related to symptoms, prescribe medication for

organic disease, suggest psychosocial interventions such as coping strategies, follow-up with the patient, and recommend activity as a type of psychosocial intervention.

Third, a series of interviews were conducted with pediatric gastroenterologists and pediatricians to contribute to clinical content. Pediatric gastroenterology fellows were interviewed in a focus group. One-on-one interviews were conducted with an experienced pediatric gastroenterologist and an experienced pediatrician specializing in pediatric pain conditions. In the focus group, physicians were asked to discuss their approach to discussing organic and functional diagnoses with parents of pediatric patients from a biomedical versus biopsychosocial approach. In the one-on-one interviews, physicians were presented with the child vignette and were asked to present medical information about functional versus organic diagnoses from a biomedical versus biopsychosocial approach in response. In both interviews, physicians were consistent in identifying types of medical information discussed and questions typically asked by parents; specifically, explanation of examination and diagnosis, explanation of the cause of the pain, treatment recommendations, follow-up and prognosis information, and school attendance. These areas corresponded to those identified in the illness schema literature.

Fourth and finally, after the vignettes were developed with information from the resources discussed above, the vignettes were reviewed and edited by pediatricians, pediatric gastroenterologists, and pediatric psychologists. The pediatrician who filmed the vignettes contributed to the editing process by making his delivery more conversational and realistic.

The same structure was used in each of the four vignettes. Only the content of the medical information varied between vignettes; the physician, the delivery, the setting, the length, and the tone of the vignettes were held as constant as possible. In the development of the content of each vignette, the goal was to represent extreme applications of the biomedical versus

biopsychosocial model for purposes of experimental comparison. Working with pediatric gastroenterologists, gastritis was chosen as the organic diagnosis and functional abdominal pain was chosen as the functional diagnosis, because of their ecological validity and correspondence to the symptom presentation of the child in the vignette.

Vignettes consisted of six parts. First, the physician presented the results of the medical evaluation, which was identical within presentation type (biomedical versus biopsychosocial). After this introduction, information varied by medical evaluation vignette condition for the remaining five sections, which consisted of diagnosis, explanation of causality of pain, treatment, prognosis and follow-up, and school attendance recommendations. Between each section in the vignettes, the screen faded away from the physician to a blank screen with a question presented in white text. Participants were told that these questions would be presented between sections and were asked to read them as if they were asking that question of the physician. Questions were included that had been identified as frequently asked questions by parents in the physician interviews. This feature was included in order to create the feel of the dialogue that typically occurs between physicians and parents during children's medical visits, to give context to the evaluation information provided, and to increase the reality of the vignettes. Word counts and playing time of the vignettes were similar across conditions (see Appendix B). Validity was assessed by participants' ratings of the realistic quality of the medical evaluation vignettes.

Study Baseline and Response

Mothers completed four measures about how they would think, feel, and act if they were the mother of the child described in the vignette. For each measure, the stem of the question that participants' responded to was revised to evoke a state-like response. Participants were

prompted to answer items based on how they were thinking or feeling "right now" and were reminded to continue imagining that they were the mother of the child presented in the vignette. Mothers completed the same four measures at baseline (before viewing the medical evaluation vignette) and response (after viewing the medical evaluation vignette), presented in Appendix C.

Cognition. Two measures were used to assess mothers' beliefs of children's abdominal pain. First, the Pain Beliefs Questionnaire (PBQ) was used to measure of parents' appraisals of the seriousness of children's abdominal pain (Van Slyke, 2001; Walker, Smith, Garber, & Claar, 2005). The PBQ is a 32-item self-report measure that yields three sub-scales; only the primary appraisal sub-scale was used for this study, assessing parents' perceptions of the seriousness of children's abdominal pain. Participants rate how true each statement is for them on a five-point scale with responses ranging from "not at all true" (0) to "very true" (4). Items are scored so that high scores reflect parents' perceptions of more serious pain. Responses are summed and averaged to create mean scores that can range from 0 to 4.

The PBQ was developed in a sample of parents of children with functional abdominal pain and demonstrates good reliability and validity (Van Slyke, 2001). Several changes were made to the PBQ for use in the current study. Only items of the primary appraisal sub-scale of the PBQ that were most relevant to the research question and study design were chosen for administration. This resulted in the inclusion of 4 items reflecting condition seriousness, eliminating questions related to pain episodes, frequency, and duration. Because of the imagined nature of the child vignette that mothers' were referencing in their responses, the other items on this sub-scale pertaining to episodic pain as well as pain duration and intensity were deemed inappropriate and therefore were excluded. The alpha reliability for the scale used in the current study was low, .66 at baseline and .67 at response, likely because of the few items retained.

Second, mothers' catastrophic thinking about children's pain was assessed with the parent version of the Pain Catastrophizing Scale (PCS-P; Goubert et al., 2006). Conceptually, pain catastrophizing has been regarded as cognitions specific to the threat of pain and confidence of ability to effectively cope with it (Severeijns, Vlaeyen, & van den Hout, 2004). The PCS-P is a 13-item self-report measure designed to assess magnification ("I become afraid that my child's pain may get worse"), rumination ("I can't seem to keep it out of my mind"), and helplessness ("I feel I can't go on") specifically related to parents' perception of children's pain. Participants indicate the degree to which they experience each of the thoughts and feelings related to children's painful episodes on a 5-point scale ranging from "not at all" (coded as "0") to "all the time" (coded as "4"). Items are summed and averaged, producing a total mean score than can range from 0 to 4. Higher scores are associated with higher pain catastrophizing responses.

The original PCS was developed from dimensions of catastrophizing supported in the empirical literature, including attentional bias to pain-related thoughts, exaggeration of pain threat, and a helpless orientation to coping with pain (Sullivan, Bishop, & Pivik, 1995). Exploratory and confirmatory factor analyses have supported these dimensions as related and separate constructs, with correlations between factors ranging between $r = .30$ to $r = .50$ (D'Eon, Harris, & Ellis, 2004; Sullivan et al., 1995). Discriminant and construct validity have been demonstrated for this measure; although pain catastrophizing is highly correlated with negative affect and trait anxiety, it is a unique predictor of pain (Osman et al., 2000; Sullivan et al.). Alpha reliabilities for the total score have been reported between .87 and .95 (Osman et al.; Sullivan et al.). Test-retest reliability reports range from .70 to .75 (Sullivan et al.). Alpha reliability for the current study was excellent; .92 at baseline and .93 at response.

Emotion. Mothers' affect was assessed with the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a widely used, validated, and reliable measure of affect in adults. The measure is comprised of two 10-item mood scales for negative affect (NA) and positive affect (PA). NA and PA reflect dispositional dimensions, with high NA including feelings of distress and high PA including feelings of pleasure. Participants rate how much they experience ten positive emotions and ten negative emotions on a 5-point numerical scale ranging from "very slightly or not at all" (coded "0") to "extremely" (coded "4"). Item ratings are summed and a mean is obtained for each mood scale that can range from 0 to 4. Items are scored so that higher scores correspond to higher levels of positive or negative affect.

The PANAS has excellent psychometric properties. The measure is internally consistent and reliable (Watson et al., 1988). The factor structure supporting two scales corresponding to NA and PA has been empirically validated (Crawford & Henry, 2004; Watson et al.). The PANAS demonstrates convergent and discriminant validity (Watson et al.). The PANAS has demonstrated reliability across multiple populations (Crawford & Henry). The reliability of the NA scale has been reported between .84 and .87 and the reliability of the PA scale has been reported between .86 and .90 (Crawford & Henry; Watson et al.). Test-retest reliability has been demonstrated as stable (Watson et al.). Alpha reliability for this study was adequate for NA (.91 at baseline and .94 at response) and PA scales (.79 at baseline, .86 at response).

Behavior. Protective and distracting parenting behavior was assessed with the Adult Responses to Children's Symptoms (ARCS) inventory (Van Slyke & Walker, 2006). The ARCS is a 28-item self-report instrument designed to measure parents' responses to children's pain episodes. Two sub-scales of the ARCS were used for the current study: Protective, consisting of parental care-taking behaviors that limit children's activities and place them in a passive sick role

("Give your child special privileges"), and Distracting, consisting of parental efforts to draw children's attention away from symptoms and encourage children's usual activities while monitoring pain ("Ask your child what you can do to help"). Participants rate how often they respond to children during pain episodes in the manner described by each item on a 5-point numerical scale ranging from "never" (coded "0") to "always" (coded "4"). Responses are summed by scale and a mean score for each scale is obtained that can range from 0 to 4.

The ARCS was developed from two measures of parental solicitous behavior corresponding to the sick role, the Illness Behavior Encouragement Scale (Walker & Zeman, 1992) and the Social Learning Scale for Adults (Whitehead, Winget, Fedoravicius, Wooley, & Blackwell, 1982). The ARCS has been validated on a sample of parents of children with functional abdominal pain (Van Slyke & Walker, 2006). The three general factors of parenting behavior measured by the instrument were supported by exploratory factor analysis. Correlation analyses demonstrated independence of the three factors, with the highest correlation between factors at an order of $r = .41$. Alpha reliabilities were excellent for the Protective scale, .91 at baseline and .91 at response and low for the Distracting scale, at .67 baseline and .65 at response.

Medical Evaluation Vignette Review and Demographic Measures

The final set of study questionnaires assessed mothers' satisfaction with the physician in the medical evaluation vignette, how realistic mothers believed the medical evaluation vignette was, the health status of mothers' own children, and mothers' demographic information. These questionnaires were administered at the end of the study, after all baseline and response questionnaires had been completed. Items assessing satisfaction with the physician and vignette reality were presented together in a questionnaire titled "Video Review." Participants were

instructed to answer items on the Video Review measure based on their viewing of the medical evaluation vignette. Mothers were instructed to answer child health and demographic questionnaires reflecting themselves and their own families, unrelated to the vignettes. These measures are presented in Appendix D.

Satisfaction with physician. A three-item questionnaire was created for use in the current study to assess mothers' satisfaction with the physician in the medical evaluation vignette. Questions were derived from a review of the literature on parents' satisfaction with pediatric providers in the outpatient setting and items were selected that made sense in the context of the medical evaluation vignette utilized in the current study (Simonian, Tarnowski, Park, & Bekeny, 1993). Participants rated the degree to which they found the physician effective at communicating, competent, and concerned on a five-point scale ranging from "not at all" (coded as "0") to "extremely" (coded as "4"). Responses were summed and averaged to yield a total mean score that could range from 0 to 4. Items were worded so that high scores reflect more satisfaction. Alpha reliability was good at .86.

Vignette validity. To assess the validity of the medical evaluation vignettes, participants were asked to rate how realistic they thought the medical evaluation vignette was. Participants rated the degree to which they found the medical evaluation vignette realistic on a five-point scale ranging from "not at all" (coded as "0") to "extremely" (coded as "4"). The item was worded so that high scores reflect ratings of a more realistic scenario.

Child health information. Mothers completed the Child Health History (CHH) questionnaire, a measure designed for use in the current study to collect information about their children's chronic medical conditions and gastrointestinal disorders.

Mothers' demographic information. Mothers completed the Mother Information Form (MIF), designed for use in the current study to collect demographic information about study participants, including employment, education, age, ethnicity, and number of children.

Procedure

Screening

Participants were invited to participate in the screening by a mass email advertisement sent through the University's email system to all employees' with an email address at the University medical center. In the email, mothers of children ages 8 to 17 were invited to participate in an online survey about mothers' beliefs about children's health. Interested persons contacted the study coordinators and were sent an email with a link to the online screening surveys. Participants completed the surveys online and responses were tracked and recorded with the use of an online survey collection system. The screening was constructed so that no questions could be skipped, items could only be marked with one answer, and no changes could be made after survey submission. Participants' names were entered into a drawing upon completion of the screening; one in every 25 participants won a $25 gift certificate as a thank-you for participation.

The screening consisted of a consent form and two measures. The STAI was used to assess trait anxiety levels to determine eligibility for study participation. The SIQ assessed mothers' attributions for children's general health symptoms. All instructions and questionnaires were presented online. Participants were instructed to contact study personnel with questions.

Fewer than one percent of screening participants contacted study personnel with questions about the study or problems with the online survey system.

Study

Eligible mothers (i.e., those mothers in the high and low trait anxiety groups based on the screening) were contacted and invited to participate in the study by email. The study was described as an online study to learn more about how mothers think about their children's health before and after medical evaluations. Mothers were told that the study required them to watch a video and answer questions in an online format.

Mothers who responded to the study invitation were randomly assigned to one of four medical evaluation vignette conditions with the use of a random numbers chart. Mothers were then sent an email with a link to the online study that included a link to watch the medical evaluation vignette video pertaining to their condition. Mothers were instructed to complete the study in one sitting without interruptions and were advised to set aside 30 minutes to do so. Mothers read the child vignette, completed baseline questionnaires, viewed the medical evaluation vignette pertaining to their condition, completed response questionnaires, and finally completed medical evaluation vignette review (satisfaction with physician and realistic quality of the vignette) and demographic questionnaires. All instructions and questionnaires were presented online. The study was constructed so that no questions could be skipped, items could only be marked with one answer, and no changes could be made after survey submission. Participants were instructed to contact study personnel with questions. Fewer than one percent of study participants contacted study personnel with questions about the study or problems with

the online survey system. Mothers were mailed $10 for their participation after responses were submitted. The order of presentation of measures is presented below in the study timeline.

Study Timeline.

1. Informed consent
2. Child vignette
3. Baseline measures
    a. Pain Beliefs Questionnaire (PBQ)
    b. Pain Catastrophizing Scale-Parent (PCS-P)
    c. Positive and Negative Affect Schedule (PANAS)
    d. Adult Responses to Children's Symptoms (ARCS)
4. Medical evaluation vignette
5. Response measures
    a. Pain Beliefs Questionnaire (PBQ)
    b. Pain Catastrophizing Scale-Parent (PCS-P)
    c. Positive and Negative Affect Schedule (PANAS)
    d. Adult Responses to Children's Symptoms (ARCS)
6. Medical evaluation vignette review and demographic measures
    a. Video Review (satisfaction with physician & vignette reality)
    b. Child Health History (CHH)
    c. Mother Information Form (MIF)
7. Payment

CHAPTER III

RESULTS

Preliminary Data Screening

Prior to hypothesis testing, data were examined in a series of analyses to describe the population of study, to assess associations between demographic and baseline variables, and to evaluate the success of study randomization procedures by testing for differences in demographic variables between medical evaluation vignette conditions.

Descriptive Statistics

Table 2 presents descriptive statistics for demographic and symptom attribution variables. Participants were an average of 41 years of age. The majority of participants reported having some college experience or a technical degree, followed by college graduates, those with professional degrees, and high school graduates. Participants' ethnicity was reflective of the region in which the study was conducted; the majority of participants were Caucasian, followed by participants who reported their ethnicities as African-American, Asian-American, Hispanic, and Pacific Islander. On average, participants had two children. One quarter of the sample had a child with a chronic condition; asthma was the most frequent response ($N = 25$). Of mothers of children with a chronic condition, two-thirds described the condition as mild. One quarter of participants had a child with a gastrointestinal condition; irritable bowel syndrome ($N = 12$) and reflux or esophagitis ($N = 12$) were tied for the most frequent response. Mothers attributed their children's symptoms to normalizing factors more than to psychological or physiological factors.

Overall, examination of the descriptive statistics for demographic variables revealed that participants were a representative sample of the population under investigation with experience caring for their children during times of illness and a normalizing symptom attribution style.

Table 2. Descriptive Statistics for Demographic and Symptom Attribution Variables.

	Mean (*M*) (or percentage)	**Standard Deviation (*SD*)**	**Range**
Mothers' Age (MIF)	41.42	6.84	26-56
Number of Children (MIF)	2.18	.92	1-5
Mothers' Employment (MIF)	100% of mothers were employed		
Mothers' Highest Educational Level (MIF)	6% high school graduate 36% some college or technical degree 34% college graduate 24% professional degree		
Mothers' Ethnicity (MIF)	77% Caucasian 16% African-American 3% Asian-American 3% Hispanic 1% Pacific Islander		
Child With a Chronic Health Condition (CHH)	27% had a child with a chronic health condition		
Child With a GI Condition (CHH)	25% had a child with a GI condition		
Psychological Attributions (SIQ)	10.08	5.72	0 – 24
Somatic Attributions (SIQ)	9.01	5.55	0 – 30
Normalizing Attributions (SIQ)	20.01	6.43	6 – 35

Association of Demographic and Baseline Variables

Pearson correlations were calculated between continuous demographic and baseline variables to examine preexisting relations prior to data analysis and are presented in Table 3.

Table 3. Pearson Correlation Values Between Demographic and Baseline Variables.

	STAI Trait Anxiety	PBQ Seriousness Appraisal	PCS Pain Catastrophizing	PANAS Positive Affect	PANAS Negative Affect	ARCS Protective Parenting	ARCS Distracting Parenting
Maternal Age	.01	-.19*	-.16*	-.10	-.17*	-.03	-.14
Number of Children	-.04	.09	.02	.01	.01	.01	-.08
Psychological Attributions (SIQ)	.20*	-.01	.07	.04	.10	.05	.13
Somatic Attributions (SIQ)	.17*	.22^{+}	.16*	-.01	.19*	.19*	.06
Normalizing Attributions (SIQ)	.01	.07	.01	.06	.07	.02	-.01

* $p < .05$

$^{+}$ $p < .01$

There were several significant correlations between demographic and baseline variables. Age was significantly inversely related to appraisal of pain seriousness, pain catastrophizing, and negative affect. The greater maternal age, the significantly less serious pain appraisal, catastrophizing, and negative affect reported at baseline. Two scales of the SIQ demonstrated significant correlations with baseline variables. Psychological symptom attributions significantly

and positively related to trait anxiety; high anxiety was associated with a more psychological symptom attribution style and low anxiety was associated with a lesser psychological symptom attribution style. The somatic scale of the SIQ was significantly and positively related to trait anxiety, pain seriousness appraisals, pain catastrophizing, negative affect, and protective parenting. A stronger somatic symptom attribution style was associated with high trait anxiety and greater appraisals of pain seriousness, pain catastrophizing, negative affect, and protective parenting; a lesser somatic attribution style was associated with low trait anxiety and lower pain seriousness appraisals, pain catastrophizing, negative affect, and protective parenting at baseline.

Multivariate analyses of variance (ANOVAs) were performed between categorical demographic variables and baseline variables to assess preexisting relations of these variables prior to data analysis. There was a main effect of education on baseline variables; $\underline{F}$ (152) = 3.95, $p < .001$. Participants with lower levels of education reported significantly more catastrophizing, positive and negative affect, and protective and distracting parenting behavior at baseline than participants with higher levels of education.

There also was a main effect of ethnicity on baseline variables; $\underline{F}$ (152) = 8.35, $p < .001$. Non-Caucasian participants reported significantly more serious pain appraisals, catastrophizing, positive and negative affect, and protective parenting at baseline than Caucasian participants.

Finally, there was a main effect of having a child with a GI condition on maternal trait anxiety; $\underline{F}$ (1, 158) = 5.53, $p < .05$. Mothers of a child with a GI condition had significantly higher levels of trait anxiety than mothers of well children.

Overall, although there were some significant associations between demographic and baseline variables, these associations were low, suggesting that it is unlikely that participants' responses were differentially influenced by demographic variables across conditions.

Randomization Evaluation

Demographic and symptom attribution variables were examined for differences between the four medical evaluation vignette conditions and high and low trait anxiety groups. Due to random assignment of participants to condition, no differences in demographic variables were expected between conditions (diagnosis; presentation model). It was anticipated that anxiety could demonstrate a main effect among some demographic and symptom attribution variables based on the trait nature of this variable and selection of high and low anxiety participants. Univariate ANOVAs were performed for continuous variables to test the main and moderating effects of diagnosis, presentation, and anxiety. Chi-squares were performed for categorical variables to test main and moderating effects of diagnosis, presentation, and anxiety.

Overall, as predicted, results of the majority of analyses were non-significant. This suggests that random assignment was successful in evenly distributing participants between conditions. There were several exceptions of significant effects with anxiety.

There were four significant effects of anxiety with demographic variables. Education level (χ^2 (4) = 10.41, $p < .05$) and having a child with a GI condition (χ^2 (1) = 4.80, $p < .05$) demonstrated main effects with anxiety. Mothers with high anxiety had significantly lower education levels and more children with GI conditions than mothers with low anxiety.

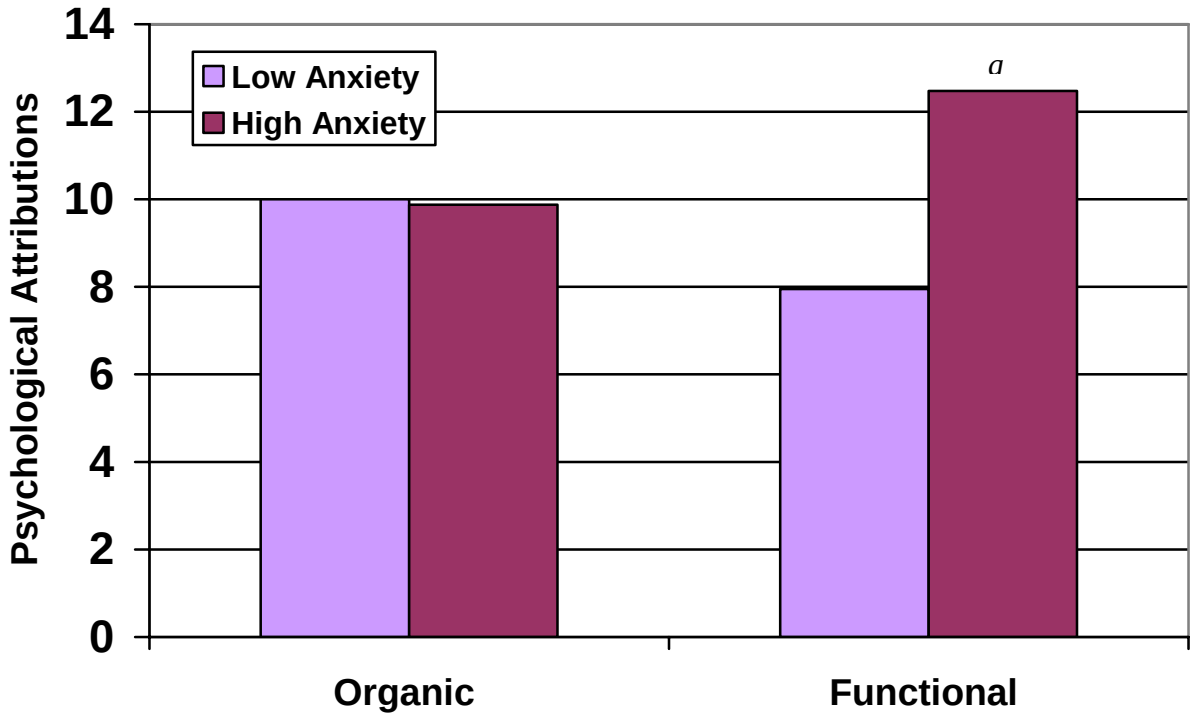
There also was an interaction effect of anxiety and presentation on having a child with a GI condition; χ^2 (3) = 10.13, $p < .05$. Examination of the counts revealed that mothers with low anxiety who received a biopsychosocial presentation in the medical evaluation vignette had significantly fewer children with GI conditions compared to mothers with low anxiety who received a biopsychosocial presentation, and mothers with high anxiety who received either a biomedical or biopsychosocial presentation.

Finally, there was a significant three-way interaction effect of anxiety, diagnosis, and presentation on maternal age, F (150) = 7.46, $p < .01$. Least Significant Difference comparisons revealed that mothers in the Low Anxiety Organic Biomedical group were significantly younger than mothers in the Low Anxiety Functional Biomedical group (*Mean Difference (MD)* = -5.05, *SE* = 2.13, $p < .05$), High Anxiety Organic Biomedical group (*MD* = -5.70, *SE* = 2.13, $p < .01$), and High Anxiety Functional Biopsychosocial group (*MD* = -4.70, *SE* = 2.13, $p < .05$). In addition, mothers in the High Anxiety Functional Biomedical group were significantly younger than mothers in the High Anxiety Organic Biomedical group (*MD* = -4.30, *SE* = 2.13, $p < .05$).

There were three significant effects of anxiety on symptom attribution variables. There was a main effect of anxiety on the somatic attribution scale; F (152) = 4.64, $p < .05$. Mothers with high anxiety attributed children's symptoms to physiological causes significantly more than low anxious mothers (High Anxiety *M* = 9.94, *SD* = 5.64; Low Anxiety *M* = 8.08, *SD* = 5.34).

There also was a main effect of anxiety on psychological symptom attribution; F (152) = 6.47, $p < .05$. Mothers with high anxiety attributed children's symptoms to psychological causes significantly more than mothers with low anxiety (High Anxiety *M* = 11.18, *SD* = 5.67; Low Anxiety *M* = 8.98, *SD* = 5.60). There also was an interaction effect of anxiety and diagnosis on psychological symptom attribution; F (152) = 7.22, $p < .01$. Least Significant Difference comparisons indicated that mothers with high anxiety who received a functional diagnosis attributed children's health symptoms to psychological causes significantly more than mothers with high anxiety who received an organic diagnosis (*MD* = 2.60, *SE* = 1.24, $p < .05$), and mothers with low anxiety who received either a functional diagnosis (*MD* = 4.53, *SE* = 1.24, $p < .001$) or organic diagnosis (*MD* = 2.48, *SE* = 1.24, $p < .05$). This interaction effect is illustrated in Figure 2.

Figure 2. Interaction Effect of Anxiety and Diagnosis on SIQ Psychological Scale.



a The High Anxiety Functional group was significantly greater than the other three groups, $p < .05$. There were no other significant differences between groups.

Of the demographic variables with significant effects in the randomization evaluation, only maternal age and symptom attribution variables were significantly associated with baseline variables. Due to this potential confound, maternal age and symptom attribution variables were entered as covariates on all analyses performed in study hypothesis testing. Maternal age and the three symptom attribution scales were not significant covariates and the pattern of results remained the same for all analyses. Therefore, preexisting differences in maternal age and symptom attribution between anxiety groups and conditions did not account for the significant effects observed in hypothesis testing. These variables were not included in hypothesis testing.

In summary, while analyses of demographic and symptom attribution variables revealed several significant effects with anxiety, there were no significant effects solely with diagnosis and presentation, suggesting that overall, random assignment to medical evaluation vignette conditions was largely successful. Symptom attribution was even between groups. Given the number of tests, it is possible that these significant effects were spurious and due to chance. It is also possible that this was an effect of chance in randomization procedures. Additionally, the trait nature of anxiety may have contributed to these associations. Overall, participants were evenly distributed among the medical evaluation vignettes based on demographic variables and beliefs about attribution of children's symptoms. Moreover, preexisting associations of demographic and symptom attribution variables to baseline variables are not likely to differentially affect mothers' responses across conditions based on this even distribution.

Hypothesis Testing

Analytic Strategy

Three sets of analyses were conducted to address the research hypotheses. First, baseline variables were examined descriptively and univariate ANOVAs were conducted to test main and moderating effects of anxiety (high versus low trait anxiety), diagnosis (functional versus organic diagnosis), and presentation (biomedical versus biopsychosocial presentation of medical information) on mothers' baseline cognitive, emotional, and behavioral responses to the children's abdominal pain. Second, paired t-tests were conducted to test the effect of time from before to after viewing the medical evaluation vignette for all dependent variables, collapsed across medical evaluation vignette conditions and trait anxiety groups. Third, univariate

analyses of covariance (ANCOVAs) were conducted. Controlling for baseline, main and moderating effects of anxiety, diagnosis, and presentation were tested on mothers' cognitive, emotional, and behavioral responses to children's symptoms after viewing the medical evaluation vignette. Least Significant Difference comparisons were used to determine the direction of significant interactions. Adjusted means and standard errors for response measures, controlling for baseline values, are presented in the text and figures. Effect sizes were calculated for significant main and interaction effects for all analyses and were interpreted with Cohen's (1988) definition for small (d = .2), medium (d = .5), and large effect sizes (d = .8).

This analytic strategy was based on the following rationale. The research questions of the current study focused on measuring change from baseline, where participants' scores were not expected to differ, to response, where participants' scores were expected to differ as a function of the experimental manipulation. Both ANCOVA and repeated measures ANOVA (RMANOVA) are appropriate pre-post tests that were considered to examine these research questions. ANCOVA is a test that holds the baseline value constant, so that any response value demonstrating a difference is interpreted as a differential change from baseline as a function of the manipulation. RMANOVA does not hold initial values constant or control for initial differences; this test measures change from the actual initial value to the response value. For the current study, ANCOVA was chosen as the most appropriate test because it held initial values constant and isolated the impact of the manipulation pertaining to the research questions. Overall, the combination of using ANOVAs to test baseline differences, paired t-tests to examine overall effects of time, and ANCOVAs to test the effects of the study manipulation provided the most direct estimate of any baseline differences (or absence of), effects of time, and differential changes across groups.

Baseline Analyses

Descriptive statistics. Table 4 presents descriptive statistics for baseline variables.

Table 4. Descriptive Statistics for Cognitive, Emotional, and Behavioral Baseline Variables.

	Mean	**Standard Deviation**	**Range**
Pain Seriousness Appraisal (PBQ)	2.70	.72	0.5 – 4.00
Pain Catastrophizing (PCS)	2.37	.82	.54 - 3.85
Positive Affect (PANAS)	2.01	.68	.2 – 3.80
Negative Affect (PANAS)	1.95	.91	0 – 4.00
Protective Parenting (ARCS)	1.95	.69	.47 – 3.80
Distracting Parenting (ARCS)	3.11	.45	1.38 – 4.00

On average, participants reported mid-levels of pain seriousness appraisals and catastrophic thinking about children's pain, mid-levels of positive and negative affect, mid-levels of protective parenting behavior, and high levels of distracting parenting behavior. This corresponds to "somewhat" and "moderate" response categories of the rating scales. Given the imagined nature of the child vignette, this mid-level of response is reasonable and provides an adequate baseline from which to measure differential change in response to the four medical evaluation vignettes and as a function of trait anxiety group.

Association among baseline variables. Based on the theoretical framework of the study, associations between cognitive, emotional, and behavioral variables were expected. Pearson correlations calculated among baseline variables are presented in Table 5.

Table 5. Pearson Correlation Values Between Baseline Study Variables.

	STAI Trait Anxiety	PBQ Seriousness Appraisal	PCS Pain Catastrophizing	PANAS Positive Affect	PANAS Negative Affect	ARCS Protective Parenting	ARCS Distracting Parenting
STAI Trait Anxiety	1.0	-.07	.16*	.02	.27^{+}	.07	.02
PBQ Seriousness Appraisal		1.0	.41^{+}	.20*	.35^{+}	.38^{+}	.21^{+}
PCS Pain Catastrophizing			1.0	.36^{+}	.80^{+}	.53^{+}	.44^{+}
PANAS Positive Affect				1.0	.35^{+}	.35^{+}	.46^{+}
PANAS Negative Affect					1.0	.51^{+}	.37^{+}
ARCS Protective Parenting						1.0	.58^{+}
ARCS Distracting Parenting							1.0

* $p < .05$

$^{+}$ $p < .01$

As expected, there were many significant correlations. Trait anxiety was significantly and positively related to pain catastrophizing and negative affect. All baseline measures of mothers' cognitive, emotional, and behavioral responses were significantly and positively related to one another; specifically, pain seriousness appraisals, pain catastrophizing, positive and

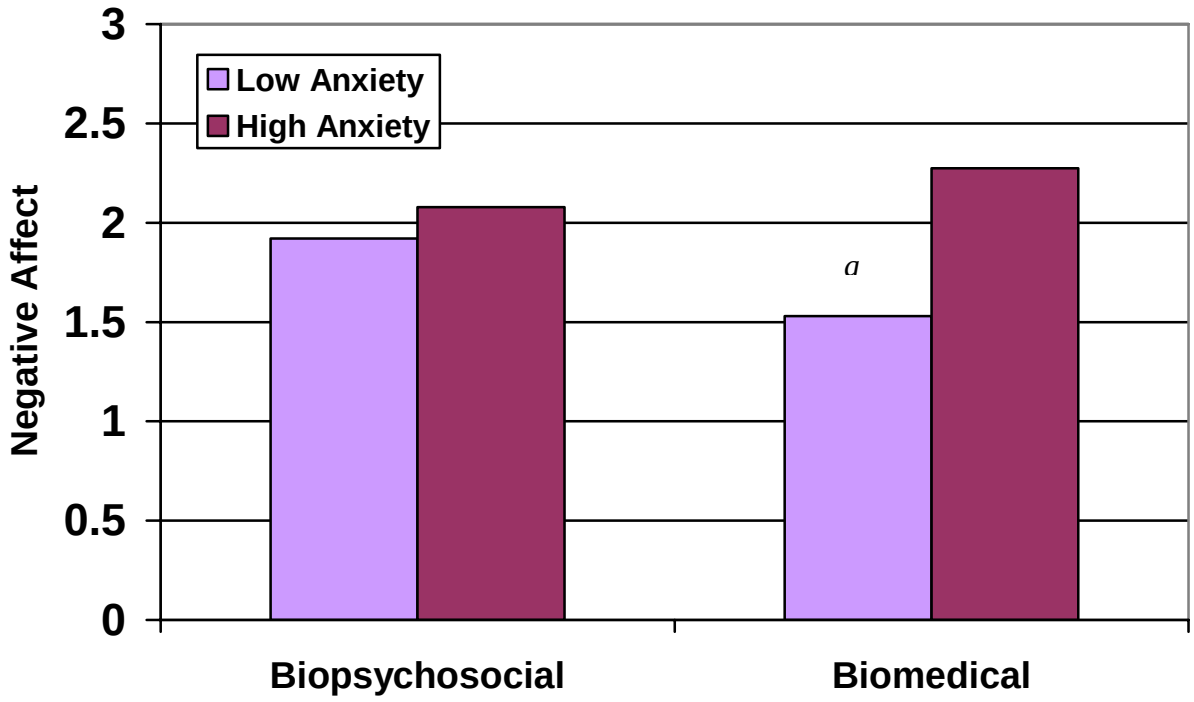
negative affect, and protective and distracting were all significantly and positively associated. Participants responded in a consistent pattern; high cognitive, emotion, and behavioral responses versus low cognitive, emotion, and behavioral responses. It is noteworthy that pain catastrophizing and negative affect demonstrated a very high correlation value, r = .80. It is likely that these variables measure a similar construct, which has been supported in the literature (Osman et al., 2000; Sullivan et al., 1995). Due to this high correlation, it was hypothesized that these variables would demonstrate a similar pattern of results in hypothesis testing.

Randomization evaluation. Finally, baseline variables were examined for differences across medical evaluation vignette conditions and trait anxiety groups to determine the success of randomization procedures. Due to random assignment and the fact that the baseline assessment occurred prior to experimental manipulation, no differences in these variables were expected. It was anticipated that anxiety could demonstrate a main effect among baseline variables based on the trait nature of this variable. Results of analyses were non-significant, suggesting that random assignment was successful and participants responded uniformly to the child vignette between conditions, with three exceptions.

A main effect of anxiety on negative affect, F (152) = 10.53, $p < .01$, indicated that mothers with high trait anxiety had significantly more negative affect than mothers with low trait anxiety at baseline (High Anxiety $M = 2.18$, $SD = .91$; Low Anxiety $M = 1.73$, $SD = .86$). Effect size calculations showed a medium effect size of $d = .53$. Research has demonstrated a strong association between trait anxiety and negative affect (Watson et al., 1988). There also was an interaction effect of anxiety and presentation on negative affect, F (152) = 4.45, $p < .05$. Least Significant Difference comparisons indicated that mothers with low trait anxiety who viewed a biomedical vignette reported significantly lower negative affect at baseline compared to mothers

with low trait anxiety who viewed a biopsychosocial vignette (*MD* = -.39, *SE* = .20, *p* = .05), mothers with high anxiety who viewed a biomedical vignette (*MD* = -.74, *SE* = .20, *p* < .001), and mothers with high anxiety who viewed a biopsychosocial vignette (MD = -.55, SE = .20, *p* < .01). The interaction effect size was small, *d* = .33. This effect is depicted in Figure 3.

Figure 3. Interaction Effect of Anxiety and Presentation on Baseline Negative Affect.



a The Low Anxiety Biomedical group was significantly lower than the other three groups, *p* < .05. There were no other significant differences between groups.

Finally, there was a main effect of diagnosis on protective parenting; F (152) = 3.88, *p* = .05. Mothers assigned to a functional diagnosis condition scored significantly higher on the

protection scale of the ARCS than mothers in an organic diagnosis condition (Functional M = 2.05, SD = .64; Organic M = 1.84, SD = .74). This was a small effect size, d = .32.

Overall, the majority of baseline tests were non-significant, indicating that mothers did not differ on cognitive, emotional, and behavioral measures prior to viewing the medical evaluation vignettes. There were three significant effects with baseline measures; two main effects and one interaction effect. Given the number of tests performed, these significant differences at baseline could be spurious and due to chance. Two significant effects were with anxiety; the trait level nature of this variable likely contributed to these differences at baseline prior to experimental manipulation. Baseline scores were controlled for in analyses of response measures; however, effects demonstrating differences at baseline were interpreted with caution.

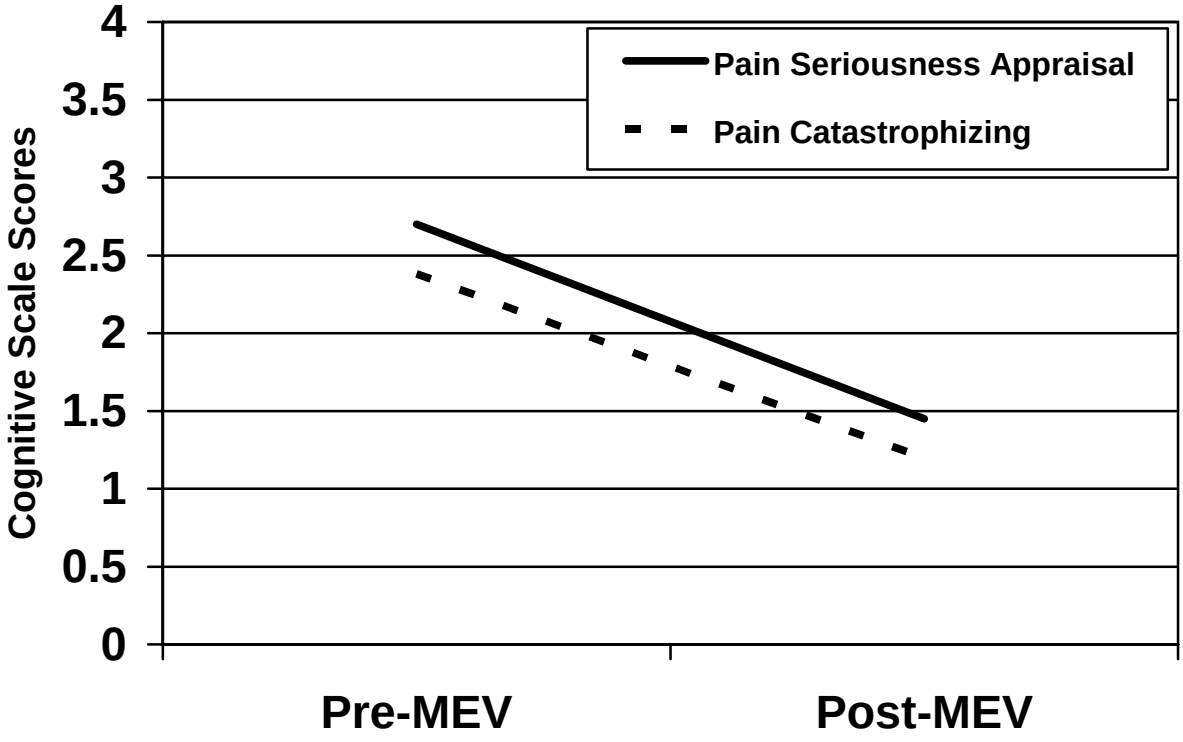
Time Analyses

Paired t-tests were performed between baseline and response variables to test the overall effects of time from before participants' viewed the medical evaluation vignette (pre) to after participants' viewed of the medical evaluation vignette (post) collapsed across medical evaluation vignette conditions and trait anxiety groups. The following abbreviations will be used in analyses and figures in this section to denote these time points: pre-MEV, for pre medical evaluation vignette, and post-MEV, for post medical evaluation vignette.

There was an effect of time on both cognitive measures. Pain seriousness appraisal decreased from pre- to post-MEV, t (159) = 18.90, $p < .001$. Similarly, pain catastrophizing decreased from pre- to post-MEV, t (159) = 19.98, $p < .001$. Overall, participants appraised the child's pain condition as significantly less serious and reported significantly less catastrophic

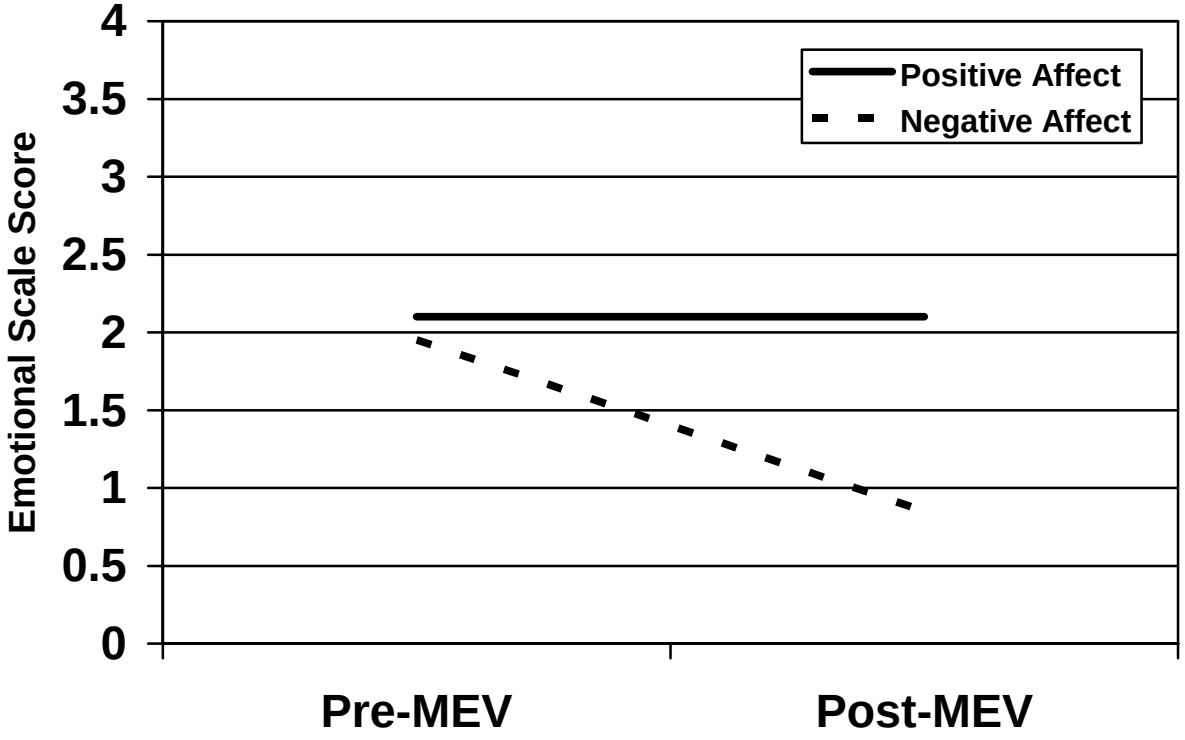
thinking from baseline to after viewing the medical evaluation vignette. These effects are illustrated in Figure 4.

Figure 4. Effects of Time on Pain Seriousness and Catastrophizing.



There was one effect of time on participants' emotional response. Negative affect decreased from pre- to post-MEV, $\underline{t}$ (159) = 15.71, $p < .001$. Whereas participants reported significantly less negative affect after viewing the medical evaluation vignette compared to baseline, participants' report of positive affect did not change from pre- to post- MEV. These means are presented in Figure 5.

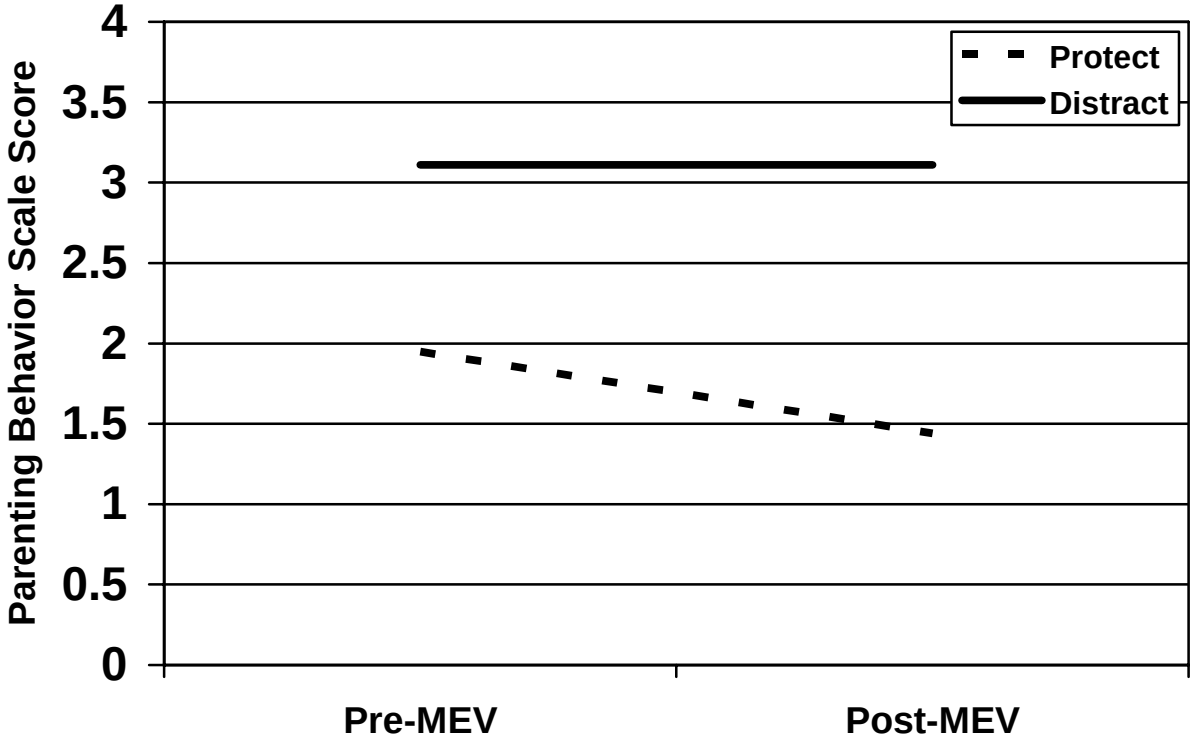
Figure 5. Effects of Time on Positive and Negative Affect.



Finally, there was one effect of time on participants' parenting behavior. Protective parenting decreased from pre- to post-MEV, $\underline{t}$ (159) = 12.38, $p < .001$. Mothers reported significantly less protective parenting behavior from baseline to after viewing the medical evaluation vignette. However, there was no change in distracting parenting behavior, which remained at a high level from pre- to post-MEV. These means are presented in Figure 6.

Effect sizes were calculated for significant effects of time. All variables demonstrated large effect sizes for the decrease in scores from pre- to post-MEV; pain seriousness $d = 1.73$, pain catastrophizing $d = 1.45$, negative affect $d = 1.25$, and protective parenting $d = .74$.

Figure 6. Effects of Time on Protective and Distracting Parenting Behavior.



Overall, mothers' initial mid-levels of pain seriousness appraisals, catastrophizing, negative affect, and protective parenting were alleviated after viewing the medical evaluation vignette. Participants' positive affect and distracting parenting did not change from pre- to post-MEV. These effects are qualified by the following set of ANCOVA analyses.

Response Analyses

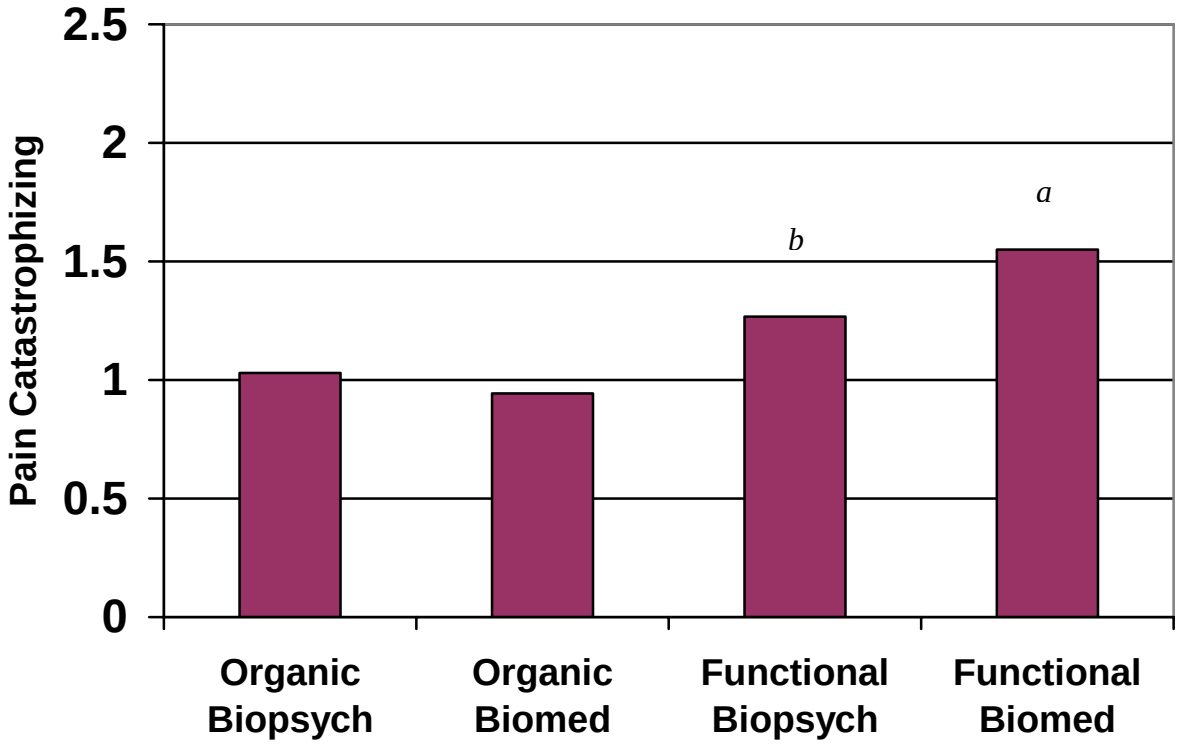
In every ANCOVA analysis reported below, the baseline measure entered as a covariate in the prediction of the response measure was significant, $p < .01$.

Cognition. There was a main effect of trait anxiety on the PBQ; F (151) = 8.75; $p < .01$. Examination of the adjusted means indicated that controlling for baseline, mothers in the high anxiety group reported significantly greater pain seriousness appraisals in response to the medical evaluation vignette than mothers with low anxiety (High Anxiety $M = 1.61$, $SE = .08$; Low Anxiety $M = 1.30$, $SE = .08$). Effect size calculation revealed a medium effect size; $d = .48$.

There was a main effect of anxiety on the PCS-P; F (151) = 5.04, $p < .05$. Controlling for baseline, mothers with high anxiety reported significantly more pain catastrophizing than mothers with low anxiety (High Anxiety $M = 1.31$, $SE = .07$; Low Anxiety $M = 1.09$, $SE = .07$). This was a small effect size, $d = .37$. Also, there was a main effect of diagnosis on the PCS-P; F (151) = 19.14, $p < .001$. Controlling for baseline, mothers who received a functional diagnosis reported significantly greater pain catastrophizing in response to the medical evaluation vignette than mothers who received an organic diagnosis (Functional $M = 1.41$, $SE = .07$; Organic $M = .99$, $SE = .07$). Effect size calculation showed a large effect size; $d = .71$.

The main effect of diagnosis on catastrophizing was qualified by a significant interaction between diagnosis and presentation; F (151) = 3.73, $p = .05$. Controlling for baseline, mothers who received a functional diagnosis from a biomedical presentation reported significantly greater pain catastrophizing in response to the medical evaluation vignette than mothers who received a functional diagnosis from a biopsychosocial presentation ($MD = .28$, $SE = .14$, $p < .05$) and mothers who received an organic diagnosis from either a biomedical presentation ($MD = .61$, $SE = .14$, $p < .001$) or a biopsychosocial presentation ($MD = .52$, $SE = .14$, $p < .001$). In addition, mothers in the Functional Biopsychosocial group had significantly greater pain catastrophizing than mothers in the Organic Biomedical group ($MD = .32$, $SE = .14$, $p < .05$). Effect size calculation showed a small effect size of $d = .31$. This interaction effect is depicted in Figure 7.

Figure 7. Interaction Effect of Diagnosis and Presentation on Pain Catastrophizing.



a The Functional Biomedical group was significantly greater than all other groups, $p < .05$.

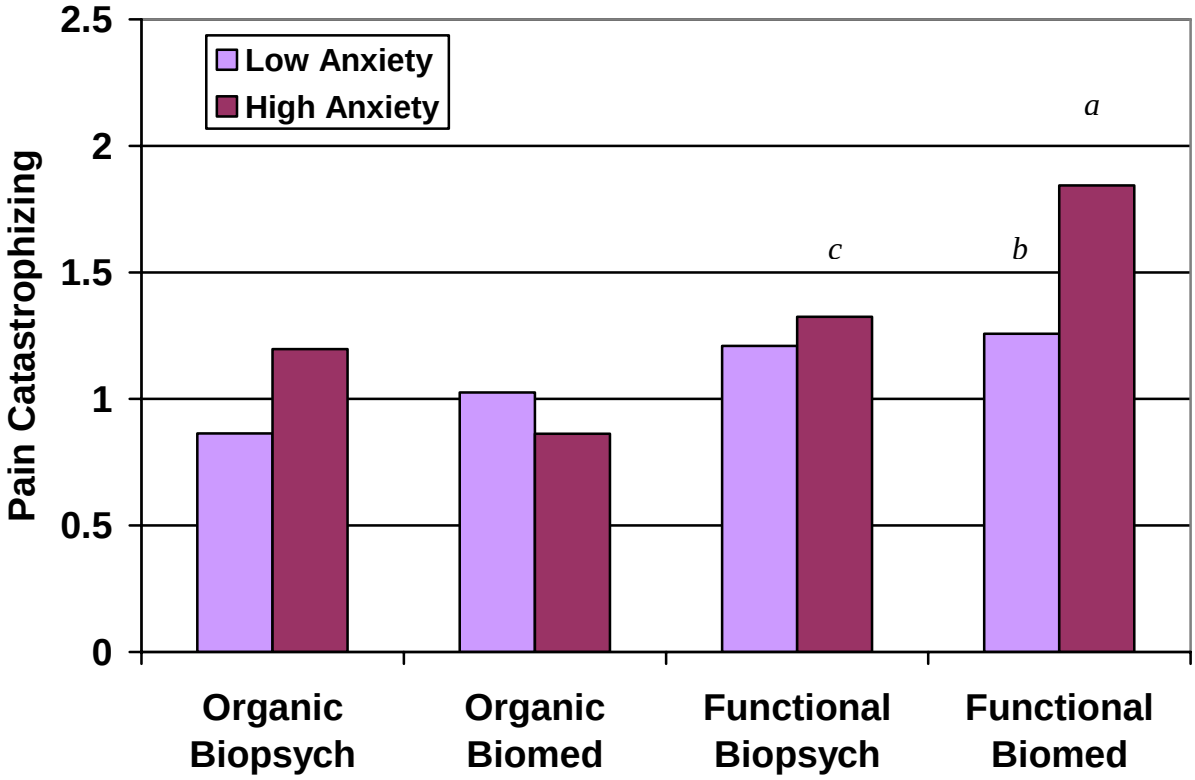
b The Functional Biopsychosocial group was significantly greater than the Organic Biomedical group, $p < .05$. The remaining groups were not significantly different from each other.

Finally, in accordance with study hypotheses, there was a three way interaction effect of anxiety, diagnosis, and presentation on catastrophizing; F (151) 6.33, $p < .05$. Controlling for baseline, mothers in the high anxiety group who received a functional diagnosis from a biomedical approach had a significantly greater pain catastrophizing response to the medical evaluation vignette compared to high anxiety mothers who received a functional diagnosis from a biopsychosocial presentation ($MD = .52$, $SE = .19$, $p < .01$), high anxiety mothers who received an organic diagnosis from either a biomedical presentation ($MD = .98$, $SE = .19$, $p < .001$) or a

biopsychosocial presentation (*MD* = .65, *SE* = .19, $p < .01$), and all mothers in the low anxiety group (range in *MD* = .59 - .98, *SE* = .19, $p < .01$).

Several other groups were significantly different from each other on pain catastrophizing. The Low Anxiety Functional Biomedical group was significantly greater than the High Anxiety Organic Biomedical group (*MD* = .40, *SE* = .19, $p < .05$) and the Low Anxiety Organic Biopsychosocial group (*MD* = .39, *SE* = .19, $p < .05$). Finally, the and High Anxiety Functional Biopsychosocial group was significantly greater than the High Anxiety Organic Biomedical group (*MD* = .46, *SE* = .19, $p < .05$) and Low Anxiety Organic Biopsychosocial group (*MD* = .46, *SE* = .19, $p < .05$). Effect size calculation showed a medium effect size; d = .41. These effects are illustrated in Figure 8.

Figure 8. Interaction Effect of Anxiety, Diagnosis, and Presentation on Pain Catastrophizing.



a The High Anxiety Functional Biomedical group was significantly greater than all other groups, $p < .01$.

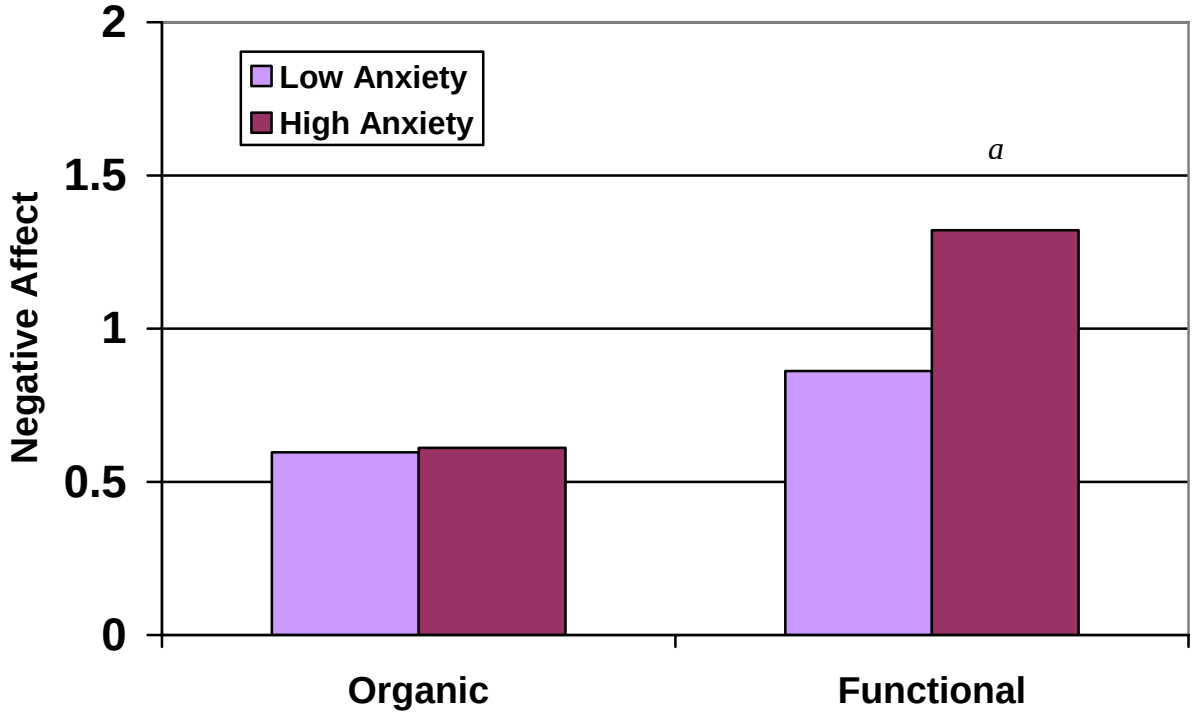
b The Low Anxiety Functional Biomedical group was significantly greater than the High Anxiety Organic Biomedical and Low Anxiety Organic Biopsychosocial groups, $p < .05$.

c The High Anxiety Functional Biopsychosocial group was significantly greater than the High Anxiety Organic Biomedical and Low Anxiety Organic Biopsychosocial groups, $p < .05$. The remaining groups were not significantly different from each other.

Emotion. A main effect of anxiety on NA, F (151) = 4.43, $p < .05$, showed that controlling for baseline, high anxious mothers had significantly greater negative affect in response to the medical evaluation vignette than low anxious mothers (High Anxiety $M = .96$, $SE = .08$; Low Anxiety $M = .73$, $SE = .08$). This was a small effect size of $d = .34$. A main effect of diagnosis on NA, F (151) = 20.50, $p < .001$, indicated that controlling for baseline, mothers who received a functional diagnosis reported significantly greater negative affect in response to receiving medical information compared to mothers who received an organic diagnosis (Functional $M = 1.09$, $SE = .08$; Organic $M = .61$, $SE = .08$). Effect size calculation revealed a large effect size of d = .74.

There was an interaction effect of anxiety and diagnosis on NA; F (151) = 4.45, $p < .05$. Controlling for baseline, mothers in the high anxiety group who received a functional diagnosis reported significantly greater negative affect in response to the medical evaluation vignette than mothers in the high anxiety group who received an organic diagnosis ($MD = .71$, $SE = .16$, $p < .001$) and mothers in the low anxiety group who received either a functional diagnosis ($MD = .46$, $SE = .16$, $p < .01$) or organic diagnosis ($MD = .72$, $SE = .16$, $p < .001$). Effect size calculation showed a small effect size of $d = .34$. This interaction effect is depicted in Figure 9.

Figure 9. Interaction Effect of Anxiety and Diagnosis on Negative Affect.

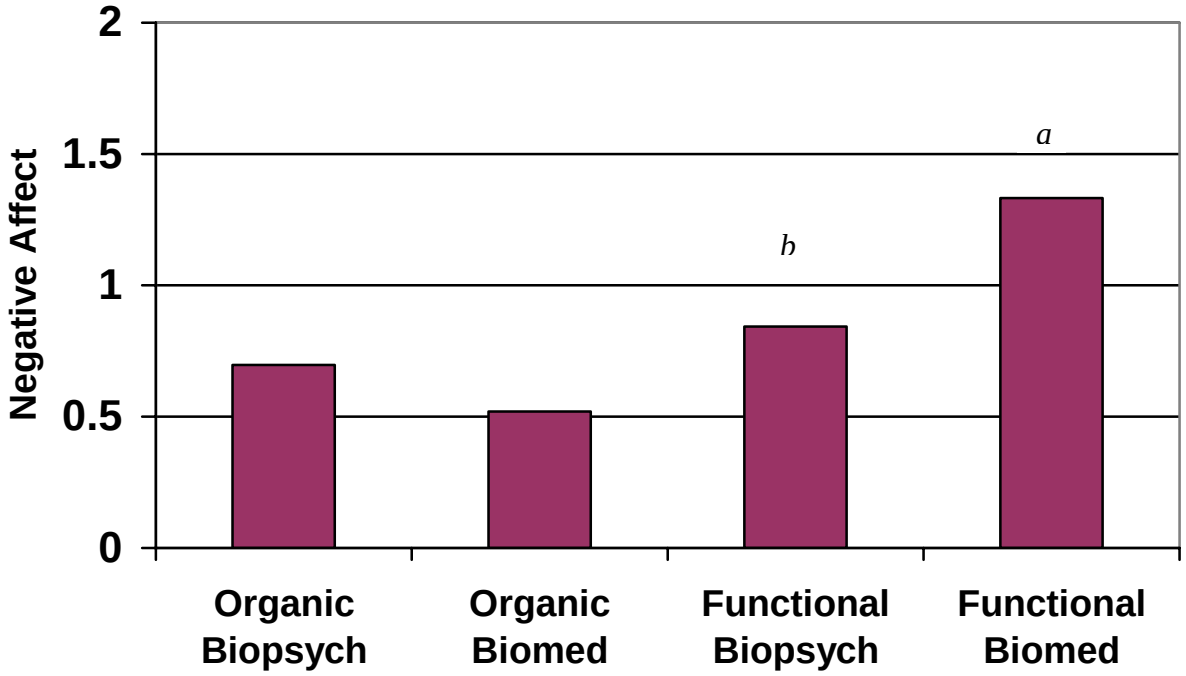


a The High Anxiety Functional group was significantly greater than all other groups, $p < .01$. There were no other significant differences between groups.

Also, there was an interaction effect of diagnosis and presentation on NA; F (151) = 9.75, $p < .01$. Controlling for baseline, mothers who received a functional diagnosis from a biomedical presentation reported significantly greater negative affect in response to the medical evaluation vignette than mothers who received a functional diagnosis from a biopsychosocial presentation (*MD* = .49, *SE* = .16, $p < .01$) and than mothers who received an organic diagnosis from either a biomedical presentation (*MD* = .81, *SE* = .15, $p < .001$) or a biopsychosocial presentation (*MD* = .64, *SE* = .15, $p < .001$). Also, mothers in the Functional Biopsychosocial group had significantly greater negative affect than mothers in the Organic Biomedical group

(*MD* = .32, *SE* = .16, $p < .05$). Effect size calculation showed a medium effect size of $d = .51$. Figure 10 depicts this interaction effect.

Figure 10. Interaction Effect of Diagnosis and Presentation on Negative Affect.



a The Functional Biomedical group was significantly greater than all other groups, $p < .01$.

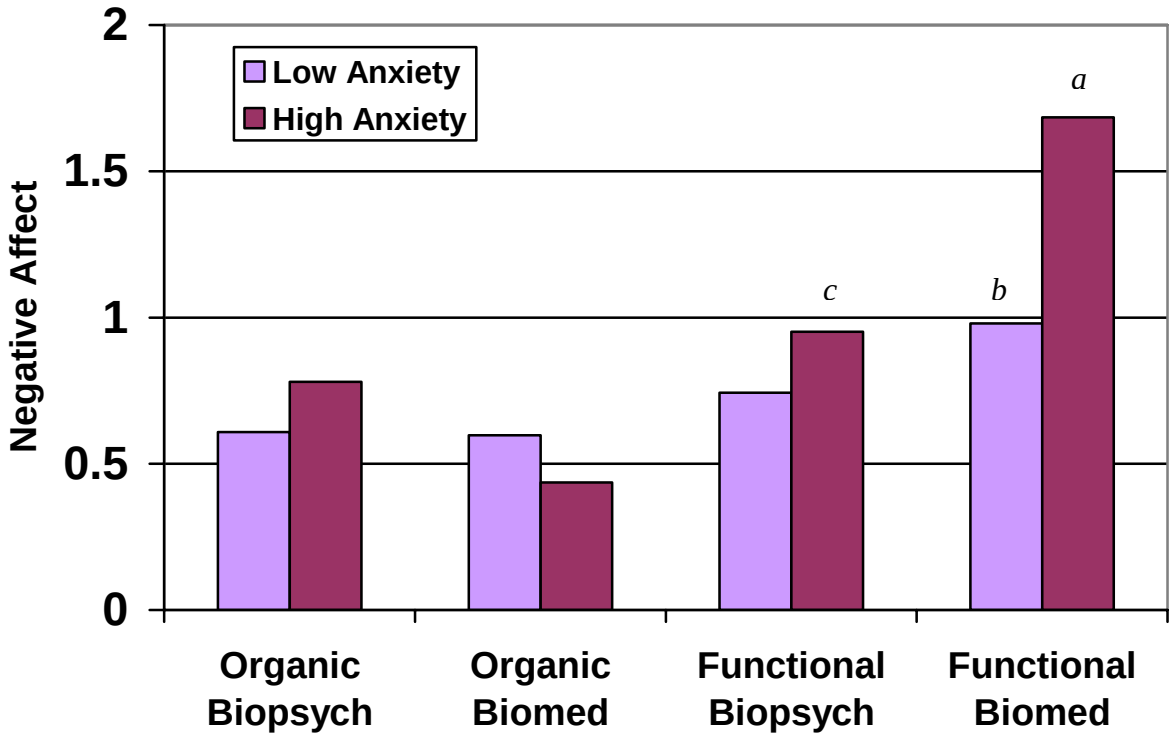
b The Functional Biopsychosocial group was significantly greater than the Organic Biomedical group, $p < .05$. The remaining groups were not significantly different from each other.

Finally, in accordance with study hypotheses, there was an interaction effect of anxiety, diagnosis, and presentation on NA; F (151) = 3.82, $p = .05$. Controlling for baseline, mothers in the high anxiety group who received a functional diagnosis with a biomedical presentation reported significantly greater negative affect in response to the medical evaluation vignette compared to high anxiety mothers who received a functional diagnosis from a biopsychosocial

presentation (*MD* = .73, *SE* = .21, $p < .01$), high anxiety mothers who received an organic diagnosis from either a biomedical approach (*MD* = 1.25, *SE* = .21, $p < .001$) or a biopsychosocial approach (*MD* = .90, *SE* = .21, $p < .001$), and all mothers in the low anxiety group who received either diagnosis from either approach (range in *MD* = .70 – 1.09, *SE* = .21, $p < .01$).

In addition, the Low Anxiety Functional Biomedical was significantly greater in negative affect than the High Anxiety Organic Biomedical group (*MD* = .54, *SE* = .22, $p < .05$) and similarly the High Anxiety Functional Biopsychosocial group also was significantly greater in negative affect than the High Anxiety Organic Biomedical group (*MD* = .51, *SE* = .21, $p < .05$). This was a small effect size of $d = .32$. This effect is illustrated in Figure 11.

Figure 11. Interaction Effect of Anxiety, Diagnosis, and Presentation on Negative Affect.



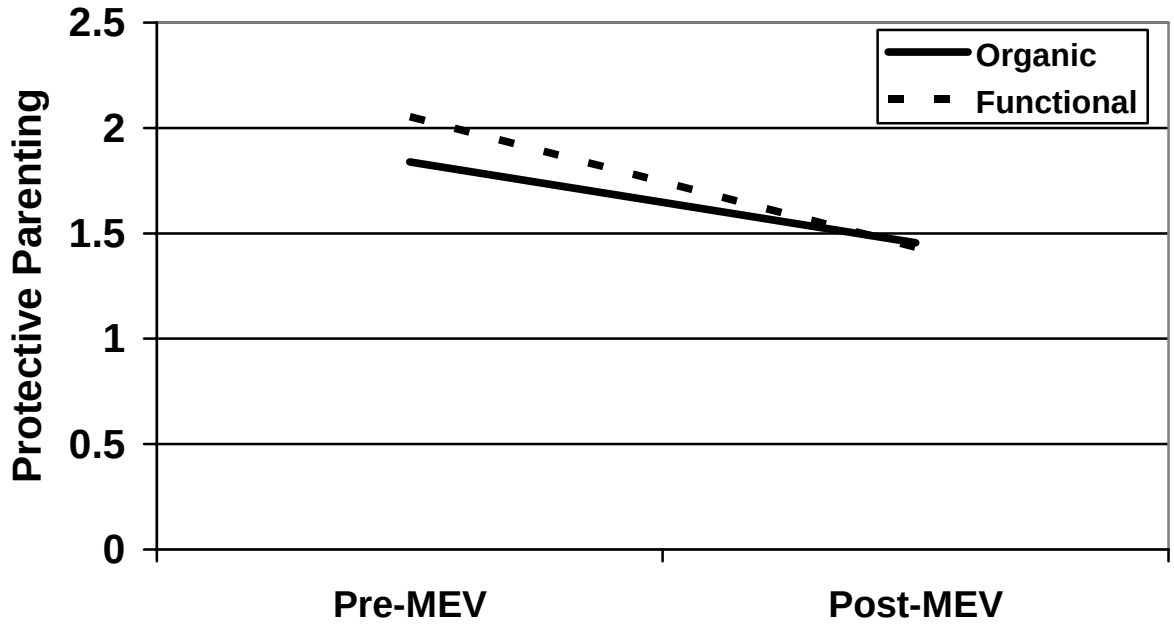
a The High Anxiety Functional Biomedical group was significantly greater than all other groups, $p < .01$.

b The Low Anxiety Functional Biomedical group was significantly greater than the High Anxiety Organic Biomedical group, $p < .05$.

c The High Anxiety Functional Biopsychosocial group was significantly greater than the High Anxiety Organic Biomedical group, $p < .05$. The remaining groups were not significantly different from each other.

Behavior. A main effect of diagnosis on protective parenting, F (151) = 6.19, $p < .05$, indicated that controlling for baseline, mothers who received an organic diagnosis were significantly more protective of their children in response to receiving medical information from the evaluation vignette compared to mothers who received a functional diagnosis (Organic M = 1.53, SE = .05; Functional M = 1.36, SE = .05). Due to the preexisting baseline difference in protective parenting between mothers in the functional versus organic conditions, the main effect was interpreted with caution. Examination of the actual means revealed that whereas functional and organic groups were significantly different pre-MEV, they were identical at post-MEV. Thus, the main effect of diagnosis was driven by participants in the functional condition who decreased significantly more in protective parenting from pre- to post-MEV than participants in the organic condition. Effect size calculation showed this to be a medium effect size of d = .41. This effect is illustrated in Figure 12.

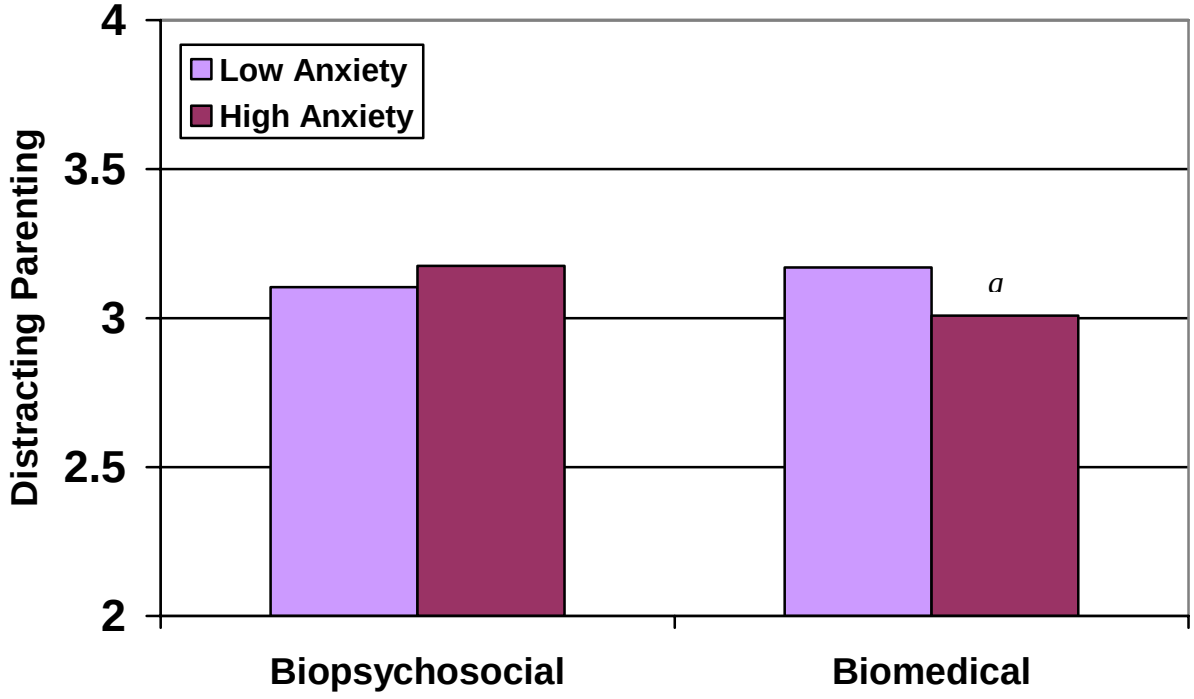
Figure 12. Main Effect of Diagnosis on Protective Parenting Behavior.



A main effect of presentation on protective parenting, F (151) = 7.53, $p < .01$, showed that controlling for baseline, mothers who received a biomedical presentation reported significantly greater protective parenting in response to the evaluation vignette than mothers who received a biopsychosocial explanation (Biomedical $M = 1.54$, $SE = .05$; Biopsychosocial $M = 1.35$, $SE = .05$). This was a medium effect size; $d = .45$.

For the distracting parenting scale of the ARCS, there was an interaction effect of anxiety and presentation; F (151) = 4.44, $p < .05$. Controlling for baseline, mothers in the high anxiety group who received a biomedical presentation reported significantly less distracting parenting behavior in response to the medical evaluation vignette than mothers in the high anxiety group who received a biopsychosocial presentation ($MD = -.17$, $SE = .08$, $p < .05$) and mothers in the low anxiety group who received a biomedical presentation ($MD = -.16$, $SE = .08$, $p < .05$). Effect size calculation revealed a small effect size of $d = .34$. This effect is depicted in Figure 13.

Figure 13. Interaction Effect of Anxiety and Presentation on Distracting Parenting Behavior.



a The High Anxiety Biomedical group was significantly lower than the Low Anxiety Biomedical and High Anxiety Biopsychosocial groups, $p < .05$. There were no other significant differences between groups.

Finally, participants' ratings of their satisfaction with the physician and vignette validity were examined. For both variables, descriptive statistics were examined and univariate ANOVAS were performed to test main and moderating effects of anxiety, diagnosis, and presentation. Two additional univariate ANOVAs were performed for the vignette reality rating to assess the effect of participants' experience caring for children with chronic and/or GI conditions on the degree to which they found the medical evaluation vignette realistic.

Satisfaction with the Physician

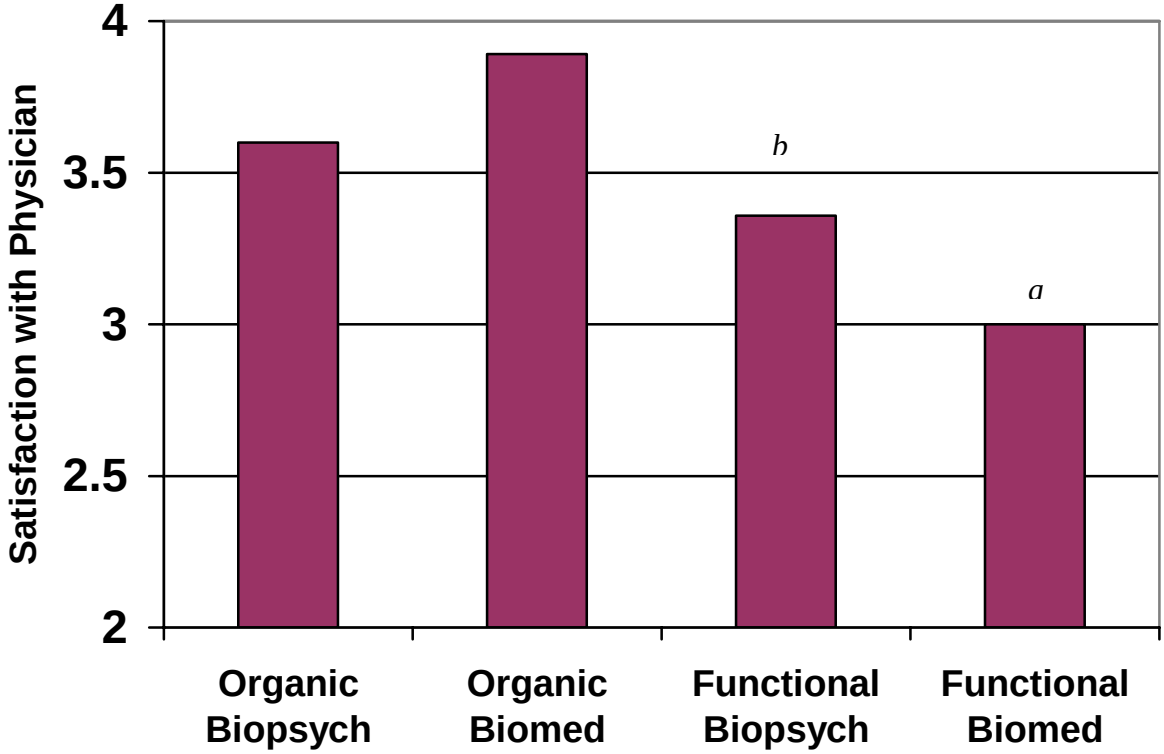
Examination of the means revealed that overall, mothers were highly satisfied with the physician in the medical evaluation vignette; $M = 3.46$, $SD = .77$, $Range = 0 – 4$.

There was a main effect of diagnosis on satisfaction with the physician; $F(152) = 25.72$, $p < .001$. Mothers who received an organic diagnosis were significantly more satisfied than mothers who received a functional diagnosis (Organic $M = 3.75$, $SD = .52$; Functional $M = 3.18$, $SD = .88$). This was a large effect size of $d = .82$.

There was an interaction effect of diagnosis by presentation on satisfaction with physician; $F(152) = 8.46$, $p < .01$. Mothers who viewed the functional biomedical vignette were significantly less satisfied compared to mothers who viewed the functional biopsychosocial vignette ($MD = -.36$, $SE = .16$, $p < .05$) and mothers who viewed an organic vignette from either a biomedical presentation ($MD = -.89$, $SE = .16$, $p < .001$) or a biopsychosocial presentation ($MD = -.60$, $SE = .16$, $p < .001$). In addition, mothers in the Functional Biopsychosocial group were significantly less satisfied than mothers in the Organic Biomedical group ($MD = -.53$, $SE = .16$, p

< .01). Effect size calculation revealed a medium effect size of $d = .47$. This interaction is depicted in Figure 14.

Figure 14. Interaction Effect of Diagnosis and Presentation on Satisfaction with the Physician.



a The Functional Biomedical group was significantly lower than all other groups, $p < .05$.

b The Functional Biopsychosocial group was significantly lower than the Organic Biomedical group, $p < .01$. There were no other significant differences between groups.

Vignette Validity

Examination of the frequencies revealed that over 50% of participants described the medical evaluation vignette as "extremely" realistic. Descriptive statistics for the vignette reality rating were as follows; $M = 3.34$, $SD = .82$, *Range* = 1 – 4.

The effect of participants' experience caring for children with chronic and/or GI conditions on the degree to which they rated the vignette as realistic was examined. Results of analyses were non-significant, indicating that mothers of children with illness did not differ in their vignette reality rating from mothers of well children.

Finally, main and moderating effects of anxiety, diagnosis, and presentation on vignette reality ratings were examined. A main effect of diagnosis on vignette reality, $F(147) = 9.17$, $p < .01$, indicated that mothers who received an organic diagnosis rated the vignette as significantly more realistic than mothers who received a functional diagnosis (Organic $M = 3.53$, $SD = .68$; Functional $M = 3.14$, $SD = .89$). This was a medium effect size of $d = .50$.

CHAPTER IV

DISCUSSION

Overview

Conceptual differences between the biomedical and biopsychosocial models of symptoms and disease are manifested in different approaches to the treatment of patients with functional symptoms. Empirical research operationalizing differences between the models and examining patients' responses to the models is lacking. The current study initiated research in this area by examining differences in mothers' cognitive, emotional, and behavioral responses to children's abdominal pain as a function of maternal anxiety and presentation of a functional versus organic diagnosis from a biomedical versus biopsychosocial approach, using the Lazarus and Folkman (1984) model of stress and coping as a theoretical framework. The discussion reviews the results of this study in relation to relevant literature and in the context of the theoretical framework. Clinical implications of the findings for parents and physicians are discussed. Finally, limitations of the study and ideas for future research are considered.

Review of Study Findings

Hypothesis Testing

Study hypotheses were largely supported for the six dependent variables examined. Although results did not demonstrate all predicted effects, all of the main and interaction effects were in the predicted direction with only one exception. Anxiety (high versus low trait anxiety)

demonstrated a main effect for pain seriousness appraisal, catastrophic thinking about pain, and negative affect. Compared to mothers with low anxiety, mothers with high anxiety significantly appraised children's pain as more serious, had greater pain catastrophizing, and reported more negative affect in response to children's symptoms after viewing the medical evaluation vignette. Diagnosis (functional versus organic) had main effects on pain catastrophizing, negative affect, and a marginal effect on positive affect. Mothers who received a functional diagnosis to explain the child's symptoms significantly showed more pain catastrophizing, greater negative affect, increased protective parenting behavior, and marginally less positive affect than mothers who were presented with an organic diagnosis. A main effect of diagnosis on protective parenting suggested that mothers who received a functional diagnosis decreased in their protective parenting behavior to a greater extent than mothers who received an organic diagnosis. Finally, presentation (biomedical versus biopsychosocial) had a main effect on protective parenting behavior. Mothers who received medical information from a biomedical approach reported significantly greater protective parenting behavior in response to the vignette than mothers who received information from a biopsychosocial approach.

These main effects were qualified by interaction effects. In addition to several two-way interactions, there were two three-way interaction effects. The most negative pattern of responses (i.e., highest levels of pain catastrophizing and negative affect) were observed for mothers with high anxiety given a functional diagnosis for children's symptoms from a biomedical presentation.

Interaction effects of anxiety, diagnosis, and presentation. Research shows that parents expect to receive information about diagnosis, treatment, and prognosis in pediatric medical encounters (Korsch et al., 1968) and that uncertainty about children's symptoms is associated

with high symptom severity appraisals, emotional distress, and protective parenting behavior (Stewart & Mishel, 2000). Unmet expectations in the pediatric medical encounter have been associated with frustration for parents of pediatric patients with functional symptoms (Walker et al., 1997). It has been posited that parental expectations are more likely to be unmet and thus parental uncertainty is higher for functional diagnoses when that information is presented from a biomedical versus a biopsychosocial model (Drossman, 1998). These effects were hypothesized to be amplified for parents with high anxiety, as people with high trait anxiety have a bias to attend to threatening stimuli, interpret ambiguous stimuli as threatening, and recall threatening more than neutral information (Eysenck, 1997; Spielberger, 1972). In fact, analyses in the current study revealed significant interaction effects of anxiety, diagnosis, and presentation on pain catastrophizing and negative affect, supporting study hypotheses developed from this review of the empirical literature of expectations, uncertainty, and trait anxiety. This finding underscores the importance of these three factors taken together in understanding parents' responses to children's symptoms in the pediatric medical encounter, especially for cognitive and emotional variables.

It is likely that mothers with high anxiety reported the most negative cognitive, emotional, and behavioral responses to children's symptoms after receiving medical information because of their tendency to interpret ambiguous stimuli as threatening, which was amplified when a functional diagnosis was presented from a biomedical presentation in which expectations were unmet and uncertainty was high. Conversely, explanation of a functional diagnosis from a biopsychosocial approach resulted in a more positive response pattern for high anxious mothers. Using the same logic, possibly the utilization of the biopsychosocial approach reduced mothers'

level of ambiguity, addressed expectations, and reduced illness uncertainty about children's functional diagnosis that resulted in a feeling of empowerment from the information provided.

Examination of additional significant differences between groups in the interaction effects of anxiety, diagnosis, and presentation on pain catastrophizing and negative affect further clarify these interaction effects. Mothers with high anxiety presented with an organic diagnosis from a biomedical approach reported significantly *lower* pain catastrophizing and negative affect than mothers with high *and* low anxiety presented with a functional diagnosis from a biomedical presentation, as well as mothers with high anxiety presented with a functional from a biopsychosocial presentation. These findings illustrate that results cannot simply be distilled to an overall effect of trait anxiety; mothers with high anxiety who received an organic diagnosis explained biomedically fared better than low anxious mothers presented with a biomedical explanation of functional symptoms. The type of diagnosis and the way in which it was presented to mothers had a very big impact on maternal responses to children's symptoms, even while accounting for the effect of mothers' level of trait anxiety.

Finally, even though high anxious mothers who received a functional diagnosis from a biomedical presentation reported a more negative response pattern in comparison to the other groups, it is important to note that overall, pain catastrophizing and negative affect levels *decreased* from baseline to after viewing the medical evaluation vignettes among participants in all conditions and trait anxiety groups. Participants began at a moderate level of distress prior to viewing the medical evaluation vignettes and ended at a low level of distress subsequent to receiving medical information from the physician.

This study is the first to empirically demonstrate that mothers' cognitive, emotional, and behavioral responses were more negative when a functional diagnosis was presented from a

biomedical model compared to a biopsychosocial model, and especially so for mothers with high trait anxiety.

Main effects of trait anxiety. In accordance with study hypotheses, there were several main effects of trait anxiety on mothers' responses to children's symptoms after viewing the medical evaluation vignette. Anxiety had a significant main effect on three variables, pain seriousness appraisal, pain catastrophizing, and negative affect. The pattern of results was consistent; mothers with high trait anxiety reported consistently more negative responses on cognitive and emotional variables than mothers with low anxiety. These effects were consistent with the trait anxiety literature, as discussed above.

In addition, it is possible to use additional data from the current study to consider the influence of trait anxiety on study findings, such as symptom attribution. Maternal trait anxiety was significantly and positively associated with psychological and somatic symptom interpretation. Mothers with high trait anxiety attributed children's symptoms to psychological and somatic causes significantly more than mothers with low trait anxiety; there was no association with normalizing symptom attribution and trait anxiety. Mothers with high trait anxiety possibly reported a negative response pattern after receiving medical information because of their bias to make psychological and somatic causal attributions of children's symptoms, which they may have gauged as more severe than normalizing attributions. Research suggests that psychological and somatic symptom interpretation is associated with a more negative reporting style (Aronson, 2006). This may be an important area of future investigation for studies furthering the knowledge of the influence of parental trait factors on their experiences with children's illness.

Main effects of diagnosis. In accordance with study hypotheses, there were several main effects of diagnosis on mothers' cognitive, emotional, and parenting behavior responses to children's symptoms after viewing the medical evaluation vignette. Mothers' responses to a functional diagnosis were more negative compared to mothers' responses to an organic diagnosis. The only exception was with protective parenting; mothers who received a functional diagnosis decreased in their level of protective parenting more so than mothers who received an organic diagnosis. A baseline difference on this variable between functional and organic diagnostic conditions may have confounded this effect.

Notably, this main effect of diagnosis was most frequently qualified by an interaction effect with presentation of medical information. That is, mothers presented with a functional diagnosis from a biomedical approach reported the most negative responses to children's symptoms after viewing the medical evaluation vignette. This pattern of findings is consistent with the literature on parental uncertainty and expectations about children's medical visits, as reviewed above.

Additionally, in a separate examination of data collected for this study for this sample, Franks (2007) showed that mothers who received a functional diagnosis from a biomedical presentation reported the most uncertainty and unmet expectations following the medical evaluation vignette. These findings support the importance of understanding uncertainty and expectations when explaining why mothers had more negative responses to receiving a functional diagnosis from a biomedical presentation than a biopsychosocial one. Future studies utilizing designs that allow for testing of mediational relations should include measures of uncertainty and expectations to examine the influence of these variables on parents' responses children's symptoms in the pediatric medical encounter.

Consistent with the negative response pattern explained above, mothers also reported less satisfaction with the physician in the medical evaluation vignette when he presented a functional diagnosis from a biomedical presentation compared to mothers in the other conditions. Interestingly, mothers reported the greatest satisfaction when they were presented with an organic diagnosis from a biomedical presentation; this could be because this is the most expected kind of medical encounter.

Main effect of presentation. There was one significant main effect of presentation on protective parenting; mothers who received a biopsychosocial presentation reported less protective parenting after viewing the medical evaluation vignette compared to mothers who received a biomedical presentation. Whereas the physician's recommendation for the child to reengage in activities did not differ between presentation styles, a major difference in the application of the biomedical versus biopsychosocial model was in the biopsychosocial model's explanation of why children should be more active. Specifically, the multidimensional explanation of symptoms practiced in the biopsychosocial model includes discussing information about how being active helps to distract children and reduce pain signals. Possibly, receiving this explanation of why activity is beneficial for children resulted in decreased protective parenting among mothers who received this explanation.

Additionally, there was an interaction effect of anxiety and presentation on distracting parenting behavior, such that high anxious mothers who received a biomedical explanation reported the least distracting parenting behavior. Similar to the discussion of the main effect of presentation on protective parenting, it is possible that without the explanation of why activity is beneficial for children in coping with abdominal pain in the biomedical model (versus the

biopsychosocial model), mothers with a bias to interpret ambiguous information as threatening were the least likely to encourage children to engage in regular activities.

Overall, compared to the changes in mothers' cognitions and emotions there were minimal changes in mothers' parenting behavior following the medical evaluation vignette. This could be because of the more abstract quality of the parenting behavior questions compared to the cognitive and emotional questions. That is, whereas the cognitive and emotional questionnaires directly assessed mothers' thoughts and feelings related to the scenarios presented in the current study, the parenting behavior measure required mothers to go beyond thinking about themselves and extend their responses to how they would interact with the child. It may have been more challenging for mothers to answer this more secondary question about their coping response compared to the questions tapping into their primary cognitive and emotional experiences. Measuring mothers' own coping responses, eliminating the need to extend their response beyond themselves, may have produced more effects. It is also possible that receiving medical information about their children has a greater impact on parents' cognitions and emotions rather than parenting behavior that has become routine. Methodologically, the vignette format of the current study may have been better able to elicit cognitive and emotional responses than behavioral ones.

Adaptive responses. Mothers reported high levels of positive affect and distracting parenting behavior at baseline that remained unchanged after viewing the medical evaluation vignette. Perhaps this is an indication that when parents observe children's symptoms and seek to understand them, parents demonstrate positive emotions and parenting behaviors in addition to negative ones. Possibly this reflects parents' own protective factors and resilience (Simon & Smith, 1992). Methodologically, the stability of these variables between pre- and post-MEV

compared to the significant decrease of the other four dependent variables suggests participants' minimal attenuation to the administration of two sets of identical measures in close succession.

Additional Study Findings

Demographic variables. There were several significant associations of demographic and baseline variables. First, maternal age and education level were inversely associated with responses to baseline cognitive, emotional, and behavioral variables. One possible explanation is that the amount of life and child rearing experience likely associated with the variables of age and education differentially influenced mothers' responses. Mothers with greater experience were less reactive to the child vignette, possibly because they had a greater context in which to interpret the information presented compared to mothers with less experience based on age and education. Also, participants' ethnicity related to baseline cognitive, emotional, and behavioral variables. It is likely that cultural differences in approach to illness were reflected in these significant relations. Finally, the relation of maternal trait anxiety and having a child with a GI condition replicates research demonstrating greater levels of trait anxiety among parents of children with functional abdominal pain compared to parents of well children (Garber et al., 1990; Walker & Greene, 1989).

Symptom attribution. There were several significant associations of symptom attribution style and baseline variables. First, maternal anxiety was related to psychological and somatic symptom attribution styles. This finding is consistent with empirical studies linking these attributions styles with worry, anxiety, and neuroticism (Aronson, 2006; Robbins & Kirmayer, 1996; Taillefer et al., 2003; Wise & Mann, 1995). Additionally, psychological and somatic attribution styles represent more stable constructs than a normalizing attribution style associated

with environmental causes that are more transient. It follows that these more stable attribution styles would be associated with a trait variable, such as trait anxiety.

Somatic attribution style related to baseline cognitive, emotional, and behavioral variables. Perhaps mothers with a bias to attribute symptoms to physical causes deemed the symptom presentation of the child in the vignette as a more serious, physical, medical issue, which influenced their more negative response style at baseline compared to mothers who attributed children's symptoms to somatic causes to a lesser degree. Overall, symptom attribution was evenly distributed between conditions and was not a significant covariate in analyses, suggesting this variable did not differentially influence participants' responses.

Theoretical Considerations

The Lazarus and Folkman (1984) model of stress and coping provided a useful framework from which to conceptualize the relation of the variables examined in the current study. Inclusion of both person (i.e., trait anxiety) and situational (i.e., diagnosis and presentation) factors proved important in the prediction of mothers' responses to children's symptoms. In addition, including a variety of response variables (i.e., cognitive, emotional, and behavioral) allowed for the broad examination of parental responses. Study hypotheses were guided from the framework of this model, which also proved an effective way to conceptualize and test the impact and interaction of person and situational factors on maternal responses to children's symptoms.

The design of the current study did not allow for testing mediational components of the Lazarus and Folkman model (1984). Existing literature suggests that primary appraisals predict emotional distress in parents of children with chronic illnesses (Ireys & Silver, 1996; Vollrath et

al., 2004). These findings suggest that cognitive variables play a central role in determining parental emotional reaction to children's symptoms. Future studies utilizing a longitudinal design would be able to test a mediational model of cognitive, emotional, and behavioral variables. Such investigation would inform intervention by identifying the primary and therefore most important place in the model to influence change in a parents' response to children's symptoms. According to the model and previous research, it is likely that this would happen at the cognitive level. In the current study, this would suggest intervention with parents' appraisal of pain seriousness and catastrophic thinking about pain. Challenges posed to those parental cognitive components, especially pain catastrophizing, could initiate positive change to emotional and behavioral responses in parents that may translate to their children.

Clinical Implications

Understanding the impact of models of symptoms and disease within which medical information is presented has the potential to inform interventions for physicians, parents, and ultimately children. Clinical implications for parents and physicians are considered.

Parents

The literature has acknowledged parents' central role in children's experience with illness; "parents are the most influential persons in a child's close environment and their appraisal of the illness most likely affects the illness appraisals of their child" (Vollrath et al., 2004, p. 4). How parents think about children's symptoms, their associated emotional reaction, and parenting behavior affects not only parents' experience of children's illness, but their children's experience with illness as well (Hakim-Larson et al., 1999). Findings from the current

study advance the understanding of parents' experience of children's symptoms within the pediatric medical encounter and offer insight into potential interventions to improve parents' experience, thereby improving children's experience as well.

Regarding presentation and diagnosis, results of the current study were consistent; the most negative pattern of cognitive, emotional, and behavioral responses were reported by mothers who received medical information about children's functional symptoms from a biomedical perspective. When a functional diagnosis is indicated, one major way to improve parents' responses to children's symptoms is to provide explanation of functional symptoms from a biopsychosocial perspective. Several recent studies lend support to the long term benefits of the biopsychosocial explanation. Crushell and colleagues (2003) found that parents of children with functional abdominal pain who believed that psychosocial factors contributed to symptoms were more likely to have children who had recovered in one year, compared to parents who believed symptoms were due to physiological causes. Van Tilburg and colleagues (2006) suggested that parents receiving inadequate information about children's functional symptoms, such as receiving an explanation of functional symptoms from a biomedical approach, "can lead to dramatic consequences, like poor adherence to medical treatment, a belief that the doctor does not understand the child's symptoms, and self-referral to other physicians" (p. 51). In sum, not only is a biopsychosocial explanation of functional symptoms beneficial to parents' immediate responses to children's symptoms, it also has the potential to impact parents' healthcare-seeking behavior and children's recovery long after the initial evaluation.

In further support of the biopsychosocial approach, a recent study demonstrated parents' high level of willingness to use psychosocial intervention for treatment of children's functional symptoms, as purported by a biopsychosocial model. Although few parents and pediatric pain

patients reported actually using psychosocial treatments for pediatric pain conditions, parents indicated that not only would helping children learn to cope with their pain conditions be an acceptable treatment, they gauged that modality as potentially the most effective (Claar & Scharff, 2007). The authors conclude that psychosocial intervention should be framed as coping skills training to maximize parents' willingness to seek this type of treatment for their children. In the current study, the biopsychosocially oriented medical evaluation vignettes used this "coping skills" language to discuss psychosocial intervention with children. Overall, mothers' more positive responses to the biopsychosocial approach than the biomedical approach in the current study could be in part due to their willingness to consider a psychosocial intervention as well as their belief that it could potentially be the most effective. The inclusion of coping skills in the treatment suggested by the biopsychosocial approach is likely to be well received by parents.

Another major factor influencing mothers' reactions to children's symptoms was maternal trait anxiety. High anxious mothers reported the most negative pattern of cognitive and emotional responses when they received a functional diagnosis from a biomedical perspective in the current study. This is a particularly relevant finding when considering the population of children with functional symptoms presenting for treatment in the health care system. Research has shown that parents of children with functional symptoms demonstrate greater levels of trait anxiety than parents of well children (Garber, Zeman, & Walker, 1990; Walker & Greene, 1989). In the current study, maternal trait anxiety was significantly and positively correlated with children's GI conditions. Thus, when children present with functional symptoms, it is likely that they will have a high anxious parent. Given this relation, it may be prudent to provide all parents with a biopsychosocial explanation when a functional diagnosis is indicated.

Physicians

Findings from the current study inform how physicians' presentation of medical information to parents of children with functional symptoms can reduce parents' negative responses. Physicians should consider using a biopsychosocial approach to minimize parents' negative cognitions, emotional distress, and protective parenting behavior, especially for high anxious mothers. As discussed, when a functional diagnosis is indicated, parents' expectations are more likely to go unmet in the pediatric medical encounter when information is provided from a biomedical approach that does not address diagnostic, prognostic, and treatment information. Parents are not reassured nor comforted by hearing "everything is fine," which is often the statement associated with the explanation of functional symptoms from a biomedical model.

The finding that maternal trait anxiety was highly influential to responses to children's symptoms suggests that physicians may need to modify their presentation based on parents' anxiety level, especially for functional symptom explanations. Although the medical evaluations vignettes in the current study were constructed to be equal in length across conditions, in practice it may take more time for physicians to use a biopsychosocial model, as there are more factors being assessed and explained than in the biomedical model. In the reality of busy clinics and time-pressured appointments, giving a longer evaluation and explanation in this manner may not always be possible. Physicians may be wise to save more in-depth explanations for high anxious parents, as this is where they are likely to have the biggest impact on parents' responses to children's functional symptoms. Stated differently, there is a greater cost associated with using a biomedical approach to explain functional symptoms to high anxious parents compared to using a biopsychosocial approach.

Regardless of the trait anxiety level of the parent and the diagnosis or presentation of medical information by the physician, study findings indicated that mothers' initially negative cognitive, emotional, and behavioral responses decreased from initial baseline values to after viewing the medical evaluation vignette. In other words, mothers were relieved no matter which evaluation vignette they viewed and regardless of their anxiety level. Additionally, mothers' use of more adaptive parenting strategies for ill children (i.e., distracting parenting) and positive affect in response to the situation remained at a high level regardless of the medical information received. While these findings are qualified by the effects of anxiety, diagnosis, and presentation discussed above, overall, physicians may have a positive impact on parents regardless of the diagnosis or model in which they present medical information. This finding is consistent with empirical literature that any information is better than no information regarding their child's condition when it comes to parents feeling a sense of relief (Horner, 1997; Murray, 1993). Methodological considerations must be taken into account in the interpretation of this finding. Clinically, parents' distress related to their children's medical symptoms is high, especially when there is uncertainty related to diagnosis, prognosis, and treatment (Stewart & Mishel, 2000; Walker et al., 1997). It is possible that the overall decline in mothers' negative cognitive, emotional, and behavioral responses observed in this study is an artifact of the imagined nature of the vignettes. Parents' responses may not demonstrate the same pattern of decline if they were responding about their own children in an actual illness episode.

When physicians talk to parents about children's medical conditions, they not only communicate information about diagnosis, prognosis, and treatment, they also have an impact on parents' cognitive, emotional, and behavioral responses to children's symptoms. There are ways to enhance this effect, especially by choosing a biopsychosocial approach for parents who are

high anxious and for children presenting with functional symptoms. In addition, studies of physicians who treat patients with functional symptoms have revealed high levels of frustration, uncertainty, helplessness, and discomfort associated with physicians' inability to diagnose patients' symptoms (Dalton, Drossman, Hathaway, & Bangdiwala, 2004; Drossman, 1998; Reid, Whooley, Crayford, & Hotopf, 2001; Walker et al., 1997). The adoption of the biopsychosocial model is likely to benefit not only parents' experience with children's functional symptoms, but physicians' experiences as well.

Limitations

A number of factors may have impacted the findings of the current study, limiting the extent to which the results can be generalized.

Sample

A potentially limiting factor was the population chosen for study. Participants only were required to be mothers of school-age children; they were not required to have a child with a chronic illness. The major advantage of this decision was increased feasibility of recruiting the desired number of participants within the study timeframe. However, choosing not to recruit mothers of children with chronic illnesses necessitated the use of an imagined scenario for mothers to respond to in the study, as opposed to drawing on their own experiences. A benefit to this approach was the standard information presented in the child vignette from which all participants responded. However, it is possible that the study would have been more salient and mothers' responses would generalize more had they drawn from their own experiences.

Another potential limiting factor was the selection of only mothers as participants. This decision was based on mothers' more frequent role as caregivers to children during times of illness, thus providing more experience from which to draw for the questions posed in the study. Thus, conclusions from the results of this study only should be discussed in terms of mothers' responses to receiving medical information regarding children's chronic illness instead of parents in general. Fathers' responses to children's symptoms are equally important to understand in this area of research. It simply was beyond the scope of the current study to include a similarly sized sample of fathers for adequate comparison purposes.

Measures

The decision to measure only trait anxiety in mothers poses a limitation to study findings. While trait anxiety was measured because of the theoretical framework used to guide research questions of the study, state anxiety also plays an important role in parents' experience of receiving medical information for their ill children. For instance, a mother who self describes as "calm, cool, and collected" (thus classified as having low trait anxiety) may become highly state-anxious when taking her ill child to the doctor, particularly when that child may be having unexplained symptoms. Research shows an association between high parental state anxiety and increased perceived threat of children's symptoms, as well as poor understanding of children's conditions during medical encounters (McCarthy et al., 1991; Richtsmeier & Hatcher, 1994). In the current study, it is possible that state anxiety influenced mothers' reactions to the medical evaluation vignettes in the same fashion, yet this factor was unaccounted for. In future studies, especially those done in naturalistic situations of parents' actual experience with their ill

children, it would be useful to examine the role of state anxiety in parents' responses to children's symptoms in addition to trait anxiety.

Vignettes

Several limitations exist in the vignettes developed for the study. First, a limitation exists in the gender of the child used in the vignette, who was selected to be a girl based on the greater frequency of girls demonstrating functional abdominal pain than boys (Apley, 1975). While measuring mothers' responses to girls' functional symptoms provides a reasonable starting point from which to generalize, it must be noted that mothers' responses may have differed had the child in the vignette been a boy. Research demonstrating girls' perceptions of greater attention from their mothers during times of illness compared to boys' perceptions (Walker & Zeman, 1992) and girls' greater symptom reactivity to mothers' attentive behavior compared to boys (Chambers, Craig, & Bennett, 2002; Walker et al., 2006) suggests that child gender plays an important role in parent-child interaction around illness. Differences also exist in mothers' and fathers' parenting of sons versus daughters, such that fathers have been shown to be more involved with sons than daughters and provide more instrumental support to their children whereas mothers provide more emotional support (Starrels, 1994). It is likely that these gender-related differences in parenting extend to the context of parenting a child with a chronic illness and have the potential to differentially affect parents' and children's experience. Examination of parent and child interaction within the different gender dyads would further contribute to the understanding of parents' and children's experience with pediatric chronic illness.

Several points about the content of the medical evaluation vignettes deserve consideration in the discussion of study limitations. The medical evaluation vignettes reflected

the situation of a child who already had received an examination from her primary care physician (with negative findings) who was then referred to a sub-specialist for further examination. While this scenario represents a typical process for children with the abdominal pain presentation in the child vignette, results of the study may have differed had the medical evaluation vignette reflected a primary care evaluation, possibly because parents hold a different set of expectations for physicians practicing in primary versus specialty care or have different cognitive, emotional, and behavioral responses to receiving care for their children in a primary versus specialty setting.

Finally, the content of the vignettes was developed from a review of the literature on illness schema and clinical application of the biomedical and biopsychosocial models as well as contributions of both pediatricians and sub-specialists. Nonetheless, it is possible that the information imparted in actual pediatric medical encounters differs from that presented in the medical evaluation vignettes in the current study. Vignette validity was assessed by asking participants to rate how realistic they believed the medical evaluation vignette was at the end of the study. Results suggested that participants thought the medical evaluation vignette was highly realistic, with a majority of respondents giving it the highest rating of "extremely" realistic. Moreover, there were no differences in the vignette reality rating between mothers with experience caring for children with chronic illnesses and GI conditions and mothers of well children. This finding suggests that even mothers with a good deal of experience with pediatric medical encounters found the vignette to be just as realistic as mothers without that same level of medical experience with their children. Mothers who received a functional diagnosis rated the vignette as less realistic than mothers who received a diagnosis, even though functional symptom presentations are quite common (Kroenke & Mangelsdorff, 1989). While it is reasonable to conclude that the medical evaluation vignettes in the current study reasonably approximate the

reality of a pediatric medical encounter, conducting a naturalistic study would be the optimal way in which to ensure authenticity of medical information presented from different models.

Procedure

Procedural limitations also must be taken into account. This study was presented in an online format in which participants were able to complete the study entirely on the computer on their own time, therefore unobserved by the researchers. While the advantages of this online administration format were many, including ease of participation and recruitment, several costs were incurred. Although participants were given strict instructions to complete the study in one sitting, to participate at a time when they would not be interrupted, and to review all materials presented for the study carefully and in their entirety, there is no guarantee that these conditions were satisfied. It is possible that a face-to-face administration would have resulted in participants' more undivided attention, possibly resulting in stronger findings.

Future Directions

Future studies have many potential directions in which to direct their focus in this developing area of research. Effects of presentation of functional versus organic diagnosis could be examined in a variety of patient populations, as functional symptoms are common in nearly every specialty area (Stone et al., 2005a; Campo & Fritsch, 1994). There are many additional aspects of the biomedical and biopsychosocial models that could be operationalized. In the current study, the difference in content between the models was the major focus of investigation; however, the models likely differ on other factors, such as how patient concerns are elicited or how information is communicated. Studying physicians who practice in different settings, such

as primary versus specialty care, also might reveal differences in the clinical applications of the two models. The use of naturalistic research techniques would allow for direct observation of patient-parent-physician interactions and measurement of actual behavior. Examining parents' state anxiety and own coping behaviors would further the knowledge of parents' responses.

Research on pediatric patients' cognitive, emotional, and behavioral responses would advance the knowledge of children's reactions to medical encounters and concordance with parents' experience. Examining trait variables in children that may influence their responses to medical evaluations likely would improve knowledge of children's experience, just as inclusion of a maternal trait variable was helpful in understanding mothers' responses in the current study.

Taken together, advancing this field of study would increase knowledge of optimal delivery of medical information to parents about their children's symptoms. A benefit of research in this area of children's health is the potential to enhance communication between parents and physicians, empowering parents to feel optimally prepared to provide the best care for their children in the face of unexpected symptoms.

Appendix A: Screening Measures

STAI-T Form Y

Directions: A number of statements which people used to describe themselves are given below. Read each statement and then circle the number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	Not at all	Somewhat so	Moderately	Very much so
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with my life	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am calm, cool, and collected	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn't matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

SIQ

For the following questions, please think about one of your children between the ages of 8 and 17 years. Listed below are symptoms your child may or may not have ever experienced. For each symptom, please check the circle next to each reason or group of reasons that correspond to how much that might explain your child's symptoms. Please check one answer for each item and answer all questions.

0	1	2	3
Not at all	Somewhat	Quite a bit	A great deal

1. If my child had a *prolonged headache*, I would probably think that it is because:

He/she is emotionally upset	0	1	2	3
There is something wrong with his/her muscles, nerves, or brain	0	1	2	3
A loud noise, bright light or something else irritated him/her	0	1	2	3

2. If my child was *sweating a lot*, I would probably think that it is because:

He/she must have a fever or infection	0	1	2	3
He/she is anxious or nervous	0	1	2	3
The room is too warm, he/she is overdressed or working too hard	0	1	2	3

3. If my child got *dizzy all of a sudden*, I would probably think that it is because:

There is something wrong with his/her heart or blood pressure	0	1	2	3
He/she is not eating enough or got up too quickly	0	1	2	3
He/she must be under a lot of stress	0	1	2	3

4. If my child noticed his/her *mouth was dry*, I would probably think that it is because:

He/she must be scared or anxious about something	0	1	2	3
He/she needs to drink more liquids	0	1	2	3
There is something wrong with his/her salivary glands	0	1	2	3

5. If my child felt his/her *heart pounding*, I would probably think that it is because:

He/she has exerted him/herself or drunk a lot of caffeinated beverages	0	1	2	3
He/she must be really excited or afraid	0	1	2	3
There must be something wrong with his/her heart	0	1	2	3

6. If my child felt *fatigued*, I would probably think that it is because:

He/she is emotionally exhausted or discouraged	0	1	2	3
He/she has been over-exerting him/herself or not exercising enough	0	1	2	3
He/she is anemic or his/her blood is weak	0	1	2	3

7. If my child noticed his/her *hand trembling*, I would probably think that it is because:

He/she might have some sort of neurological problem	0	1	2	3
He/she is very nervous	0	1	2	3
He/she has tired the muscle in his/her hand	0	1	2	3

8. If my child had *trouble sleeping*, I would probably think that it is because:

Some kind of pain or physical discomfort is keeping him/her awake	0	1	2	3
He/she is not tired or had too much caffeine	0	1	2	3
He/she is worrying too much or must be nervous about something	0	1	2	3

9. If my child's *stomach was upset*, I would probably think that it is because:

He/she has worried him/herself sick	0	1	2	3
He/she has the flu or stomach irritation	0	1	2	3
He/she has had something to eat that did not agree with him/her	0	1	2	3

10. If my child had *lost his/her appetite*, I would probably think that it is because:

He/she has been eating too much or his/her body doesn't need as much food as before	0	1	2	3
He/she is worrying so much that food just doesn't taste good anymore	0	1	2	3
He/she has some stomach or intestinal problem	0	1	2	3

11. If my child had a *hard time catching his/her breath*, I would probably think that it is because:

His/her lungs are congesting from infection or irritation	0	1	2	3
The room is stuffy or there is too much pollution in the air	0	1	2	3
He/she is over-excited or anxious	0	1	2	3

12. If my child noticed *numbness or tingling in his/her hands or feet*, I would probably think that it is because:

He/she is under emotional stress	0	1	2	3
There is something wrong with his/her blood circulation	0	1	2	3
He/she is cold or his/her hand went to sleep	0	1	2	3

13. If my child was *constipated or irregular*, I would probably think that it is because:

There is not enough fruit or fiber in his/her diet	0	1	2	3
Nervous tension is keeping him/her from being regular	0	1	2	3
There is something wrong with his/her bowels or intestines	0	1	2	3

Appendix B: Study Vignettes

Child Vignette

Please carefully read the following description of a child with abdominal pain, imagining that you are her mother:

Imagine you are the mother of an 11-year-old girl. Your daughter has been having stomach aches off and on for several years. She has stomach aches two to three times a week and the pain lasts for at least an hour or more each time. Recently, the stomach aches have been getting worse, becoming even more painful and frequent than ever. Sometimes she cries and doubles over in pain. Your daughter has to stay home from school once or twice a week because of the pain. She has missed two weeks of school already this semester. You can tell that your daughter's pain is really severe. It is keeping her from doing a lot of things she used to do. You've taken her to your primary care physician's office several times, but they have not been able to determine what's causing this pain. The doctors haven't found anything to help relieve her pain.

Now, imagine that you are the mother of this child who has been having pain on and off for the last several years, which has become even more severe in the past couple of weeks. You are going to fill out a set of questionnaires. Please answer the questions as if you are the mother of this child with abdominal pain.

Medical Evaluation Vignette 1: Organic Biopsychosocial

MD presents evaluation results:
Hi, good to see you again. We have the results of your daughter's evaluation. As you might remember, we sent some samples of her blood and urine to the lab the last time you were here. Those tests have come back and they're all normal. We also at that time did an endoscopy and that's when we put the tube down inside of her stomach and took a look around and also took some biopsies at that time. The biopsy results have come back and they show some mild inflammation in some of the cells in her stomach.

Parent asks: What is her diagnosis?
The results of the stomach biopsy tells us that your daughter has gastritis. What that means is there's some areas in the lining of her stomach that are mildly inflamed.

Parent asks: Why is she having such severe pain?
Inflammation isn't the only thing that can be causing her her pain. Other things such as emotions and stress can also intensify pain signals. When you think it about, when you're upset or you're stressed, pain has a tendency to get worse, it's kind of like turning up the volume on the television. And then the other thing we also have a tendency to see is that when patients focus on pain, it can make it worse as well.

Parent asks: What can you do for her?
You know, as far as what we can do for her pain, I can give her some medication that's going to help reduce the acid in her stomach so that'll allow the inflammation that she has there currently to heal. I think the other thing that we see is that stress can also aggravate pain, so many patients, like your daughter, can get some control over their pain by learning some stress and some pain management techniques. I've got a great psychologist who I work with who can help her cope with her pain and with her stress and teach her some pain management techniques. For example, she can learn how to use relaxation and distraction to turn down the volume of the pain signals.

Parent asks: What if she keeps having pain?
That's a great question. I'll be seeing her again in a couple of weeks to see how she's doing. I'll give her a different medication if the one that I give her today doesn't work. The other thing is the psychologist will keep working with her on her strategies to cope with stress and help her manage her pain.

Parent asks: Can she go to school?
Oh yes, she can go back to school and continue her normal activities. In fact, being involved in activities will help distract her from the pain and make her feel better.

Word Count: 422
Playing Time: 2:41

Medical Evaluation Vignette 2: Organic Biomedical

MD presents evaluation results:
Hi, good to see you again. We have the results of your daughter's evaluation. As you might remember, we sent some samples of her blood and urine to the lab the last time you were here. Those tests have come back and they're all normal. We also at that time did an endoscopy and that's when we put the tube down inside of her stomach and took a look around and also took some biopsies at that time. The biopsy results have come back and they show some mild inflammation in some of the cells in her stomach.

Parent asks: What is her diagnosis?
The results of the stomach biopsy tells us that your daughter has gastritis. What that means is there's some areas in the lining of her stomach that are mildly inflamed.

Parent asks: Why is she having such severe pain?
Even some minor inflammation in the stomach can cause a lot of pain. The stomach lining is red and irritated, so it's very sensitive to the stomach acid that digests food. And that combination of inflammation in the stomach plus the acid that's already there can irritate nerves that send pain signals.

Parent asks: What can you do for her?
As far as what I can do for her, what I'd like to do is give her a prescription for Reduxal. This is a medicine that should reduce the acid in her stomach so that the inflammation can heal. This medicine comes in either a liquid form or a tablet form, but I usually like to use the liquid form in kids her age. What I'd like to do for the first week is give her a tablespoon in the morning right before she eats breakfast and then also have her take a tablespoon at night right before she goes to bed. After that first week, she'll only need to take a tablespoon at night. I'm going to give you a one month prescription of the medicine.

Parent asks: What if she keeps having pain?
That's a great question. I'll be seeing her again in a of couple weeks to see how she's doing. I'll give her a different medicine if this one doesn't work. There are several different kinds of medicines that are out there that can be used to reduce stomach acid.

Parent asks: Can she go to school?
Oh yes, she can go back to school and continue her normal activities. This medication should start working pretty quickly and should make her feel better.

Word Count: 382
Playing Time: 2:29

Medical Evaluation Vignette 3: Functional Biopsychosocial

MD presents evaluation results:
Hi, good to see you again. Well we have the results of your daughter's evaluation. As you know, the last time you were here we sent some samples of her blood and urine to the lab. Those test results have come back and they're normal. At that time we also did an endoscopy and that's when we put the tube down inside of her stomach and when I took a look at that time everything looked normal. While I was down there, I took some biopsies and those results are back and those are normal as well. So there is no evidence of any disease or any other abnormality.

Parent asks: What is her diagnosis?
Given that the results of the lab tests and the results from the endoscopy were normal, your daughter has functional abdominal pain. She may be hypersensitive to sensations in her stomach.

Parent asks: Why is she having such severe pain?
In patients with functional abdominal pain, emotions and stress can intensify the sensations and make them more painful. When you think about it, when you're upset or stressed, pain gets worse, it's sort of like turning up the volume on the television. Also, what we tend to see is that focusing on the pain can make it worse as well.

Parent asks: What can you do for her?
You know, as far as what we can do for your daughter, you know stress can aggravate pain, so many patients can get some control over their pain by learning stress and pain management techniques. I've got this great psychologist who I work with who can help her cope with the stress and teach her some pain management techniques. You know, for example, she can learn how to use relaxation and distraction to turn down the volume of her pain signals, and that should help her cope with the pain.

Parent asks: What if she keeps having pain?
That's a great question. I'll see her again in a couple of weeks to see how she's doing. In the meantime, the psychologist will be seeing her weekly to teach her strategies to cope with her stress and help her manage her pain.

Parent asks: Can she go to school?
Oh yes, she can go back to school and continue her normal activities. In fact, being involved in activities will help distract her from the pain and make her feel better.

Word Count: 364
Playing Time: 2:27

Medical Evaluation Vignette 4: Functional Biomedical

MD presents evaluation results:
Hi, good to see you again. Well we have the results of your daughter's evaluation. As you know, the last time you were here we sent some samples of her blood and urine to the lab. Those test results have come back and they're normal. At that time we also did an endoscopy and that's when we put the tube down inside of her stomach and when I took a look at that time everything looked normal. While I was down there, I took some biopsies and those results are back and those are normal as well. So there is no evidence of any disease or any other abnormality.

Parent asks: What is her diagnosis?
Your child seems to be perfectly healthy. Her history, physical exam and test results don't show anything wrong with her.

Parent asks: Why is she having such severe pain?
You know, physically, there's really no reason for her to have any type of pain. You know, we've done all the tests that were indicated and they all came back normal. You know, the pain is probably caused by stress or emotions. This seems to be more of a psychological problem and not a medical problem.

Parent asks: What can you do for her?
You know, as far as what we can do for your daughter, I can tell you she's in good health. When I looked down into her stomach with the endoscopy, it looked just fine. The lining of her stomach is nice and pink and healthy-looking. The results of the biopsy in addition to the blood and the urine tests were all normal. We've ruled out a number of conditions, such as infections, food allergies, ulcers, and Crohn's disease that can cause abdominal pain. So there's really nothing medically we can do for her.

Parent asks: What if she keeps having pain?
You know, that's a great question. You know, at this point, there's really nothing more that I can do for her. Since this is not a physical problem, I would suggest seeing a psychiatrist if the pain continues. I can give you the name of a great child psychiatrist if you want one.

Parent asks: Can she go to school?
Oh yes, she can go back to school and continue her normal activities. She's not physically sick, so there's really no reason for her to stay home.

Word Count: 358
Playing Time: 2:25

Appendix C: Study Baseline and Response Measures

PBQ

How true are each of these statements for you *right now* about your child's stomach aches, *imagining you are the mother of the child you just heard about*?

	Not at all true	A little true	Some true	Mostly true	Very true
1. My child's stomach aches mean that she has a serious illness	0	1	2	3	4
2. Even though my child gets stomach aches, there's nothing seriously wrong with her	0	1	2	3	4
3. My child's stomach aches mean that she is very sick	0	1	2	3	4
4. My child's stomach aches are no big deal	0	1	2	3	4

PCS-P

How much are you are experiencing each of these thoughts and feelings *right now* about your child's stomach aches, *imagining you are the mother of the child you just heard about*?

	Not at all	A little	Some-what	Moder-ately	Extre-mely
1. I am worried about whether my child's pain will end	0	1	2	3	4
2. I feel I can't go on	0	1	2	3	4
3. My child's pain is terrible and I think it's never going to get any better	0	1	2	3	4
4. My child's pain is awful and I feel that it overwhelms me	0	1	2	3	4
5. I feel I can't stand my child's pain anymore	0	1	2	3	4
6. I become afraid that my child's pain may get worse	0	1	2	3	4
7. I think of my child's other painful experiences	0	1	2	3	4
8. I anxiously want my child's pain to go away	0	1	2	3	4
9. I can't seem to keep my child's pain out of my mind	0	1	2	3	4
10. I keep thinking about how much my child is in pain	0	1	2	3	4
11. I keep thinking about how badly I want my child's pain to stop	0	1	2	3	4
12. There is nothing I can do to reduce the intensity of my child's pain	0	1	2	3	4
13. I wonder whether something serious may happen	0	1	2	3	4

PANAS

How much are you experiencing each of these feelings *right now* as you think about your child's stomach aches, *imagining you are the mother of the child you just heard about*?

	very slightly or not at all	a little	moderately	quite a bit	extremely
1. Interested	0	1	2	3	4
2. Distressed	0	1	2	3	4
3. Excited	0	1	2	3	4
4. Upset	0	1	2	3	4
5. Strong	0	1	2	3	4
6. Guilty	0	1	2	3	4
7. Scared	0	1	2	3	4
8. Hostile	0	1	2	3	4
9. Enthusiastic	0	1	2	3	4
10. Proud	0	1	2	3	4
11. Irritable	0	1	2	3	4
12. Alert	0	1	2	3	4
13. Ashamed	0	1	2	3	4
14. Inspired	0	1	2	3	4
15. Nervous	0	1	2	3	4
16. Determined	0	1	2	3	4
17. Attentive	0	1	2	3	4
18. Jittery	0	1	2	3	4
19. Active	0	1	2	3	4
20. Afraid	0	1	2	3	4

ARCS

Thinking about your child's stomach aches *right now,* how likely would you be to respond to your child in each of the following ways, *imagining you are the mother of the child you just heard about*?

Never	means that you would never do this.
Once in a while	means that you would only do this once in a while.
Sometimes	means that you would do this some of the time.
Often	means that you would usually do this.
Always	means that you would always do this.

When your child has a stomach ache or abdominal pain, how often would you . . .	Never	Once in a while	Some-times	Often	Always
1. Ask your child what you can do to help?	0	1	2	3	4
2. Express irritation of frustration with your child?	0	1	2	3	4
3. Do your child's chores or pick up your child's things instead of making him/her do it?	0	1	2	3	4
4. Talk to your child about something else to take your child's mind off it?	0	1	2	3	4
5. Give your child some medicine?	0	1	2	3	4
6. Reassure your child that he/she is going to be OK?	0	1	2	3	4
7. Get your child something to eat or drink?	0	1	2	3	4
8. Bring your child special treats or little gifts?	0	1	2	3	4
9. Try not to pay attention to your child?	0	1	2	3	4
10. Ask your child questions about how he/she feels?	0	1	2	3	4
11. Let your child stay home from school?	0	1	2	3	4
12. Encourage your child to do something he or she enjoys (like watch TV or play a game)?	0	1	2	3	4
13. Tell your child that he/she doesn't have to finish all of his/her homework?	0	1	2	3	4

When your child has a stomach ache or abdominal pain, how often would you . . .	Never	Once in a while	Some-times	Often	Always
14. Tell your child there's nothing you can do about it?	0	1	2	3	4
15. Give your child special privileges or let him/her do things that he/she isn't usually allowed to do (like staying up late or watching more TV)?	0	1	2	3	4
16. Stay home from work or come home early (or stay home instead of going out or running errands)?	0	1	2	3	4
17. Tell others in the family not to bother your child or to be especially nice to your child?	0	1	2	3	4
18. Tell your child not to make such a fuss about it?	0	1	2	3	4
19. Pay more attention to your child than usual?	0	1	2	3	4
20. Let your child sleep in a special place (like in your room or on the couch)?	0	1	2	3	4
21. Tell your child that he/she needs to learn to be stronger?	0	1	2	3	4
22. Let your child sleep later than usual in the morning?	0	1	2	3	4
23. Keep your child inside the house?	0	1	2	3	4
24. Try to involve your child in some activity?	0	1	2	3	4
25. Insist that your child try to go to school?	0	1	2	3	4
26. Try to make your child as comfortable as possible?	0	1	2	3	4
27. Tell your child you still expect him/her to do his/her chores or pick up his/her things around the house?	0	1	2	3	4
28. Check on your child to see how he/she is doing?	0	1	2	3	4

Appendix D: Medical Evaluation Vignette Review and Demographic Measures

Video Review

Please answer the following questions in relation to the video you just viewed.

	Not at all	A little	Some-what	Moder-ately	Extre-mely
1. Did the doctor communicate clearly?	0	1	2	3	4
2. Did the doctor seem competent?	0	1	2	3	4
3. Did the doctor seem concerned about your child?	0	1	2	3	4
4. How realistic was the vignette?	0	1	2	3	4

CHH

Please complete the following questions about your own child or children.

1. Does your child or do your children have any chronic medical conditions?
   a. Asthma Yes No

   b. Diabetes Yes No

   c. Seizures Yes No

   d. Other:_____

If yes, how severe is the condition?_____

2. What about gastrointestinal disorders?
   a. Crohn's Disease Yes No

   b. Peptic Ulcer Yes No

   c. Gastritis Yes No

   d. Colitis Yes No

   e. Irritable Bowel Syndrome Yes No

   f. Reflux; esophagitis Yes No

   g. Other:_____

MIF

1. Are you employed and if so, what is your occupation and job title?

   ☐ 0. not employed
   ☐ 1. employed, _____ hours per week
   Occupation:_____
   Job title:_____

2. How much school did you complete?

   ☐ Less than 7 years
   ☐ Junior high school (7-9th grade)
   ☐ Some high school (9-12th grade without graduation)
   ☐ High school graduate
   ☐ Some college or technical school
   ☐ Completed 4 years of college
   ☐ Graduate or professional school

3. How old are you? _____ years

4. To what ethnic group do you belong?
   ☐ White (Caucasian) ☐ African-American ☐ Asian
   ☐ Hispanic ☐ Other _____

5. How many children do you have? _____

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