

**EMPIRICALLY DERIVED RECURRENT ABDOMINAL PAIN CLUSTERS:  
THE DEVELOPMENT OF A TAXONOMY USING  
PSYCHOSOCIAL VARIABLES**

**BY**

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for the Degree of**

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**Empirically Derived Recurrent Abdominal Pain Clusters:  
The Development of a Taxonomy Using Psychosocial Variables**

**BY**

**Ian M. Mogilevsky**

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University  
of Manitoba in partial fulfillment of the requirements of the degree  
of  
Doctor of Philosophy**

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## ABSTRACT

Epidemiological studies have found that recurrent abdominal pain (RAP) occurs in approximately 10 to 15% of all school age children. Researchers have hypothesized about the relationship between a variety of psychosocial variables and the experience of RAP. However, empirical research has revealed that these variables have shown to be of minimal importance in describing the RAP population. The problem is that children with RAP are a heterogeneous group with different variables being important in subgroups of children. The focus of this study was to develop a preliminary taxonomy, which would identify salient psychosocial variables among clusters of children with RAP. This study hypothesized that empirically derived RAP clusters can be derived using psychosocial variables that would have clinical relevance and usefulness for treatment planning. Sixty children, between the ages of 6 and 16, with RAP and their parents participated in this study from a primary care Pediatrics clinic. Each child and parent completed a questionnaire package consisting of items relating to: pain, depression, anxiety, somatization, self-concept, pain reinforcement, family history of pain, and family functioning questions. In addition, a chart review determined the presence or absence of constipation in addition to identifying the pediatrician's RAP diagnosis (i.e., organic, dysfunctional, psychogenic) for each child. Cluster analysis identified four clusters of children with RAP derived from 17 child and parental measured variables. They were labeled (a) a *Parental Distress* cluster, (b) an *Adaptive Coping* cluster, (c) a *Family Dysfunction* cluster, and (d) a *Child Distress with Reinforcement* cluster. Discriminant function analysis demonstrated the distinctiveness of these empirically derived clusters. Clusters were examined against an external measure, specifically the Child Behavior Checklist (Achenbach, 1991), and revealed well-discriminated groups. Then, the derived clusters were compared with Barr's (1983) tripartite model of categorization. The empirically derived taxonomy proved to be more clinically relevant and useful for treatment planning when compared to the Barr's tripartite categorization model. With the identification of this preliminary taxonomy, it is now possible to undertake a more focused investigation in treatment research and the etiologies of RAP.

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## INTRODUCTION AND REVIEW OF THE LITERATURE

An individual's encounter with pain is ultimately a subjective experience that can not be fully known by another individual. Although completely understanding the pain experience of another will continue to be a futile endeavor, people for millennia have tried to understand and lessen the pain of others. In the last three decades, researchers have made great strides in understanding, measuring, and influencing the experience of pain. This pain research has had its primary focus on the adult population.

### PREVIOUS PAIN RESEARCH

Over the last 30 years, great advancements have been made in the understanding of pain because of a paradigm shift that was initiated by the gate control theory developed by Ronald Melzack, a psychologist, and Patrick Wall, a physician and anatomist (Melzack and Wall, 1965). Before this shift, the model that dominated our theorizing about pain was the unidimensional sensory model of pain, which was first proposed by Descartes in the 17<sup>th</sup> century.

#### Theoretical Models of Pain

##### Unidimensional Sensory Model of Pain

Historically, pain has been understood as solely an unidimensional sensory experience (Turk, 1997). The unidimensional sensory model of pain suggests that pain is a singular sensation that is determined by the degree of noxious sensory stimulation involved. This sensation was believed to be unaffected by affective, evaluative, and other experiences. This view comes from Descartes' Cartesian mind-body dualism, which dominated thought about the mind and body relationship. An analogy of a telephone line, with two ends and sound transferred, describes this view. With only a whisper, we hear little sound, but with a loud yell, we hear much sound.

The unidimensional sensory model of pain had obvious limitations that were difficult to explain. For example, it remained a mystery why some patients with objectively determined equivalent degrees and types of tissue damage varied widely in their reported pain severity. In addition, it was unclear why certain people would continue to report pain long after the expected time of normal healing had taken place. Melzack and Wall (1965) proposed the gate control theory to attempt to explain these phenomena.

### Gate Control Theory

The gate control theory was the first integrative model that included both physiological and psychological factors in the understanding of an individual's pain experience (Turk, 1997). This model proposes that three systems work together to process pain stimulation, also called nociceptive stimulation (i.e., pain receptors are also called nociceptor). The three systems are sensory-discriminative, motivational-affective, and cognitive-evaluative, which individually and collectively define the subjective experience of pain for an individual.

The gate control theory proposes that the spinal cord's dorsal horn contains a gating mechanism that either opens or closes (in gradations) transmission of peripheral nerve impulses to the brain (Melzack & Wall, 1965). Whether the gate is open or close depends on the active peripheral fibers and the influence of certain brain processes. These certain brain functions, such as selective cognitive processes, influence pain perception at the spinal gating mechanism (Turk, 1997). Thus, this theory emphasizes the dynamic role of the brain in pain processing. Subsequently, this model propelled psychological variables, such as attention, mood, perception of pain history, and other cognitive activities into the forefront of pain theory and research.

### Operant Conditioning Model

Along another line of theorizing, Wilbert Fordyce, a psychologist, first described an operant conditioning model of pain that took into consideration the effects of one's environment in shaping the experience of pain (Fordyce, 1976). In the operant conditioning model, principles of operant conditioning are applied to the behavioral manifestations of pain (Turk, 1997). Based on this model, pain behaviors, such as avoidance of an activity to attempt to prevent one from experiencing painful sensations, are controlled by external contingencies of reinforcement. For example, withdrawing from an activity becomes negatively reinforced by the reduction of pain. In addition, pain behaviors are positively reinforced if they attract positive attention from others (Craig, 1986). Furthermore, this model proposes that chronic pain behaviors that were initially caused by disease or injury could (after a sufficient time of healing) now be occurring in response to the reinforcing environment. Although operant factors clearly

play a role in the prolonged reporting of pain, one limitation of this model is that it fails to consider the emotional and cognitive aspects of pain (Turk, 1997).

#### Cognitive-Behavioral Model

The cognitive-behavioral model is a broader model than the operant model of pain because it includes behavioral aspects as well as emotional and cognitive aspects of pain (Turk, 1997). In contrast to the operant conditioning model of pain, this model proposes that cognitive factors are of primary importance and conditioning factors are of lesser importance. Differing from the operant conditioning model, this model suggests that it is the cognitive appraisals and expectations of pain events rather than evoked conditioned responses that are really at work in an individual's perception of pain. Personal cognitive interpretations based on past experiences of what is helpful to decrease pain (such as avoiding an activity) or what will exaggerate pain (such as feelings of loneliness or depression) contribute to an individual's response to pain. Furthermore, this model highlights the idea that there are continual reciprocal relationships between one's cognitive, emotional, behavioral, physical, and environmental histories that continually influence and shape the perception of pain. An example of this is when a chronic pain patient's behavior or attitude elicits a supportive or critical response from his or her spouse that will either reinforce adaptive or maladaptive ways of thinking and behaving (Mogilevsky, 1995).

#### McGrath's Model of a Child's Experience of Pain

It has been only in the last 15 years that research into pain in children has gained a prominent place in the current pain literature. Books by McGrath and Unruh (1987), Ross and Ross (1988) and McGrath (1990a) provided the impetus to the exponential growth rate of research in child pain. No longer do we assume that pain is a "one-to-one" direct relationship between nociceptive stimuli and pain experience. Rather, pain is a plastic and complex phenomenon, in which numerous psychological and social factors can influence one's experience of pain (McGrath, 1990a). McGrath (1990b) proposes a model that helps to provide insight into the factors that come into play when a child experiences pain. McGrath conceptualizes a model that identifies the factors that contribute to a child's experience of pain (see Figure 1). She identifies situational, behavioral, and emotional factors along with more stable factors that in combination influence a child's experience of pain. Stable factors include gender, age, cognitive

Figure 1. A model of the situational, behavioral, and emotional factors that affect a child's pain (From P. A. McGrath, 1989).

#### SITUATIONAL FACTORS

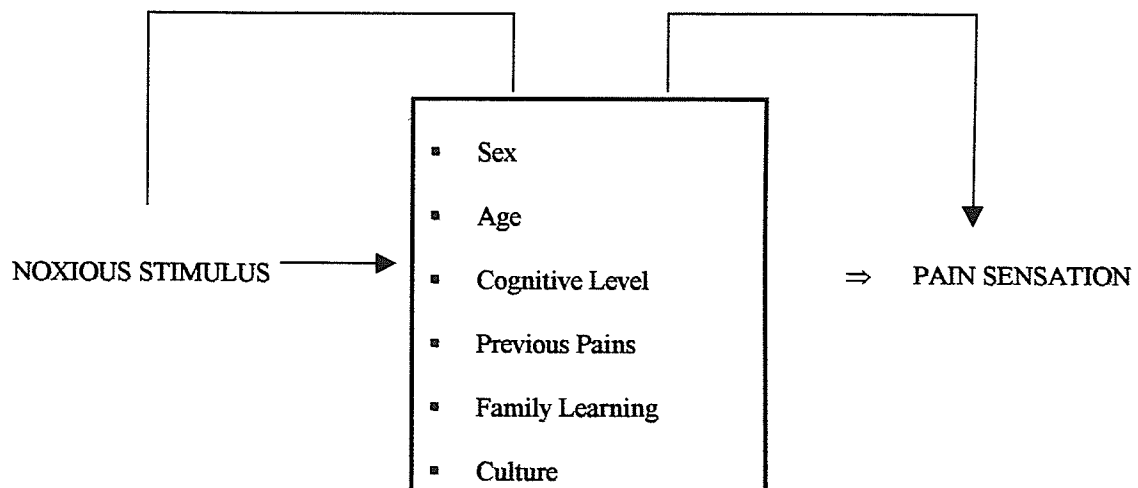
- Expectation
- Control
- Relevance

#### BEHAVIORAL FACTORS

- Coping Style
- Overt Distress
- Parental Response

#### EMOTIONAL FACTORS

- Fear
- Anger
- Frustration



---

Redrawn and reproduced from McGrath and Brigham (1992).

level, previous pain experience, and how pain is dealt within the family and the surrounding culture. Situational factors highlight the interaction between environmental and psychological factors that co-exist during the time the child is experiencing pain (McGrath & Brigham, 1992). McGrath (1990b) notes that "situational factors include a child's expectation about the pain source, the meaningfulness of the pain, a child's ability to control or predict what will happen, and a child's attention" (p. 9). Furthermore, the behavioral category includes a child's usage of coping strategies, a child's overt behavioral distress, and a parent's response to these behaviors. The emotional category includes the child's fear, anger, and frustration among others in response to the pain. McGrath notes that "all of these factors may modify the neuronal activity initiated by tissue damage thereby augmenting or reducing the pain" (p. 9). Thus, it is concluded from this model that comprehensive pain assessment of psychosocial variables is vitally important to the understanding of pain in children and our ability to treat it.

#### RECURRENT ABDOMINAL PAIN IN CHILDREN

The International Association for the Study of Pain (IASP) have defined recurrent abdominal pain (RAP) in children to be a syndrome consisting of abdominal pain that interferes with normal activities occurring at least three times over at least three months (Merskey, 1986, 1994). Millions of dollars each year are spent on medical tests for children experiencing RAP. Surprisingly, an overwhelming majority of these tests results in negative findings. For example, one study reported negative results on all 750 medical tests, which included 18 proctoscopies and rectal biopsies, 19 esophagoscopies, and 22 electroencephalograms, among 119 Children with RAP (Liebman, 1978). In addition, one hundred consecutive children who suffered from non-specific abdominal pain underwent medical tests that yielded all negative findings in a hospital setting (Barr & Feuerstein, 1983).

#### A Chronic Condition

When negative medical results are found, some physicians report feeling uncertain as to what the next step should be (e.g., see Levine & Rappaport, 1984). Most often, these physicians provide reassurance to the family by stating that no identifiable medical problem is present in hopes that the RAP would spontaneously remit. A few studies have reported that RAP does remit without treatment in some children (Apley & Hale, 1973; Stickler & Murphy, 1979). However, for many other children, their RAP

does not go away. Other studies have shown that from 25 to 50% of children with RAP continue to report similar symptoms in adulthood (Walker, Garber, Van Slyke, & Greene, 1995; Apley & Hale, 1973; Stickler & Murphy, 1979). For example, Christensen and Mortensen (1975) conducted a 28-year follow-up investigation of 35 children diagnosed with RAP. They found that over 50% had gastrointestinal pain in adulthood. Less than 30% of their control group of adults reported gastrointestinal pain.

### Prevalence

Recurrent abdominal pain in children appears to be a common problem. Prevalence studies have indicated that as many as 10 to 15% of children and adolescents may suffer with RAP (Mortimer, Kay, & Jaron, 1993; Parcel, Nader, & Meyer, 1977). Of these, less than 10% have a clear organic etiology (Apley & Naish, 1958; Apley, 1975; Oster, 1972). Given this, many medical professionals call RAP a "psychogenic" disorder (e.g., see Barr, 1983). Thus, researchers have investigated numerous psychological variables in attempts to provide some answers as to why this pain problem develops and what are the best psychological interventions available.

Given the prevalence and chronic nature of RAP, it is surprising that there is an absence in the research literature of a systematic investigation into this pain problem. In fact, little is known about the specific etiologies of RAP in children and which psychosocial variables are contributors to the onset and maintenance of RAP. It appears that children with RAP have presented a complex quandary to clinicians and investigators alike in pediatric psychology.

Part of this confusion stems from the absence of a dominant theoretical model to provide structure and guidance to the information gathering process. Moreover, McGrath (1983) noted that the lack of a dominant model is primarily due to the controversy that exists among researchers who investigate probable causes of RAP. He stated that some investigators take an "either-or" stance, which suggest that the absence of an obvious organic cause subsequently means the existence of a psychosocial etiology. Other investigators believe that unless there is an obvious psychosocial cause, it would be better to assume that the problem is an organic one, albeit unknown (e.g., see Barr, 1983). However, most of the current theoretical models have challenged this "psychogenic vs. organic" dichotomy. These models have

attempted to explain the complexity of the RAP population by taking into consideration a variety of psychosocial variables.

### THEORETICAL MODELS

A number of theoretical models are described below that attempt to explain the relationships between physiological mechanisms, and psychological and environmental factors in children with RAP. These models are the bipartite model, the tripartite model, the primary forces model and the newly described childhood functional gastrointestinal disorders (FGIDs) published this year (Rasquin-Weber, Hyman, Cucchiara, Fleisher, Hyams, Milla, & Staiano, 1999).

#### Bipartite Model

Even with the advancements in pain research and the understanding of the biopsychosocial nature of RAP, many pediatric textbooks still discuss RAP as being categorized as bipartite in nature (Sondheimer & Silverman, 1995). This traditional view of RAP categorized these children into an organic or a psychogenic group depending on whether an organic cause was found for the pain (see Figure 2a). An organic cause referred to the presence of an organic disease or an abnormal physiologic process, which is believed to be producing the pain. The definition of the psychogenic group was much more ambiguous. Most researchers referred to this group as having "stressful, emotional, or psychosocial factors having some [primary] role in the production of the syndrome" (Barr & Feuerstein, 1983, p. 16).

Barr (1983) noted that this model has limited utility because it does not take into consideration "dysfunctional pain, the sensation [that] is generated intra-abdominally but is the result of normal physiologic functioning" (p. 524). In addition, Rappaport (1989) argued that this psychogenic group was used as a diagnosis of exclusion. That is, he noted that if an organic cause were not found, a psychogenic label would be the "default" diagnosis that usually discontinued any further medical investigation. Thus, a noteworthy limitation of this model is its lack of acknowledgement of possible normal physiologic processes that may be playing a part in RAP. Given this, McGrath (1983) noted that this model could lead to an erroneous diagnosis and overlooked medical treatment. The next model takes into consideration this important issue.



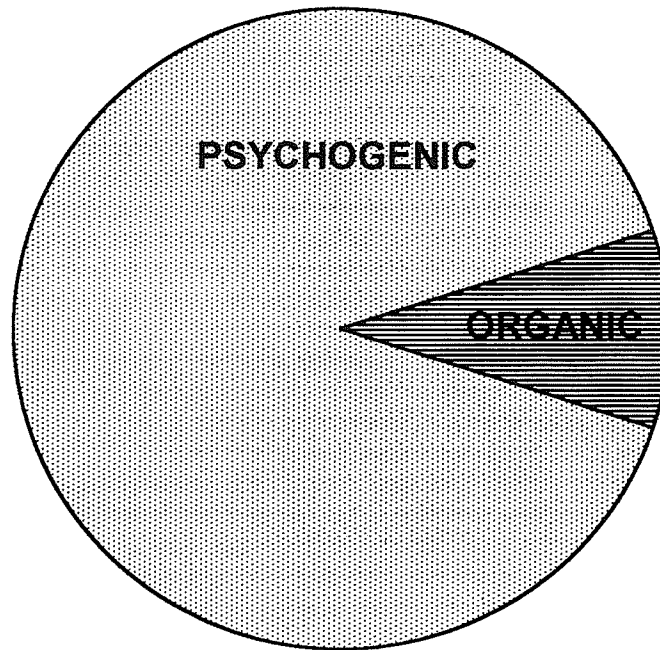
### Tripartite Model

Barr and Feuerstein (1983) proposed a model that grouped children who experienced RAP into three categories (see Figure 2b). The organic group, children with a known organic illness and the psychogenic group, children with a psychological disorder, were taken from the bipartite model (Rappaport, 1989). They added a third group called the dysfunctional group, which consisted of children who had an imbalance in their physiologic processes that were causing their pain (Barr, 1983). This included children "in which the mechanism or specific pattern of pain is recognizable . . . [and those] in which no mechanism or pattern is apparent" (p. 525). For example, a child's pain may be considered dysfunctional if it was determined that he or she was lactose intolerant or if there was some suspicion of "some type of imbalance that is not yet clearly defined" (Rappaport, 1989, p. 81).

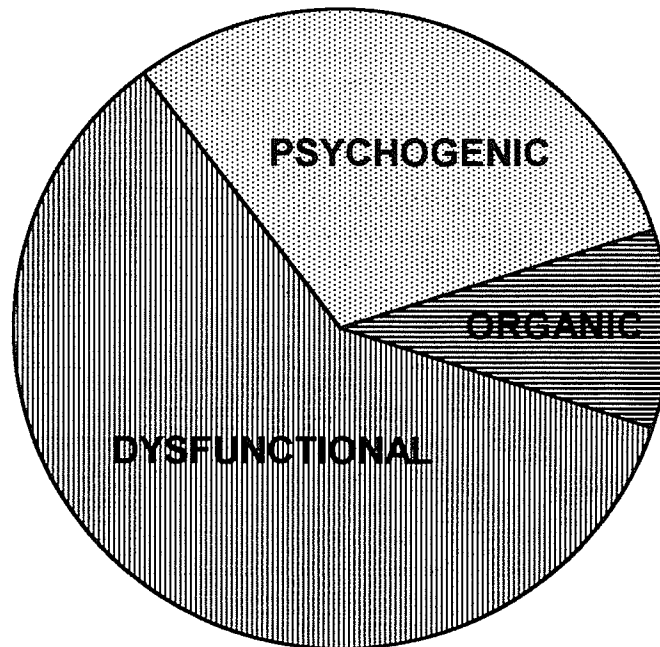
Using these criteria, Barr (1983) reported that only 6% of the children with RAP from his clinical sample would have a clear psychogenic disorder. His data revealed that 6% had a known organic illness, 34% had a normal physiologic process that was believed to be contributing to the pain, 54% had some suspected but unknown imbalance, and 6% had an "obvious" psychogenic disorder. Thus, 88% of the children with RAP were placed in the dysfunctional category. Although Barr believed that normal or abnormal physiologic processes explained 88% of the population, specific variables were not identified. Furthermore, this study was unable to identify specifically the variables that may have been important in the development of RAP. Thus, it is misleading to presume that normal or abnormal physiologic processes for some children with RAP was the primary cause when empirical research has shown this to be inconclusive. For example, McGrath, Goodman, Firestone, Shipman, and Peters (1983) found that children without RAP were just as likely to be lactose intolerant as children with RAP. In addition, they found that only 24% of their RAP sample were found lactose intolerant. Therefore, at most lactose intolerance is a significant factor for only a small subgroup of children with RAP. Hence, a serious limitation exists regarding the definition of the dysfunctional group because it does not account for the influence of environmental or psychological variables that may be involved. As Sammons (1988) noted, "psychological factors almost certainly play a role in the etiology of RAP" (p. 388). Thus, psychosocial variables must be considered in every child with RAP.

Figure 2. Alternative Clinical Models for Recurrent Abdominal Pain Syndrome. (a) The presence of cross-hatching indicates an assumption of "disease" being present. (b) "Dysfunctional" RAP syndrome refers to children in whom appropriate evidence for organicity or psychogenicity is lacking and no assumption of abnormality is made (From Barr, 1983).

**(a) BIPARTITE MODEL**



**(b) TRIPARTITE MODEL**



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Redrawn and modified from Barr and Feuerstein (1983).

Furthermore, Rappaport (1989) criticized the usage of the psychogenic group in the tripartite model. He commented that although research has shown that some children with RAP seem to be described with certain psychosocial variables, "the majority of the children with RAP do not fit in any of these categories" (p. 81). He questioned the usefulness of the psychogenic group due to the lack of definitive empirical evidence relating RAP to psychosocial variables.

Thus, he deduced that psychosocial variables "do not yet explain the vast group with abdominal pain of unknown etiology" (p. 81). However, if one takes the position that children with RAP are a heterogeneous population, this criticism can be easily rebutted. In most studies, only a small number of psychosocial variables have been examined. Due to the heterogeneous RAP population, these variables are not important to all the children. Most likely, different variables are important to different subgroups of children. Thus, in research that treats children with RAP as one group, each psychosocial variable would appear to be unimportant in describing these children as a whole.

One strength of the tripartite model is that the "absence of evidence of organic disease does not imply that emotional or psychogenic factors are causal." (Barr, 1983, p. 526). Barr stressed that clinicians must be cautious not to assume that psychological factors are causal when in fact they may have developed due to the presence of RAP. In addition, Barr noted that the finding of "organic or psychologic abnormalities may be incidental to the pain complaint" (p. 526). Overall, Barr's tripartite model fails to acknowledge the numerous psychosocial variables that may be contributing to the onset and maintenance of RAP in different children. Nonetheless, this model provides greater understanding into the complexity of psychosocial variables in RAP.

In summary, Barr and Feuerstein (1983) attempted to explain the complexity of possible RAP etiologies by adding a third, dysfunctional category, to the bipartite model. This model has stimulated further thinking and greater awareness of the multiple components, consisting of both physiologic and psychosocial that may be involved in the development and maintenance of RAP. In attempting to explain this interaction, Levine and Rappaport (1984) proposed a complex model that further takes into consideration these multiple components that may be involved in RAP.

### Primary Forces Model

One of the most comprehensive models reported in the literature is the primary forces model of Levine and Rappaport (1984). They suggested that multiple predisposing factors might make children more vulnerable to the development of RAP (see Figure 3). These factors included "somatic predisposition, dysfunction or disorder, milieu and critical events, temperament and learning response patterns as well as life style and habit" (Rappaport, 1989, p. 82).

Somatic predisposition, dysfunction or disorder referred to any possible physiologic factors that may have contributed to the RAP. Physiologic factors may range from somatic predisposition, such as, problems of gastrointestinal motility, to dysfunction or disorder states, such as, the presence of a peptic ulcer. Milieu and critical events referred to any components of the child's "environmental circumstance," (p. 983) such as, "nurturance, the presence of identifiable emotional illness in the family, interactions with siblings, and the level of domestic stress and strain" (p. 983) that may impact on the child with RAP (Levine & Rappaport, 1984). Furthermore, they suggested that these variables might reach into the child's broader social environment (e.g., peer relationships, school performance, etc.). Regarding temperament and learning response patterns, Levine and Rappaport (1984) listed variables, such as, the child's level of "excitability, consolability, satability, and irritability" (p. 984), coping skills, and learned responses that are developed throughout childhood. Finally, they noted that life style and habit referred to the "unique daily agenda" of each child with RAP (p. 981). Levine and Rappaport (1984) suggested that these transient variables are often neglected, such as, participation in enjoyable activities, satisfying social interaction, and other meaningful life events. Levine and Rappaport (1984) stated that when each of these variables is taken into consideration, a "heterogeneous group of children with their widely divergent pathogenic force patterns and styles of responsiveness" (p. 988) is found.

Sammons (1988) suggested that "this model is both compelling and workable; it has the capability to incorporate individual targets of earlier research into an equation that may have explanatory power in analyzing the etiology of RAP. With adequate assessment procedures, it may have real predictive ability in determining children at risk for developing RAP" (p. 402). However, in its present form, this model has serious research limitations. Many of the important constructs described in this

Figure 3. This conceptual model depicts the multifactorial genesis and modulation of recurrent abdominal pain during childhood. It suggests that, typically, a somatic propensity toward pain localized to the abdomen occurs in a living milieu that itself is affected in part by critical life events. The milieu may or may not trigger or intensify the pain. The child's own habits and style of life are also influential forces either promoting or counteracting symptoms development. Finally, there is a repertoire of temperamental traits and patterns of response that promote pain appreciation. The four forces influence each other and become specific targets for evaluation and patient management (From Levine and Rappaport, 1984).



model do not have standardized assessment instruments available. In addition, it would be very difficult to design a study that would take into consideration the myriad of hypothesized variables that they suggested may be involved in the development and maintenance of RAP.

Furthermore, Levine and Rappaport (1984) suggested that a multiple regression model could be used to measure the "portion of pain variance" (p. 971) accounted for by the different variables. However, if children with RAP are a heterogeneous population, different variables would account for the greatest amount of variance in different subgroups of children with RAP. Thus, possibly, all of the investigated variables would account for a small amount of overall variance with the possibility of some important variables of a particular subgroup of children with RAP being completely excluded. Therefore, although this model suggests multifactorial etiologies for children with RAP, it does not have the capability of discriminating which variables would be salient in a particular subgroup of children with RAP.

Overall, each of these presented models has serious limitations in their ability to describe variables that are important in the development or maintenance of RAP. This study proposed a different methodology of classifying these children. An empirically based taxonomy aims to identify clusters of children that have common psychosocial variables that can be plotted as profiles. The generation of these clusters of children with similar profiles is the first important step in determining the specific etiologies of RAP.

#### Childhood Functional Gastrointestinal Disorders

The newly described childhood functional gastrointestinal disorders (FGIDs) attempted to provide a method for standardizing the manner in which clinical disorders are defined (Rasquin-Weber, Hyman, Cucchiara, Fleisher, Hyams, Milla, & Staiano, 1999). The pediatric working team chose not to include recurrent abdominal pain (RAP) of childhood as a formal disorder because it was deemed to have too general criteria. In addition, they believed that many children with RAP also met the criteria for functional dyspepsia, irritable bowel syndrome, or functional abdominal pain (Rasquin-Weber, et al., 1999). Furthermore, they noted that there was "a growing body of evidence to suggest that functional abdominal pain is often associated with visceral hyperalgesia" (p. 1163). Five disorders were described under the category called G2.Abdominal Pain: functional dyspepsia, irritable bowel syndrome, functional



abdominal pain, abdominal migraine, and aerophagia. Unfortunately, these disorders have failed to describe psychosocial factors as being important in the onset and maintenance of the pain in some children.

## ETIOLOGICAL THEORIES

Much investigation into the importance of biopsychosocial variables among children with RAP has been conducted. Due to the lack of clarity regarding which biopsychosocial variables are important in the development and maintenance of RAP, empirical investigations have examined a variety of variables. Unfortunately, little progress has been made in our understanding of which biopsychosocial variables are causative. Researchers have suggested that children with RAP may have many of the following biopsychosocial variables influencing the development and maintenance of their pain: (a) autonomic instability; (b) lactose intolerance; (c) constipation; (d) *Helicobacter pylori*; (e) anxiety; (g) depression; (i) somatization disorder; (e) reinforcement of the pain behaviors; (f) pain modeling; (h) family dysfunction; and (j) negative life events (McGrath & Feldman, 1986; Macarther, Saunders, & Feldman, 1995). Unfortunately, the study of each these variables has yielded mixed results with no variable consistently identified as important to all children with RAP. Thus, it is unlikely that any one of these variables alone is important in the development or the maintenance of RAP in all of the children.

### Physiological Mechanisms on RAP

#### Autonomic Instability

Autonomic instability, which includes autonomic imbalances and hypersensitivity, has been considered important in the development and maintenance of RAP (Hodges & Burbach, 1991). In one study, Kopel, Kim, and Barbero (1967) found that children with RAP had increased rectosigmoid motility in response to Prostigmin in comparison with healthy children. From this finding, they suggested that children with RAP appear to have autonomic hypersensitivity. In addition, in Rubin, Barbero, and Sibinga's (1967) study, they found that children with RAP had a longer recovery time in pupillary response when tested with a cold pressor stress compared to normal controls. However, Apley, Haslam, and Tulloch (1971) failed to replicate this finding. In a more recent study, using cold pressor stress, Feuerstein, Barr, Francoeur, Houle, and Rafman (1982) compared children with RAP with carefully

matched hospital and normal control groups. In both the stress and recovery phases, they found no differences on the physiologic, behavioral, and subjective measures. Nonetheless, McGrath and Unruh (1987) hypothesized that autonomic instability may be the underlying feature that could account for how anxiety, depression, and somatization influence RAP. However, research to support this hypothesis is presently lacking.

#### Lactose Intolerance

Lactose intolerance is developed in a child when there is a lack of an intestinal enzyme, called lactase, which is used to metabolize lactose in the gastrointestinal tract. In their prospective study, Barr, Levine, and Watkins (1979) found that 32 (40%) of the children with RAP studied had a lactose malabsorption problem that may have been causing their pain. In addition, in a similar study, Liebman (1979) found that 11 (31%) of the children with RAP studied had a lactose intolerance. However, studies by, Lebenthal, Rossi, Nord, and Branski (1981), Christensen (1980), and McGrath et al. (1983) showed no differences in lactose intolerance between children with RAP and normal controls. Thus, it is uncertain if lactose intolerance is an important variable for even a subgroup of children with RAP.

#### Constipation

It is well known that constipation is a common cause of abdominal pain (McGrath & Unruh, 1987). However, it would appear that few children with RAP show signs of being constipated (Hodges & Burbach, 1991). For example, Dimson (1971) reported that only 22% of his RAP sample were constipated. In addition, Galler, Neustein, and Walker (1980) also reported that constipation was not a common symptom in their clinical treatment of children with RAP. Thus, it is likely that constipation is an important variable in only a small group of children with RAP.

#### *Helicobacter pylori*

*Helicobacter pylori* are bacteria that can be found in the stomach and intestines of children, which has been suggested to be an important cause of RAP (Oderda, Dell'olio, Morra, & Ansaldi, 1989). However, empirical research has shown mixed results. In a review of the literature, Hardikar, Feekery, Oberklaid, and Grimwood (1996) found the *H. pylori* colonization ranged from 8% to 63% in children with RAP with a mean of 26% across studies. In addition, they found the *H. pylori* infection was equally

common in children with RAP as in children without abdominal pain. Overall, Fiedorek, Casteel, and Pumphrey (1992) found that a *H. pylori* infection in children with RAP is an infrequent event.

### Psychological Variables in RAP

#### Anxiety

Apley and Naish (1958) investigated the presence of a number of psychosocial variables among children with RAP. They examined 108 children with RAP and compared them to 312 control children. They described 36 (33%) children with RAP as high-strung, fussy, and excitable or anxious, timid, and apprehensive. This finding suggests that anxiety could be an important variable in a third of children with RAP. Given that their data was collected by interview method without any diagnostic validity checks, caution must be given in generalizing this finding.

Walker, Garber, and Greene (1993) evaluated a number of psychosocial correlates in a sample of 88 children with RAP. They used a design that compared children with RAP, children with peptic disease or a psychiatric disorder, and well children to attempt to identify important factors that could be used to differentiate children with RAP from these other groups of children. They found that children with RAP reported a higher level of internalizing behavior as measured by the Child Behavior Checklist (CBCL) than the well children and lower than the children with a psychiatric disorder. However, this variable did not differentiate children with RAP from children with a peptic disease. In addition, only a small number of children with RAP were found to be within the clinical range on the internalizing measure.

In another study, Walker and Greene (1989) conducted an investigation among children with RAP and their parents. They examined reported levels of somatic complaints, anxiety, and depression for the children with RAP, as well as, for the parents. They compared these findings with reports from children with a known organic cause for their abdominal pain and healthy children, and their parents. They found that RAP and organic children had higher levels of depression and somatic complaints than the healthy children did but they did not differentiate from each other. However, children with RAP were found to have significantly higher internalization behavior as compared to both the organic and healthy groups of children. In fact, a majority of these children was found to be in the clinical range on this measure.

In a related study, Hodges, Kline, Barbero, and Flanery (1984) reported that higher levels of stress were reported in children with RAP compared to a healthy group of children. Other studies have reported similar findings (e.g., Garber, Zeman, & Walker, 1990; Hodges, Kline, Barbero, & Woodruff, 1985; Walker & Greene, 1989). However, it appears that these anxious children with RAP do not seem to differ significantly from children with a known gastrointestinal illness (Garber, et al., 1990; Hodges, Kline, Barbero, & Woodruff, 1985; Walker & Greene, 1991b). Thus, it is possible that these children were anxious because they were seeking medical attention and not because anxiety was an important variable in their experience of pain (e.g., see Hodges & Burbach, 1991).

Sanders, Shepherd, Cleghorn, and Woolford (1994) conducted a cognitive-behavioral family intervention group with children with RAP and their parents. They found that about one half of the children with RAP who completed the treatment reported no pain, whereas, only one quarter reported no pain in the control group. Interestingly, the children's internalizing behavior as reported by their parents after treatment was found to be significantly less than prior to treatment, decreasing from a clinical level to a non-clinical level.

Wasserman, Whittington, and Rivara (1988) evaluated a number of psychosocial variables among 31 children with RAP using a clinical interview and standardized questionnaires. A significant difference was found on the internalizing dimension of the CBCL between the children with RAP and control group with the majority of children with RAP in the clinical range.

Overall, anxiety seemed to be an important variable in most of these studies. However, in every study, only a subgroup of the children with RAP was found to be in the clinical range for anxiety or internalization. With these studies conducting statistical analysis that included both the clinical and non-clinical cases, the overall importance of anxiety decreased. This may explain why studies did not detect difference in anxiety levels between children with RAP and children with a known gastrointestinal illness. Most likely, anxiety is an important factor for only a subgroup of children with RAP.

#### Depression

Hughes (1984) investigated the presence of clinical depression in 23 children with RAP. He used a psychiatric interview to assess the severity of these children's psychopathology. He found all 23 children

met the DSM-III criteria for a major depressive episode. However, with the absence of a control group and the presence of an obvious referral bias, this finding must be generalized with caution. In another study, Walker and Greene (1989) reported that children with RAP had higher levels of depression than healthy children, however, no difference was found when compared to children with a known organic cause for their abdominal pain.

Hodges, Kline, Barbero, and Flanery (1985) conducted an investigation of depressive symptomatology among 25 children with RAP as compared to 67 behaviorally disordered (BD) and 42 healthy children. They found that levels of depression among children with RAP were not significantly different from those of healthy children. In addition, they found that the level of depression in children with RAP was significantly lower than the level of depression of BD children. McGrath et al. (1983) reported no differences on their measure of depression among children with RAP and their controls.

Overall, depression does not appear to be an important factor in our understanding of children with RAP. However, due to its limited examination in the literature, it is still premature to assume that it does not play a role in RAP.

#### Somatization Disorder

Ernst, Routh, and Harper (1984) conducted a study with 143 children reporting abdominal pain consisting of 21 children with a known organic cause, 14 children with an organic finding that was unrelated to the pain, and 108 children believed to have an unknown organic cause. They investigated the number of physical symptoms reported by the children by chart review. They found that children with RAP reported significantly greater number of physical symptoms in correlation with the length of time they had experienced pain. In addition, these children reported more pain symptoms as their age increased. Thus, they suggested that children with RAP "chronic polysymptomatic complaints" (p. 83) reveal the presence of a somatization disorder. They noted that the increase in symptoms with age supported this because a somatization disorder is believed to take a decade or longer to acquire. A number of limitations exist with this study. The sample sizes were uneven for comparison and physician's documentation of symptoms on the medical records made up the archival data used in this study. Thus, a

likely possibility was that these physicians searched for and documented more diligently symptoms in children who continued to have negative medical findings as they aged.

In another study, Walker, Garber, and Greene (1991) found that the duration of RAP in children was not significantly associated with the number of somatic symptoms reported in their sample of children. However, they noted that children with RAP reported more somatic complaints when compared to healthy children. Moreover, Walker et al. (1993) reported that children with RAP had higher levels of somatic complaints than those reported by well children. In a related study, Walker and Greene (1989) found that children with RAP reported higher levels of somatic complaints than healthy children but no difference from children with a known cause for their abdominal pain.

Overall, it is uncertain whether the number of somatic complaints is an important factor for children with RAP. However, it is clear that children with RAP report a variety of other somatic symptoms. Given this, it is important to identify the presence of these other somatic symptoms (e.g., see Apley, 1975). With further research, these somatic symptoms may be found to play an important role in our understanding of a subgroup of children with RAP.

#### Social Variables in RAP

##### Reinforcement of Pain Behaviors

The theory behind the operant conditioning model of pain is that children who are positively reinforced after a verbal expression of pain or pain behavior are more likely to continue to report pain (Fordyce, 1976). Reinforcement may come in terms of parental attention, special privileges, or the avoidance of undesirable events, such as, school.

Dunn-Geier, McGrath, Roucke, Latter, and D'Astous (1986) conducted a study with mothers and children experiencing pain (50% had abdominal pain). The children took part in simulated activities in the laboratory that evoked pain behaviors. One group of children labeled "non-copers" emitted more expressions of pain than the "coping" children did. Also, mothers of non-copers tended to have discouraged adaptive coping behaviors and reinforced their children's pain behaviors. Non-copers were defined by the number of days they missed from school due to pain.

Zuckerman, Stevenson, and Bailey (1987) investigated maternal depression among a community sample of preschoolers who were experiencing recurrent stomachaches. They found that depressed mothers were more willing give attention to their child if their child reported having a stomachache, which may have reinforced the pain. A number of studies have found that mothers of children with RAP report more depressive symptomatology as compared to mothers of healthy controls (Hodges, Kline, Barbero, & Flanery, 1985; Hodges, Kline, Barbero, & Woodruff, 1985; Walker & Greene, 1989). Possibly, depressed mothers are more likely than non-depressed mothers to pay more attention and thus reinforce their child's pain behavior. Alternatively but less likely, a young mother with a child with RAP may be greatly distressed because of it and subsequently develop a mood disorder.

Walker, Garber, and Greene (1993) found that children with RAP perceived greater parental reinforcement of their abdominal symptoms compared to children with a psychiatric disorder or healthy children. In addition, they noted that parents who themselves were exhibiting illness behaviors were more susceptible to providing positive reinforcement of their child's illness behaviors.

In a related study, Walker and Zeman (1992) investigated the level of parental encouragement of pain behaviors among a group of pediatric patients. They found that parents of children with RAP were more sympathetic than parents of children who reported other health concerns. In addition, they found that mothers encouraged their child's illness behavior more than fathers and that girls perceived their parents as more encouraging of their illness behaviors than boys did.

Sanders et al. (1994) conducted a treatment study with 44 children with RAP comparing a cognitive-behavioral family intervention (CBFI) treatment package with standard pediatric care (SPC). They attempted to identify the mechanisms responsible for the improvement in RAP. Children were randomly assigned to one of two groups that received four to six sessions of either CBFI or SPC. They found that parental usage of operant conditioning techniques to encourage healthy behavior and ignore pain behavior significantly predicted lower pain diary scores at post-treatment.

In a related study, Sanders, Rebgetz, Morrison, Bor, Gordon, Dadds, and Shepherd (1989) conducted a treatment outcome study with 16 children with RAP using a pre-post design with a control group. Children were randomly assigned to one of the two groups. They used a multi-component

treatment package that consisted of reinforcement of well behaviors, coping skill training, and various generalization enhancement procedures. Mothers were requested to ignore nonverbal pain behaviors and praise the child for redirecting to an activity after a verbal pain complaint. In addition, coping strategies, cognitive self-control skills, and relaxation, were taught to the children. They found that six (75%) out of the eight children in the treatment group were pain-free at post-treatment whereas two (25%) out of eight children in the control group were pain-free. Due to the small sample size, this finding was not statistically significant. The use of a multi-component treatment package made it unclear as to what extent the usage of operant conditioning techniques contributed to the children's improvement. However, two other treatment studies have shown that operant conditioning techniques can reduce pain complaints in children with RAP (Miller & Kratochwill, 1979; Sank & Biglan, 1974).

Overall, it appears that parental reinforcement of their children's pain behaviors was an important variable in a number of studies. However, due to this variable only receiving recent attention in the literature, it is uncertain whether this variable is important to all children with RAP or only a subgroup of children.

#### Pain Modeling

In general terms, Bandura's (1977) social learning theory states that observational learning facilitates the development of new behaviors. Some pain behaviors appear to be developed by observational learning (Craig, 1986). Studies have shown that parents of children with RAP tend to have significant somatic symptomatology, which seems to support a social learning model (Apley & Naish, 1958; Galler, et al., 1980; Oster, 1972; Routh & Ernst, 1984). For example, Berger, Honig, and Liebman (1977) reported that many children with RAP have parents who also report recurrent abdominal pain. Interestingly, parental reports of pain onset and the subsequent onset of RAP in the child seems to suggest more of a social learning model as compared to a genetic disposition hypothesis.

In another study, Christensen and Mortensen (1975) conducted a 28-year follow-up study with 34 children with RAP who were in adulthood. They found that abdominal pain occurred no more frequently among children of parents who experienced RAP as children than among children of parents who did not experience RAP in childhood. However, there was a higher incidence of RAP among children if their



parents also complained of abdominal discomfort at the time of the investigation than among children whose parents did not have pain. This result also seemed to support a pain modeling over and against a genetic disposition hypothesis.

Robinson, Alvarez, and Dodge (1990) conducted a matched control design study to investigate parental illness behavior, as well as, illness behavior and stressful life events among 40 children with RAP. They compared children with RAP with a hospital control group and a school control group. They collected information using a structured clinical interview and a number of standardized questionnaires. They found that somatic symptoms reported by parents of the children with RAP greatly outnumbered those of the parents in the control groups. In addition, children with RAP were more likely to receive attention when they were ill. This study provides support to the hypothesis that some children with RAP may be learning their pain behavior from their parents who are also reinforcing their pain behaviors.

In another study, Walker and Greene (1989) found that mothers of children with RAP reported significantly higher anxiety, depression, and somatic complaints than mothers of healthy children. They used a social learning explanation for this finding. They suggested that children with RAP received positive benefits for modeling the emotional distress and somatic complaints that they observed from their parent. Walker, Garber, and Greene (1994) conducted a prospective study with 197 children with RAP, and their mothers, fathers, and teachers. Information was gathered at the initial interview on a number of psychosocial variables, such as, negative life events, child social and academic competence, and parental and child somatic complaints. At a one-year follow-up, number of somatic symptoms was collected from the children with RAP. They found that for children with low social or academic competence scores and higher levels of negative life events, these children were associated with more somatic complaints at follow-up. In addition, boys were found to have reported more somatic complaints at follow-up if they were from families with high levels of negative life events and had a mother whom reported more somatic complaints. Children were found to show more somatic complaints at follow-up if they had fathers who reported more somatic complaints. From these findings, they suggested that children with RAP who are lacking in competency might have received a secondary gain from their reports of somatic complaints. These children may adopt the "sick role" to legitimize their lack of competency. Furthermore, parents

who were also found to have reported many of somatic complaints might have modeled this role. In addition, negative life events were an important variable for some children with RAP. This study included 68 children with RAP who had a known organic illness and all subjects were recruited from a tertiary care center.

Magni, Pierri, and Donzelli (1987) conducted a 10-year follow-up study with 16 children with RAP. They found that a number of variables discriminated between children with RAP who were no longer experiencing RAP (n=8) and children with RAP (n=8). Having a family member with symptomatology, undergoing a greater number of surgical procedures, as well as, educational level and social class were variables that differentiated the children with RAP from the other group. They commented that the presence of a "painful family" (p. 73) may have contributed to the maintenance of the RAP. That is, having family members that report pain symptomatology may encourage the child with RAP to model this illness behavior.

In another study, Routh and Ernst (1984) compared 20 children with RAP and their mothers with 20 children with a known organic cause and their mothers. Information was collected on first- and second-degree relatives of the children. They found that a significantly higher proportion of children with RAP had relatives with a somatization disorder. In addition, children with RAP had higher scores than the comparison group on the somatic complaint subscale of the CBCL. They suggested that either genetic predisposition or a social learning paradigm could explain these findings equally as well.

Garber et al. (1990) examined parental psychopathology among children with RAP, children with a known organic cause for their abdominal pain, children with a psychiatric disorder, and well children. They found that mothers of children with RAP were significantly more likely to be anxious than mothers of children with an organic cause or well children. However, RAP mothers reported similar levels of somatic complaints as mothers of children with organic pain, well children, and psychiatric disorder children. Thus, this study provides mixed results for a social learning hypothesis. It does not appear that RAP was a learned behavior in this study. Possibly, the children may have modeled their mother's anxiety, which lead them to manifest internalizing and RAP. In a related study, Hodges, Kline,

Barbero, and Woodruff (1985) found that parents of children with RAP were more anxious than parents of healthy children were.

Walker et al. (1991) studied the level of somatic complaints among parents and their children with RAP, their children with known organic cause for their abdominal pain, and their well children. They found that higher somatization scores in parents were associated with higher somatization scores in children with RAP. However, a non-significant association was found between children with an organic cause and their parents on the somatization subscale. In another study, Walker et al. (1993) found that children with RAP had a higher incidence of illness in family members compared to groups of children with a psychiatric disorder or well children. They noted that these children with RAP have more opportunities for vicarious learning of illness behavior.

Sawyer, Davidson, Goodwin, and Crettenden (1987) used the Illness Behavior Questionnaire (IBQ) and found no differences on the general Hypochondriasis subscale between mothers of children with RAP and mothers of children with a known cause for their abdominal pain. A limitation of this study was that no comparisons were made because mothers of the healthy control group did not complete the IBQ. In another study, McGrath et al. (1983) conducted a controlled study of 30 children with RAP with 30 "pain-free" children. They found no differences between these two groups on a variety of psychological variables. That is, they found no differences on family pain history, personality measures, depression, negative life events, and marital distress in their parents.

Overall, most studies seem to suggest that social modeling is an important variable for some children with RAP. However, Sammons (1988) noted that, in some studies, a social learning explanation is a viable explanation in only about 25 to 50% of the families. In the other families in these studies, there are minimal reports of familial pain so a social learning hypothesis is not tenable. Possibly, there is a subgroup of families in which pain modeling plays a major role in the development and maintenance of RAP.

#### Family Dysfunction

Liebman (1978) conducted a clinical investigation of 119 children with RAP and their families. He collected information on associated symptoms using a clinical interview. From his interview with the

children, he identified pallor as important in 61% of the children, tiredness in 45% of the children and an eating disorder in 34% of the children. In addition, he attempted to identify other important psychosocial variables. He found that 44% of the families reported marital discord and 30% of the children were anxious. Limitations of this study consisted of the absence of a control group and standardized measures for the assessment.

Minuchin, Baker, Liebman, Milman, and Todd (1975) reported that families with a child experiencing psychosomatic illness seem to be characterized by (1) extreme control, (2) lack of independence, (3) lack of expressiveness, and (4) high conflict. In another study, Wasserman, Whittington, and Rivara (1988) evaluated a number of psychosocial variables among 31 children with RAP using a clinical interview and standardized questionnaires. They obtained data on school functioning, family environment, life events, and social and behavioral traits. They found no significant differences between a group of children with RAP and matched controls on school functioning and negative life events. However, they did report significant differences on three individual items on their life events scale: (a) hospitalization; (b) parental hospitalization; and (c) death of a grandparent. They also found no differences on 10 dimensions of family functioning between RAP families and matched health controls. Interestingly, a significant difference was found on the internalizing dimension of the CBCL between the children with RAP and control group with the majority of children with RAP in the clinical range. However, they found no differences on the social competence and externalization dimensions of the CBCL.

In another study, Walker et al. (1993) found that children with RAP and their parents reported similar levels of family functioning as compared to a group of healthy children and their parents. Reviewing a number of clinical reports, Hodges and Burbach (1991) suggested that children with RAP belong to families "characterized by maternal overprotectiveness, interpersonal tensions between parents, and excessively anxious parents who are preoccupied with the child's state of health" (p. 262). Moreover, from the results of their study, Berger et al. (1977) concluded that chronic parental depression, alcoholism, and the onset of financial stress might be contributing factors in the development of RAP in some children.

In summary, Rappaport (1989) suggested that given these mixed results of studies that investigated family dysfunction, "the majority of the children with RAP do not fit in any of these studies" (p. 81). However, an alternative explanation is that the children with RAP have a variety of influencing variables that contributed to their pain. For instance, some families may encourage pain behaviors. Thus, These families may be perceived by family members as being a supportive home environment. Other families may experience a high level of tension. Thus, these families may be perceived by family members as a controlling and conflicted home environment. When these two groups of families are combined in a typical RAP study, the result is that the average family functioning scores are similar to the control sample families. Thus, the importance of family functioning in these families is missed, when it may play an important part in the development and maintenance of RAP in some children.

#### Negative Life Events

Negative life events have been suggested to be associated with RAP in some children (von Baeyer, 1995). Comparing children with RAP with children with a known cause for their pain, Walker and Greene (1991b) investigated the relationship between negative life events and symptom resolution at a 3-month follow-up session. They found that the number of negative life events was significantly correlated with anxiety and depression in both groups. In addition, children with RAP with a greater number of negative life events preceding or shortly following the initial interview were more likely to have maintained their abdominal pain at follow-up.

Hodges et al. (1984) investigated the level of negative life events in 30 children with RAP in comparison with 67 children with behavior difficulties (BD) and 42 healthy children. They found that RAP and BD children had significantly more negative life events than the healthy children. In addition, children with RAP reported significantly more negative life events, such as, illness, hospitalization, and death of loved ones than the BD children. However, they failed to note if many of these negative life events could have been experienced after the onset of RAP.

Greene, Walker, Hickson, and Thompson (1985) found that children with RAP reported significantly higher levels of negative life events compared to a control group. In another study, Walker et al. (1994) reported that negative life events were also an important factor for some children with RAP.

In a related study with a different outcome, Walker et al. (1993) noted that children with RAP had similar ratings of negative life events when compared to healthy children and reported significantly less negative life events when compared to children with a psychiatric disorder. Furthermore, Robinson et al. (1990) found that their sample of children with RAP had a significant increase in the number of stressful events in the past year compared to their control groups.

Overall, the importance of negative life events to children with RAP remains unclear. Some studies have reported that negative life events are important in the experience of RAP whereas other studies have not. It appears that negative life events are at most important in a subgroup of children with RAP. In addition, negative life events are probably highly correlated with depression and anxiety measures in children.

#### STATEMENT OF PROBLEM AND HYPOTHESIS

With the large variety of biopsychosocial variables that have been studied within the RAP population, McGrath (1990a) noted that "RAP is probably a generic term for a collection of disorders with varying etiologies, rather than a specific problem with a unique etiology" (p. 273). Hodges and Burbach (1991) supported the hypothesis that children with RAP appear to be a heterogeneous group. In addition, McGrath and Unruh (1987) stated that although there are "many diverse explanations . . . no comprehensive attempt to match explanations with patients has yet been attempted" (p. 150). More specific subgroups (based on salient psychosocial variables) of children with RAP are necessary to provide effective treatments to these children and their families. With the present state of vastly different suspected etiologies, vastly different treatment recommendations have been suggested in the literature (Feuerstein & Dobkin, 1990; McGrath & Unruh, 1987). For example, relaxation training, cognitive-behavioral and play therapies, social skills training, parenting training, and family therapy are only a few of the interventions that have been proposed. Presently, a clinical interview has been suggested to be the best way to classify these children and to determine which of the interventions would be appropriate (e.g., see Coleman, 1992).

The purpose of this study was to generate empirical derived clusters by identifying children with RAP with similar psychosocial variables. These clusters will be important in our understanding of the

multifactorial etiologies of RAP. It was hypothesized that these empirically derived clusters would be externally validated with the usage of a well-known measure that was not included in the cluster analysis, namely the Child Behavior Checklist (CBCL). In addition, it was hypothesized that these empirically derived clusters will improve upon Barr's (1983) tripartite model of categorization based on the clusters discriminative ability along relevant psychosocial variables. Furthermore, these clusters will provide greater clinical utility for individualized treatment planning. Because this study used exploratory methodology and an exploratory statistical technique, there were no other hypotheses formulated.

## METHOD

### SUBJECTS

Ninety-six children with RAP and their parents were referred to this study by ten pediatricians from a primary care Pediatrics clinic in Winnipeg, Manitoba between August 1996 and June 1998. Sixty children with RAP and their parents agreed to participate. Table 1 shows a list of reasons why 36 children with RAP and their parents declined to participate in this study. The percentage of subject referrals that followed through by attending an appointment (62.5%) was similar to other studies conducted from a primary care setting (Bergman, Corbin, & Haber, 1982).

Table 1. List of Reasons Parents gave for not participating in this Study.

Reason given for not participating	Frequency	%
Not interested	16	44
Too busy	9	25
Believe that the RAP had an organic cause	6	17
Live too far from clinic	2	6
No reason given	3	8

Recurrent abdominal pain (RAP) was defined as consisting of three or more pain episodes occurring over a three month period with a severity such that the pain interferes with normal activities (Apley & Naish, 1958). The criteria for inclusion in this study was that: (a) the child with RAP must have been between the age of 6 and 17 years old, (b) the child with RAP must have lived at home for a minimum of six months with a mother and/or father (or step-parent) who was willing to participate in this study, and (c) the child with RAP and parent must have been able to comprehend the English language.

### MATERIALS

Data collection consisted of a chart review and the completion of a questionnaire package by the child with RAP and at least one parent. The general utility of any proposed empirical categorization method is closely linked to the psychometric properties of the measures used to derive the categories or clusters (Turk & Rudy, 1992). Standardized instruments that measured relevant psychosocial variables were used. Many of these measures have been utilized in past research with children with RAP and their families. Overall, the measures that were used in this study have very good psychometric properties.



### Chart Review

From the child's chart, the referring pediatrician was noted (see Table 2) in addition to the pediatrician's diagnosis of the child with RAP according to Barr's tripartite categorization of RAP: organic, dysfunctional, and psychogenic (see Table 3). In addition, data was collected on whether the pediatrician recorded that the child was reporting constipation and whether the child was lactose intolerant. Unfortunately, conclusive diagnosis of lactose intolerance was not made for any children, as the hydrogen indicator was inoperative during the duration of this study. Thus, this variable was not considered in the analysis.

Table 2. Number of Referrals and Study Participants from each Pediatrician.

Physician	No. Of Referrals (% <sup>a</sup> )	No. Of Participants (% <sup>a</sup> )
Pediatrician #1	32 (33)	21 (35)
Pediatrician #2	24 (25)	16 (27)
Pediatrician #3	19 (20)	11(18)
Pediatrician #4	5 (5)	3 (5)
Pediatrician #5	4 (4)	3 (5)
Pediatrician #6	3 (3)	2 (3)
Pediatrician #7	3 (3)	1(2)
Pediatrician #8	1 (1)	1(2)
Pediatrician #9	4 (4)	1 (2)
Pediatrician #10	1 (1)	1 (2)
Total	96 (100)	60 (100)

<sup>a</sup> Total percent does not equal 100 due to rounding error.

### Descriptive Measures

Demographic information was obtained from the parent regarding the child's age, gender, ethnic background, grade in school, number of children in the family, and birth order. In addition, the parent was asked to report employment status, marital status, living arrangements, highest level of education, and income level, of both parents if applicable (see APPENDIX C).

Table 3. Clinical Classification of Children Presenting with Recurrent Abdominal Pain Syndrome

Organic		Dysfunctional	Psychogenic
<u>Gastrointestinal</u>	<u>Hepatobiliary system</u>	Chronic stool retention	Acute reactive anxiety
Peptic ulcer	Hepatitis	Heightened awareness of intestinal motility	School Phobia
Gastritis	Gallstones, cholecystitis	Lactose intolerance	Manipulation (secondary gain)
Hiatus hernia	Pancreatitis, especially familial	Sucrose intolerance (?)	Hysterical conversion reactions
Hernia		Intestinal gas syndromes	Depression
Volvulus, recurrent	<u>Trauma</u>	Menses, dysmenorrhea	Complaint modeling
Obstruction due to bands, adhesions	Traumatic hemobioia	Reaction to normal stress and anxiety (?)	Hypochondriasis
Inflammatory bowel disease	Pancreatic pseudocyst	Overeating	Factitious
Crohn's disease	Subserosal intestinal hemorrhage	Irritable colon	
Ulcerative colitis	Abdominal wall strain	Chilaiditi's syndrome	
Meckel's diverticulum			
Neoplasms	<u>Metabolic</u>		
Yersinia enterocolitis	Lead poisoning		
Intussusception, recurrent	Porphyria		
Hirschsprung's disease	Hereditary angioedema		
Infestations (e.g., giardiasis)	Familial hyperlipidemia		
Malrotation			
Annular pancreas	<u>Other conditions</u>		
Polyps, polyposis	Abdominal epilepsy and migraine		
Foreign body	Anorexia nervosa		
Mesenteric adenitis	Sickle cell disease		
Malformations	Familial Mediterranean fever		
Gastric duplication	Riley-Day syndrome		
	Multiple endocrine adenomatosis		
<u>Genitourinary</u>	Blood dyscrasias		
Hydronephrosis, obstruction	Lymphomas		
Lower tract obstruction	Coxsackie virus, pleurodynia		
Posterior urethral valves	Meconium ileus syndrome		
Atresia	Brain neoplasms		
Pyelonephritis	Epilepsy		
Renal stones	Hemolytic disease		
Ovarian cyst			
Testicular or ovarian torsion			
Hematocolpos			
Endometriosis			
Neoplasms			

## Standardized Measures

### Measures of the Child's Experience of Pain

McGrath (1987) noted that there are many difficulties in measuring the pain experience of children with RAP. However, McGrath and Brigham (1992) reported that studies have indicated that self-report pain questions "provide an accurate, thorough, and objective format" (p. 308), with reliability and validity.

#### Pain frequency.

Both the child and the parent were asked to estimate, from 0 days to 14 days, the number of days the child has had a pain episode in the last two weeks (see APPENDIX D).

#### Pain duration.

Both the child and the parent were asked to estimate the total duration since onset of the pain to the nearest month (see APPENDIX D).

#### Average pain episode length.

Both the child and the parent were asked to estimate the typical duration of a RAP episode in hour intervals from one hour to 24 hours (see APPENDIX D). If the subject reported less than one hour duration then the value was rounded to the closest hour interval.

#### Functional Disability Inventory (FDI).

The FDI (Walker & Greene, 1991a) is a 15-item questionnaire that is "designed as a global measure of functional disability for use in research regarding the impact of illness on children's physical and psychosocial functioning in everyday social roles." (p. 40) Each child was asked evaluate their level of difficulty in performing daily routine activities on a 5-point verbal rating scale: No Trouble, A Little Trouble, Some Trouble, A Lot of Trouble, and Impossible (see APPENDIX E). In addition, a modified parental questionnaire was used that asks the parent to evaluate his or her child's level of difficulty in performing daily routine activities (see APPENDIX F). The FDI is one of the few child disability measures that take a psychosocial perspective of disability. In addition, the FDI provides opportunity to collect data from multiple informants (i.e., both child and parent). The FDI has the additional advantage of being a concise questionnaire.

Regarding psychometric properties, Walker and Greene (1991a) reported that internal consistencies were high for both the child (Cronbach's alpha coefficient = .90) and the parental (Cronbach's alpha coefficient = .94) questionnaire. They reported that construct validity appears to be adequate as the FDI was strongly associated with two measures regarding the occurrence of common physical symptoms and somatic complaints ( $r = .71$  &  $.58$ :child form) and ( $r = .32$  &  $.49$ :parent form). In addition, they reported that concurrent validity seems to be adequate as the FDI was significantly associated with a measure of school absence ( $r = .52$ :child form) and ( $r = .53$ :parent form). Moreover, the FDI was strongly associated with childhood anxiety ( $r = .47$ :child form) and ( $r = .28$ :parent form) and childhood depression ( $r = .38$ :child form) and ( $r = .29$ :parent form).

Walker and Greene (1991a) also reported test-retest reliabilities of .80 at 2-weeks, .70 at 6-weeks, and .63 at 6-months for the child's questionnaire. The parental ratings of their children had reliabilities of .47 at 2-weeks, .60 at 6-weeks, and .69 at 6-months. In addition, Walker and Greene investigated the FDI predictive validity by collecting follow-up data on school absence, days in bed, medication usage, and somatic complaints. They found that the FDI was significantly associated with all of these variables measured three months later.

### Measures of Depression

#### Child Depression Inventory (CDI).

The CDI (Kovacs, 1992) is a 27-item questionnaire that was developed to assess the affective, cognitive, and behavioral symptoms of depression in children (see APPENDIX G). Each child completed the CDI and their parent also completed a modified version with reference to their child (see APPENDIX H). The modified parental questionnaire has been used in previous research (Kazdin, French, Unis, & Esveltd-Dawson, 1983).

Each item of the CDI consist of three responses in which the child is to choose which one best describes him or her over the past two weeks. Each response is scored on level of symptomatology severity, from 0 (indicating symptom absence) to 2 (indicating highest symptom severity). The overall score ranges from 0 to 54. Mild depression is indicated by scores between 9 and 15 and moderate depression is indicated by scores greater than 15.

The CDI was chosen over other measures of childhood depression because the CDI is currently the most widely used measure of depression in children. In addition, the CDI has excellent psychometric properties, which have been investigated thoroughly. Investigators have reported that the CDI has Cronbach's coefficient alphas from .80 to .94, which indicate good internal consistency (Nelson, Politano, Finch, Wendel, & Mayhall, 1987; Saylor, Finch, Spirito, & Bennett, 1984). The test-retest reliability has been found to be very good over a one-week period ( $r = .87$ ) (Saylor, et al., 1984). Furthermore, the CDI has excellent content validity as the items clearly inquire about standard depressive symptoms, such as, dysphoria, anhedonia, self-depreciation, sleep difficulties, appetite changes, decrease in school performance and social interaction.

A number of studies have investigated if the CDI can discriminate between depressed and non-depressed children (Hodges, 1990; Lobovitz & Handel, 1985). These studies have reported that the CDI discriminates very well between depressed and non-depressed clinical populations. However, regarding discriminant validity, these studies have reported that the CDI is weak in differentiating between depression and other psychological distress constructs (for example, anxiety). That is, the CDI may be more a measure of childhood emotional distress rather than a "pure" measure of depression (Meyer, 1995).

#### Beck Depression Inventory (BDI).

The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to assess the parent. The BDI was developed to assess the severity of affective, cognitive, and behavioral symptoms of depression in adults (see APPENDIX I). The BDI is a 21-item self-report questionnaire. The items inquire about variety of depressive symptoms, such as, mood, pessimism, sense of failure, self-dissatisfaction, guilt, punishment, self-dislike, self-accusation, suicidal ideas, crying, irritability, social withdrawal, indecisiveness, body image, change, work difficulty, insomnia, fatigue, loss of appetite, weight loss, somatic preoccupation, and loss of libido (Beck & Steer, 1993).

Items are provided in groups of four for each symptom ranging from 0 to 3, where 0 is indicating an absence of the symptom to 3 indicating the presence of a severe symptom. The total score is calculated by adding the selected response of each item. In their revised manual of the BDI, Beck and Steer (1993)

reported that adults with total scores between 0-9 are described as having "Minimal" depressive symptomatology, scores between 10-16 are described as having "Mild" depressive symptomatology, scores between 17-29 are described as having "Moderate" depressive symptomatology, and scores between 30-63 are described as having "Severe" depressive symptomatology.

The BDI was chosen over other measures of depression because the BDI has had wide utilization with a variety of clinical and non-clinical populations. The BDI is comprehensive in its inquiry of a variety of depressive symptoms. In addition, it is an easily understandable and is a concise questionnaire.

Regarding psychometric properties, the BDI revised manual has reported information on internal consistency, test-retest reliability, as well as, content, construct, and concurrent, and discriminant validities (Beck & Steer, 1993). Internal consistencies were found to be between .79 and .90 depending on the sample. Test-retest reliability was reported as being between .60 to .90 depending on length of time interval between sessions. Regarding content validity, many of the BDI items coincide very closely with DSM-IV diagnostic criteria for major depressive disorder or dysthymic disorder (American Psychiatric Association, 1994). Regarding construct and concurrent validities, the BDI is highly correlated with other measures of depression and hopelessness as well as with clinical ratings of depression from a structured interview. Regarding discriminant validity, the BDI revised manual reported that the BDI has excellent utility in discriminating between depressed and non-depressed individuals from either clinical or non-clinical samples.

#### Measures of Anxiety

##### State-Trait Anxiety Inventory for Children-Trait Scale (STAIC-T).

The STAIC-T (Spielberger, 1973) is a 20-item measure that was developed to assess the general level of anxiety in children (see APPENDIX J). The child completed the STAIC-T and the parent completed a modified version of the STAIC-T with reference to the child (see APPENDIX K).

Children completed the STAIC-T by choosing, for each item, one of the three verbal responses that best described how they usually feel. Each response was graded in relation to severity of the anxious symptom, with hardly every (1) being of low severity, sometimes (2) being of moderate severity, and often

(3) being of high severity. Thus, the STAIC-T has a possible range of scores between 20 to 60, with higher scores representing greater anxiety.

The STAIC-T was chosen over other measures of anxiety because it has had wide utility in a variety of clinical populations. In addition, the STAIC-T provides an intermediary response choice, which facilitates greater accuracy in symptom evaluation.

In the SCAIC manual, Spielberger (1973) reported data on test-retest reliability, internal consistency, and construct validity. The SCAIC-T test-retest reliability was reported to range from .65 to .71. Cronbach's alpha coefficient was reported to range from .78 to .81, indicating that the STAIC-T has adequate internal consistency. Concerning concurrent validity, Spielberger reported that the STAIC-T was significantly correlated with the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). Unfortunately, these data are only based on non-clinical samples of children so it is uncertain to what extent they can be generalized to a clinical population.

#### State-Trait Anxiety Inventory-Trait Scale (STAI-T).

The STAI-T (Spielberger, Gorsuth, & Lushene, 1970) was used to assess the parent. The STAI-T is a 20-item self-report questionnaire developed to assess the general level of anxiety in adults (see APPENDIX L). Each item was responded to on a 4-point verbal response scale that is of increasing severity of symptomatology. Almost never indicated the absence of the symptom for all practical purposes, Sometimes indicates a mild report of the symptom, Often indicates a moderate report of the symptom, and Almost Always indicates a severe report of the symptom. In calculating the total score, each STAI item was given a weighted score between 1 and 4. A number of items are reversed scored to provide for inquiry of both negative and positive symptoms. The STAI-T has a possible range of scores between 20 to 80.

The STAI-T was chosen over other measures of anxiety because the STAI-T has had utility in a variety of clinical and non-clinical populations. In addition, the STAI-T has well-established psychometric properties.

Regarding psychometric properties, Spielberger and his colleagues reported data in the STAI manual for internal consistency, test-retest reliability, concurrent, and construct validities of the STAI-T.

Cronbach's alpha coefficients were reported to be between .90 and .93 depending on the sample, indicating high internal consistency. Test-retest reliability was reported to be .71 after a 1-month and .68 after 2-months. Concurrent validity was investigated by correlating the STAI-T with other negative affect measures. Spielberger reported that the STAI-T correlated between .52 and .80 with other measures of negative affect. Construct validity was determined by comparing STAI-T scores to findings from structured interviews. Spielberger reported that the STAI-T consistently discriminated between anxious and non-anxious subjects in both clinical and non-clinical settings.

### Measures of Somatization

#### Child Somatization Inventory (CSI)

The CSI (Garber, Walker, & Zeman, 1991) was developed to assess somatic complaints in children (see APPENDIX M). The CSI has 35 items that are rated on a 5-point scale ranging from 0 (not at all) to 4 (a whole lot). A CSI parental questionnaire has been developed and was used to ask parents to respond in reference to their child (APPENDIX N). Each CSI item refers to a specific somatic complaint. These symptoms were generated from the DSM-III-R categories under somatization, such as, conversion or pseudoneurological (e.g., fainting, difficulties swallowing, etc.), gastrointestinal (e.g., stomach pain, nausea), pain (e.g., back pain), and cardiopulmonary (e.g., dizziness, shortness of breath) (Walker, Garber, & Greene, 1991). The child responded to each item by choosing to what extent he or she had experienced the symptom in the past two weeks.

Regarding psychometric properties, Walker and Garber (1993), in their preliminary manual, reported data for the CSI on internal consistency, test-retest reliability, as well as, construct and concurrent validities. They reported that the CSI has a Cronbach's alpha coefficient of .92 and a Pearson correlation coefficient of .66 over a three-month interval, which indicated adequate internal consistency and test-retest reliability, respectively. Construct validity is strong as CSI items were generated from the somatization subscale of the Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) and the DSM-III-R criteria for somatization disorder. They reported that the CSI was significantly correlated with the CBCL internalizing dimension and the CBCL somatic subscale, which indicated strong concurrent validity. In addition, frequency of school absences was also significantly



associated with the CSI ( $r = .44$ ,  $p < .001$ ). In another study, Walker, Garber, and Greene (1991) found a high internal consistency ( $r = .88$ ). Furthermore, Walker, Garber, and Greene (1994) reported that the CSI has a three-month test-retest reliability of .66 for children with RAP and a Cronbach's alpha coefficient of .90.

#### Hypochondriasis Scale of the Minnesota Multiphasic Personality Inventory-2 (MMPI-2).

The Hypochondriasis scale of the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) was used to assess the parent. The Hypochondriasis scale was developed to assess the excessive focus on somatic symptoms reported by an adult. The Hypochondriasis scale consists of a 32-item self-reported questionnaire (APPENDIX O). Parents were asked to respond to a list of somatic-related complaints on a presence vs. absence dichotomy. A number of items are negatively scored to inquire about both positive and negative symptoms. The Hypochondriasis scale raw scores range between 0 to 32. Scores over 13 indicated that the person had an excessive concern over his or her somatic symptoms. With non-clinical subjects, it was recommended that raw scores without the K-correction be used (Greene, 1991).

The Hypochondriasis scale was chosen over other measures of somatization because of its extensive usage with a variety of clinical and non-clinical populations. The scale is comprehensive in its coverage of the variety of nonspecific somatic complaints. In addition, the scale is at a grade eight reading level so parents were unlikely to have comprehension difficulties.

The Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983), Illness Behavior Questionnaire (IBQ; Polowski & Spence, 1983), and the MMPI-2 were compared and evaluated. SCL-90-R was found to be an equally adequate measure of somatization in adults as the MMPI-2 used in this study. However, The SCL-90-R was originally developed as a clinical measure and thus does not have well-established psychometric properties for a non-clinical population. The IBQ dimension measures a broad range of illness behaviors. However, this measure has been criticized for lacking internal reliability (e.g., see Bradley, Haile, & Jaworski, 1992). Thus, the SCL-90-R and the IBQ were not used in this study.

Regarding psychometric properties of the Hypochondriasis scale, Greene (1991) reported that test-retest reliability was adequate, with Pearson correlation coefficients ranging from .79 to .86 for a two-

week interval and .38 to .65 for a one-year interval. Content, concurrent, and construct validities were found to be adequate (Greene, 1991).

### Measure of Pain Reinforcement

#### Illness Behavior Encouragement Questionnaire (IBEQ).

The IBEQ (Walker & Zeman, 1992) was developed to assess parental encouragement of their child's illness behavior. The IBEQ is a 12-item questionnaire that was completed by the child (see APPENDIX P). In addition, a parent form was used that asked the parent to answer the items in reference to their child (see APPENDIX Q). Each item on the IBEQ was rated on a five-point scale ranging from never (0) to always (4).

The IBEQ items inquire about such things as: if the child has received special treats, has taken special trips to the physician, or is excluded from school, chores, and homework, because of stomach pain. A strength of the IBEQ is that its items are especially appropriate for school-aged children and adolescents. Another benefit of using the IBEQ is that it has already been used in a number of studies with children with RAP (e.g., see Walker, et al., 1993).

Walker and Zeman (1992) conducted a psychometric evaluation with 18 children with RAP and their mothers. They reported Cronbach's alpha coefficients of .88 and .85 for child and mother reports, respectively. This result indicates that the IBEQ has adequate internal consistency. In addition, they reported a significant positive relationship ( $r = .46, p < .001$ ) between the child and mother total scores. This correlation is within the normal range compared to other multiple informant correlations with child measures (Achenbach, McConaughy, & Howell, 1987).

In addition, Walker and Zeman (1992) found significant positive associations between the child and mother IBEQ scores and number of symptoms ( $r = .34$  &  $.50$ ), days of illness ( $r = .45$  &  $.27$ ), number of days of school missed ( $r = .53$  &  $.45$ ), amount of medication taken ( $r = .44$  &  $.32$ ), and number of visits to the physician ( $r = .45$  &  $.38$ ). These findings give support to the construct validity of the IBEQ. Reported in the same article, Walker and Zeman's second study, using a sample of 151 children with RAP, found test-retest reliability across a two-week interval to be .73 for the child-form.

### Measure of Family Pain History

#### Family Illness Questionnaire (FIQ).

The FIQ (Walker, et al., 1993) measured the presence of any family history of abdominal and health problems. Using the FIQ, the parent provided a list of family members who have had abdominal problems (see APPENDIX R). For each person specified, the nature of the problem, whether it occurred in the current year or not, whether the person lives with the family, and the person's relationship to the child was also assessed. In addition, the parent reported whether any family members have had any serious health problems during the current year.

Three scores were calculated on (a) number of first-degree relatives currently experiencing abdominal problems, (b) number of first-degree relatives who have ever experienced abdominal problems, and (c) number of relatives currently living in the home who have experienced serious health problems during the current year. The sum of these three scores were used as a measure of family pain history in this study.

### Measures of Family Functioning

#### Family Relationships Index (FRI).

The FRI (Holahan & Moos, 1981) was developed from the Family Environment Scale (FES; Moos & Moos, 1981) to assess the quality of family supportiveness in the family environment. The FRI is a 27-item true-false self-report questionnaire that was completed by both the child (see APPENDIX S) and the parent (see APPENDIX T). The FRI is based on three of the subscales of the FES: Cohesion - the degree to which family members are helpful and supportive of each other, Expressiveness - the extent to which family members are encouraged to act openly and to express their feelings directly; and Conflict - the extent to which the open expression of anger and aggression and generally conflictual interactions are characteristic of the family (Holahan & Moos, 1981). The FRI was determined by the sum of these three subscales. Conflict was negatively weighted in the formula.

The FRI was chosen over other measures of family environment because it is a concise measure that evaluates overall supportiveness. In addition, the FRI psychometric properties have been found as good as those of other longer measures. Regarding psychometric properties, Moos and Moos (1986)

reported that the FRI has adequate internal consistency and test-retest reliability. In another study, Holahan and Moos (1981) reported high internal consistency (Cronbach's alpha coefficient = .89). In a validity study, Hoge, Andrews, Faulkner, and Robinson (1989) reported that the FRI was significantly correlated with a structured family interview assessing overall family strength and family stress ( $r = .30$  &  $-.32$ ), which indicated strong construct validity. In addition, they reported that the FRI was significantly correlated with other measures of family environment, which indicated strong concurrent validity.

Other family measures were evaluated, such as the Family Expressiveness Questionnaire (FEQ; Halberstadt, 1986), the FES (Moos & Moos, 1981), and the Family Adaptability and Cohesion Evaluation Scales (FACES II; Olson, Russell, & Sprenkle, 1983). For each of these measures, it was felt that they evaluated a number of dimensions that were not of importance for this study. Thus, these measures were not used in this study.

#### Measure of Self-Esteem

##### Piers-Harris Children's Self-Concept Scale (PHCSCS).

The Piers-Harris Children's Self-Concept Scale (Piers, 1984) was developed to assess the self-esteem of children (see APPENDIX V). The PHCSCS is a measure of self-concept. Self-concept was defined as a relatively stable set of self-attitudes, reflecting both a description and an evaluation of one's own behavior and attributes. This measure also provides six cluster (or factor) scales: Behavior, which evaluates a child's recognition of his or her negative behaviors; Intellectual and School Status, which reflect the child's self-assessment of his or her abilities with respect to school tasks, general satisfaction with school, and future expectations; Physical Appearance and Attributes, which reflects the child's attitudes concerning his or her physical characteristics, leadership, and ability to express ideas; Anxiety, which reflects emotional disturbance; Popularity, which reflect the child's evaluation of his or her popularity; and Happiness and Satisfaction, which reflect the child's perceived level of happiness, ease to get along with, and level of satisfaction in life. This measure was standardized with the use of a normative sample of American children. The PHCSCS is an 80-item questionnaire that was completed by each child. Each item was evaluated on a yes-no dichotomy.

Regarding psychometric properties, Piers (1984) reported that test-retest reliabilities were found between .42 (with an interval of 8 months) to .96 (with an interval of 3 to 4 weeks). Cronbach's alphas coefficient were found between .73 and .90 for the cluster scales. The PHCSCS was found to have adequate construct validity with correlations between .41 and .54 with their teachers' rating of self-concept and .34 and .49 with peer's rating of self-concept. In addition, the PHCSCS correlated between .32 and .85 with other self-concept measures. Overall, the cluster scales of the PHCSCS have satisfactory psychometric properties.

#### Measure of Child Emotional/behavioral Difficulties

##### Child Behavior Checklist (CBCL).

The Child Behavior Checklist (Achenbach, 1991) was development to assess emotional and behavioral difficulties that child experience (see APPENDIX U). The CBCL is a 112-item measure that was completed by the parent. Each item is evaluated on a 3-point scale: 0 = Not True (as far as you know), 1 = Somewhat or Sometimes True, and 2 = Very True or Often True.

Regarding psychometric properties, Achenbach reported that the CBCL had Cronbach's coefficient alphas between .68 to .92 for the syndrome scales. Test-retest reliabilities over a one-week duration were between .82 - .96 for the syndrome scales. The CBCL was found to have adequate construct validity with correlations between it and the Conners' Parent Questionnaire being between .59 and .86. Discriminant validity showed that false negatives were present in 17.7% of the clinical sample (i.e., had normal CBCL scores) and false positive were found in 4.2% of the non-clinical group (i.e., had clinical CBCL scores). Overall, the syndrome scales of the CBCL have satisfactory psychometric properties.

## Procedure

### Questionnaire Pre-test

Two boys aged seven, a girl aged eight, and a boy aged nine were recruited from the Manitoba Clinic to pre-test components of the RAP study's child questionnaire package. From this pre-test, certain questionnaire items were modified or expanded in an attempt to improve comprehension by the children in this study's sample (see APPENDIX X). In addition, the Rosenberg Self-Concept Scale (Appendix W) was replaced with the Piers-Harris Children's Self-Concept Scale (Appendix V) because these children had a great deal of difficulty comprehending the meaning of the Rosenberg items. From this pre-test, it was determined that those children with RAP nine years old and younger would have the questionnaire items read to them aloud. They would be able to follow along if they wanted to on their own copy of the questionnaire.

### Subject Referral

Ten pediatricians from a primary care pediatric clinic in Winnipeg, Manitoba referred children who had recurrent abdominal pain (RAP) to the "on-site" psychological consultant (who was also the primary investigator for this study). Pediatricians #8, #9, and #10, who referred three children with RAP to the study, did not practice at the same location as the others. The doctor's nurse scheduled the appointments. The parents were phoned and given a reminder the day before their appointments. Thirty-four of the thirty-six children with RAP and their parents who declined to participate in this study did so during this telephone contact. When the parent(s) and child arrived for the appointment, the psychological consultant gave the parent the abdominal pain study letter to read with the study's consent form (see APPENDIX A & B). The letter stated that participation in this study would be helpful to provide greater understanding of important variables related to children with RAP, which may have particular relevance to their child. It was noted in the letter that this study was completely voluntary, that the participants may withdraw from the study at any time, and that all information collected was kept in strictest confidence. In addition, it was noted that identifying code numbers would be used to further ensure that their identities would not be matched with the information collected.

If the parent signed the consent form agreeing to participate and also allowed his or her child to participate in the study, they were lead into individual rooms to complete the questionnaire package. If both parents had brought the child, the author asked them to provide common responses to the questionnaires pertaining to their child. When both parents did participate, they were asked to complete the BDI, STAI-T and the MMPI-2 Hypochondriasis subscale, individually with only the mother's questionnaires being used.

If the child was under 10 years old, the psychological consultant read the questionnaire items to eliminate reading comprehension as a confounding variable for these children. The child would follow along on his or her own questionnaire if desired. For children 10 years old and older, the psychological consultant remained in the child's room and was available if the child needed any unfamiliar words explained. The child's questionnaire package took approximately 30-45 minutes to complete. On completion of their questionnaire packages, the children were given the opportunity to place their hand in a "grab bag" to retrieve a one-dollar item as a reward for their cooperation. In addition, the psychological consultant went into the parent's room and answered any questions related to the parent's questionnaire package. The parent's questionnaire package took approximately 45-60 minutes to complete. A feedback appointment was scheduled to give a verbal summary of the results of the completed questionnaires. Although not part of this dissertation, each child with his or her parent was offered a 6-session cognitive-behavioral treatment package (see APPENDIX Y). Further appointments were scheduled depending of the parent's interest in this treatment package.

## RESULTS

### Data Analysis

#### Descriptive Analysis

The children with RAP in this study ranged in age from 6 to 16 years old (Mean = 9.1, SD = 2.37) and were between the 1<sup>st</sup> and the 10<sup>th</sup> grade in school. The number of children between the ages of 6-8 were 31 (51.7%), between the ages of 9-11 were 18 (30.0%), between the ages of 12-14 were 10 (16.6%), and between the ages of 15-16 were 1 (1.7%). There were 27 males (45%) and 33 females (55%). Five parents reported that their child with RAP was an only child (8.3%), thirty-eight children with RAP had one sibling (63.3%), twelve children with RAP had two siblings (20.0%), three children with RAP had three siblings (5.0%), and two children with RAP had four siblings (3.4%). Of the children with a sibling or siblings, twenty children with RAP were the youngest children in their family (36.4%), twenty-eight children with RAP were the oldest of their siblings (50.9%), and seven children with RAP were a middle sibling (12.7%).

The pediatricians reported the presence of constipation for 14 children (23.3%), but lactose intolerance was not determined in any children because of equipment failure. In 57 cases, the adult that completed the parental questionnaire was the child's biological parent (fifty-three mothers, two mothers with fathers, and two fathers). Otherwise, in one case, the adult was a grandmother, in one case, the adult was a stepmother, and in one case, the adult was an adoptive mother.

Forty-nine children with RAP (81.7%) were from two-parent families, ten children with RAP (16.7%) were from single parent families, and one child (1.6%) lived with his grandparents. For three families, no data on the fathers could be collected because these fathers were not in contact with the families. Of these families, two mothers were divorced many years previously and one mother was never married.

Thirty-three mothers completed high school (55.0%), seven mothers did not complete high-school (11.7%), and twenty mothers (33.3%) participated in post-secondary education. Fifteen fathers completed high school (26.3%), eight fathers (5.3%) did not complete high school, and thirty-four fathers (59.7%) participated in post-secondary education. The mean age of the mothers was 38.5 (SD= 5.6:range 27-52) and the mean age of the fathers was 41.1 (SD=6.8:range 28-65). The mothers annual income was \$16,600



(SD=\$16,700:range 0-\$65,000) and the fathers annual income was \$43,200 (SD=\$12,200:range \$12,000-\$100,000) combining to have a total family income of \$59,000 (SD=\$24,300:range \$24,000-\$165,000).

Table 4 lists the employment status and marital status of the mothers and fathers.

Table 4. Employment Status and Marital Status of the Mothers and Fathers.

Employment Status	Mothers		Fathers	
	N	%	N <sup>a</sup>	%
Employed Full-time	15	25.0	47	82.5
Fulltime Homemaker	11	18.3	0	0
Unemployed	6	10.0	2	3.5
Employed Part-time	23	38.3	2	3.5
In School Fulltime	2	3.3	0	0
Other	3	5.0	6	10.5
<u>Marital Status</u>				
Married	47	78.3	47	82.5
Separated	6	10.0	6	10.5
Common-law	3	5.0	3	5.3
Divorced	2	3.3	0	0
Never Married	2	3.3	1	1.8

<sup>a</sup> Data collected on 57 fathers.

#### Child's Experience of Pain

Table 5 reports the means and standard deviations and Table 6 reports the inter-correlations of the pain measures used in this study.

Table 5. Means and Standard Deviations of Pain Measures

	N	M	SD
Parent: # of pain days in past two weeks	60	5.97	4.31
Child: # of pain days in past two weeks	60	7.88	4.60
Parent: duration of RAP (in months)	60	16.72	13.93
Child: duration of RAP (in months)	60	19.88	23.77
Parent: typical episode length (in hours)	60	2.47	3.40
Child: typical episode length (in hours)	60	2.93	4.46

Table 6. Inter-correlations among Pain Measures

	1	2	3	4	5	6
(1) Parent: # of pain days in past two weeks	--	.47***	-.20	-.09	.11	.12
(2) Child: # of pain days in past two weeks		--	-.34**	-.15	.07	.02
(3) Parent: duration of RAP (in months)			--	.73****	.15	.04
(4) Child: duration of RAP (in months)				--	-.08	-.02
(5) Parent: typical episode length (in hours)					--	.26*
(6) Child: typical episode length (in hours)						--

\* p < .05, \*\* p < .01, \*\*\* p < .001, \*\*\*\* p < .0001

### Correlation Analysis

The means, standard deviations, Cronbach's alpha coefficients were calculated for all variables that were used in further analyses (see Table 7). In addition, the inter-correlations of these variables were determined (see Table 8). Data was checked for outliers that tend to have a serious, negative impact on clustering methods with all subjects being retained for further analysis (Turk & Rudy, 1992).

Table 7. Raw Means, Standard Deviations, and Cronbach's Alpha Coefficients of Variables

Variable	Mean	SD	Cronbach's Alpha Coefficient
Pain disability-child report	11.13	9.47	0.87
Pain disability-parental report	12.12	9.73	0.90
Child anxiety-child report	33.18	7.43	0.87
Child anxiety-parental report	37.42	7.14	0.87
Child depression-child report	7.33	4.98	0.74
Child depression-parental report	9.93	6.64	0.84
Child somatization-child report	20.90	18.16	0.92
Child somatization-parental report	17.50	11.39	0.85
Parental anxiety	39.27	11.65	0.93
Parental depression	7.07	7.89	0.92
Parental somatization	7.75	6.13	0.88
Pain reinforcement-child report	17.38	7.22	0.74
Pain reinforcement-parental report	18.50	8.53	0.87
Family functioning-child report	17.30	3.70	0.66
Family functioning-parental report	19.55	3.99	0.77
Pain modeling-parental report	2.08	2.17	0.74
Self-concept – child report	65.12	9.86	0.90

Table 8. Inter-Correlations of Variables used in Cluster Analysis

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Pain disability-child report	.13	.43***	.02	.50****	.06	.60****	.19	-.09	-.01	.06	.26*	.07	.04	.07	.09	-.07
2 Pain disability-parental report	--	.07	.05	.17	.11	.09	.17	.10	.38**	.32**	.33*	.43***	.06	-.11	.12	.00
3 Child anxiety-child report		--	.32*	.66****	.38**	.29*	.28*	-.14	.07	.09	.13	.07	-.23	-.25	.23	-.36**
4 Child anxiety-parental report			--	.24	.72****	-.05	.45***	.55****	.49****	.44***	.07	.19	.02	-.46***	.05	-.25
5 Child depression-child report				--	.34**	.46***	.34**	-.10	.14	.19	.11	.20	-.37*	-.18	.14	-.49****
6 Child depression-parental report					--	.03	.66****	.42***	.60****	.53****	.26*	.32**	-.05	-.50****	.11	-.34**
7 Child somatization-child report						--	.10	-.10	-.01	.14	.29*	.01	-.21	.07	-.06	-.28*
8 Child somatization-parental report							--	.28*	.54****	.56****	.23	.34**	-.11	-.41***	.25	-.16
9 Parental anxiety								--	.71****	.46***	.05	.14	-.16	-.34**	.09	-.15
10 Parental depression									--	.69****	.18	.27*	.04	-.50****	.28*	-.20
11 Parental somatization										--	.31**	.28*	-.07	-.40***	.20	-.26*
12 Pain reinforcement-child report											--	.39***	.14	-.14	.19	-.01
13 Pain reinforcement-parental report												--	-.20	-.21	.17	-.16
14 Family functioning-child report													--	.12	-.27*	.46***
15 Family functioning-parental report														--	-.06	.27*
16 Pain modeling-parental report															--	-.12
17 Self-concept-child report																--

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , \*\*\*\*  $p < 0.0001$ .

### Cluster Analysis

Lorr (1994) outlined that there are seven steps in conducting a well-designed cluster analytic study. They are: (a) select a representative and adequately large sample; (b) select measures that have good psychometric properties for the constructs in question; (c) collect data; (d) standardize the various measures to establish a common metric; (e) select an appropriate index of similarity or difference such as Ward's (1963) minimum variance method; (f) perform the clustering method; and (g) conduct discriminant function analysis to validate the distinctiveness of these empirically derived clusters and check the generality of the finding with an external measure.

The main analysis for this study consisted of a clustering application, which was considered an exploratory statistical technique. The CLUSTER procedure in the SAS software package was used to perform the cluster analysis (SAS Institute Inc., 1990). A hierarchical agglomerative cluster analysis, using Ward's (1963) minimum variance method, was conducted (Aldenderfer & Blashfield, 1984). This method was deemed superior by a number of Monti Carlo studies (e.g., see Overall, Gibson, & Novy, 1993). The strength of the Ward's (1963) minimum variance method is that it is designed to maximize between-group variance while simultaneously minimizing within-group variance. The cubic clustering criterion was used to determine the number of clusters to retain (Lorr, 1994; SAS Institute Inc., 1990). In addition, the number of subjects per cluster and the clinical interpretability of the clusters were considered when determining the number of clusters to retain. Four clusters were retained in this analysis. Table 9 reports the standardized means and standard deviations of each of the derived clusters. Also shown are the strength-of-association values for each variable ( $\eta^2$ ). Tukey's honestly significant difference (HSD) showed that significant differences were found between all variables in the cluster analysis with the exception of the family history of pain and child self-concept. Figure 4 shows the four clusters along the 17 child and parental variables.

#### Cluster 1- Parental Distress Cluster

Cluster 1 was labeled as the *Parental Distress* cluster (see Figure 5). In this cluster, nine children with RAP were identified as having parents who were experiencing significant emotional distress, being depressed, anxious, and experiencing many somatic symptoms. They also reported

that their family functioning was significantly lower and the parents' reinforcement of their child's pain was significantly higher than those parents of children with RAP in the *Adaptive Coping* cluster (described in the next section). In addition, parents in this cluster reported that their child's level of disability, anxiety, depression, and somatization was significantly higher than parental reports of children with RAP in other clusters, who were not emotionally distressed. Interestingly, other salient variables for this cluster was that the children reported much lower levels of disability, anxiety, depression and somatization compared with their own parent's reports of them.

#### Cluster 2 - *Adaptive Coping* Cluster

Cluster 2 was labeled as the *Adaptive Coping* cluster (see Figure 6). This cluster, which was the largest cluster (n=23), had children with RAP who did not report emotional distress and had parents who also did not report emotional distress. In addition, parents reported no emotional distress in their children, reporting non-clinical scores on depression, anxiety, and somatization, which were similar to their children's reports. Parents' family functioning scores were significantly higher than parental reports in the *Parental Distress* cluster, indicating they were better functioning families. In addition, parental depression and parental reports of child somatization were significantly lower than those reported in other clusters. The *Adaptive Coping* cluster resembles what would be expected from a family where both the child and parent are coping well (i.e., not displaying psychological difficulties) thus appearing to be able to minimize the impact the RAP is having on the family. Furthermore, family functioning scores were within an adaptive range and pain reinforcement scores were found to be least in this cluster compared to other clusters.

#### Cluster 3 - *Family Dysfunction* Cluster

Cluster 3 was labeled as the *Family Dysfunction* cluster (see Figure 7). In this cluster, the fifteen children with RAP were identified as reporting significantly lower family functioning scores than children in other clusters. Overall, they reported less family cohesion and expressiveness and higher conflict within their families. In addition, these children reported being significantly emotionally distressed with significantly elevated depression scores and anxiety scores when compared to the *Adaptive Coping* cluster.

#### Cluster 4 - *Child Distress with Reinforcement* Cluster

Cluster 4 was labeled as the *Child Distress with Reinforcement* cluster (see Figure 8). In this cluster, thirteen children with RAP were identified as being significantly emotionally distressed with significantly elevated depression and anxiety scores when compared to the *Adaptive Coping* cluster. However, what makes this cluster distinctive from other clusters are that the children in this cluster reported significantly higher disability scores, significantly higher somatization scores, and significantly higher pain reinforcement scores.

Table 9. Standardized Means and Standard Deviations of Variables for the Four Derived Clusters.

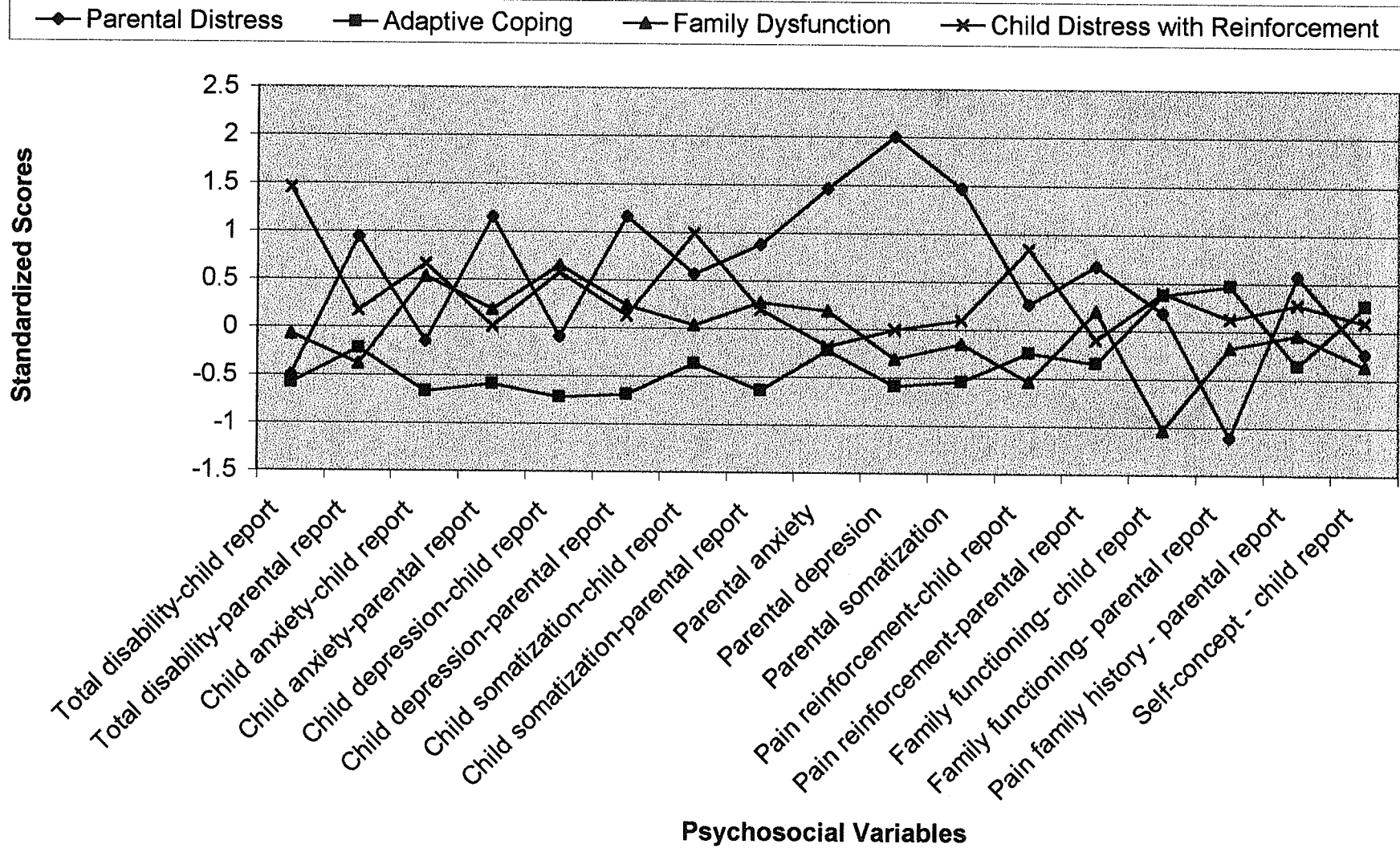
Variables	<i>Parental Distress (n=9)</i>		<i>Adaptive Coping (n=23)</i>		<i>Family Dysfunction (n=15)</i>		<i>Child Distress with Reinforcement (n=13)</i>		$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Pain disability-child	-.50 <sup>a</sup>	.61	-.58 <sup>a</sup>	.64	-.07 <sup>a</sup>	.57	1.46 <sup>b</sup>	.63	.64
Pain disability-parental	.95 <sup>a</sup>	1.15	-.22 <sup>b</sup>	.90	-.38 <sup>b</sup>	.83	.18 <sup>ab</sup>	.88	.20
Child anxiety-child	-.14 <sup>ab</sup>	.99	-.67 <sup>a</sup>	.65	.53 <sup>b</sup>	.54	.67 <sup>b</sup>	1.2	.35
Child anxiety-parental	1.15 <sup>a</sup>	.90	-.59 <sup>b</sup>	.87	.19 <sup>c</sup>	.85	.02 <sup>bc</sup>	.66	.35
Child depression-child	-.09 <sup>ab</sup>	.96	-.72 <sup>a</sup>	.70	.66 <sup>b</sup>	.46	.58 <sup>b</sup>	.68	.39
Child depression-parental	1.17 <sup>a</sup>	1.22	-.69 <sup>b</sup>	.56	.24 <sup>c</sup>	.79	.14 <sup>c</sup>	.78	.41
Child somatization-child	-.57 <sup>a</sup>	.27	-.36 <sup>a</sup>	.87	.04 <sup>a</sup>	.55	.99 <sup>b</sup>	1.25	.32
Child somatization-parental	.88 <sup>a</sup>	1.40	-.64 <sup>b</sup>	.52	.28 <sup>a</sup>	.81	.21 <sup>a</sup>	.92	.31
Parental anxiety	1.46 <sup>a</sup>	.64	-.22 <sup>b</sup>	.86	-.39 <sup>b</sup>	.45	-.17 <sup>b</sup>	1.06	.39
Parental depression	2.01 <sup>a</sup>	.79	-.59 <sup>b</sup>	.27	-.30 <sup>bc</sup>	.46	.00 <sup>c</sup>	.57	.77
Parental somatization	1.47 <sup>a</sup>	.72	-.54 <sup>b</sup>	.43	-.14 <sup>b</sup>	.99	.10 <sup>b</sup>	.93	.45
Pain reinforcement-child	.27 <sup>ab</sup>	.78	-.23 <sup>a</sup>	1.01	-.53 <sup>a</sup>	.86	.84 <sup>b</sup>	.71	.26
Pain reinforcement-parental	.67 <sup>a</sup>	.87	-.34 <sup>b</sup>	.89	.21 <sup>ab</sup>	1.14	-.09 <sup>ab</sup>	.89	.13
Family functioning-child	.19 <sup>a</sup>	.91	.38 <sup>a</sup>	.86	-1.04 <sup>b</sup>	.78	.40 <sup>a</sup>	.71	.37
Family functioning-parental	-1.11 <sup>a</sup>	1.27	.47 <sup>b</sup>	.58	-.17 <sup>ab</sup>	.97	.13 <sup>b</sup>	.83	.29
Pain modeling-parental	.58 <sup>a</sup>	1.24	-.36 <sup>a</sup>	.79	-.04 <sup>a</sup>	.83	.28 <sup>a</sup>	1.16	.12
Self-concept-child	-.23 <sup>a</sup>	1.52	.27 <sup>a</sup>	.97	-.36 <sup>a</sup>	.80	.10 <sup>a</sup>	.75	.07

Note: Different letters indicate a significant difference at a .05 level using Tukey's Honestly Significant Difference (HSD).

**Figure 4. Empirically Derived RAP Cluster Profiles**

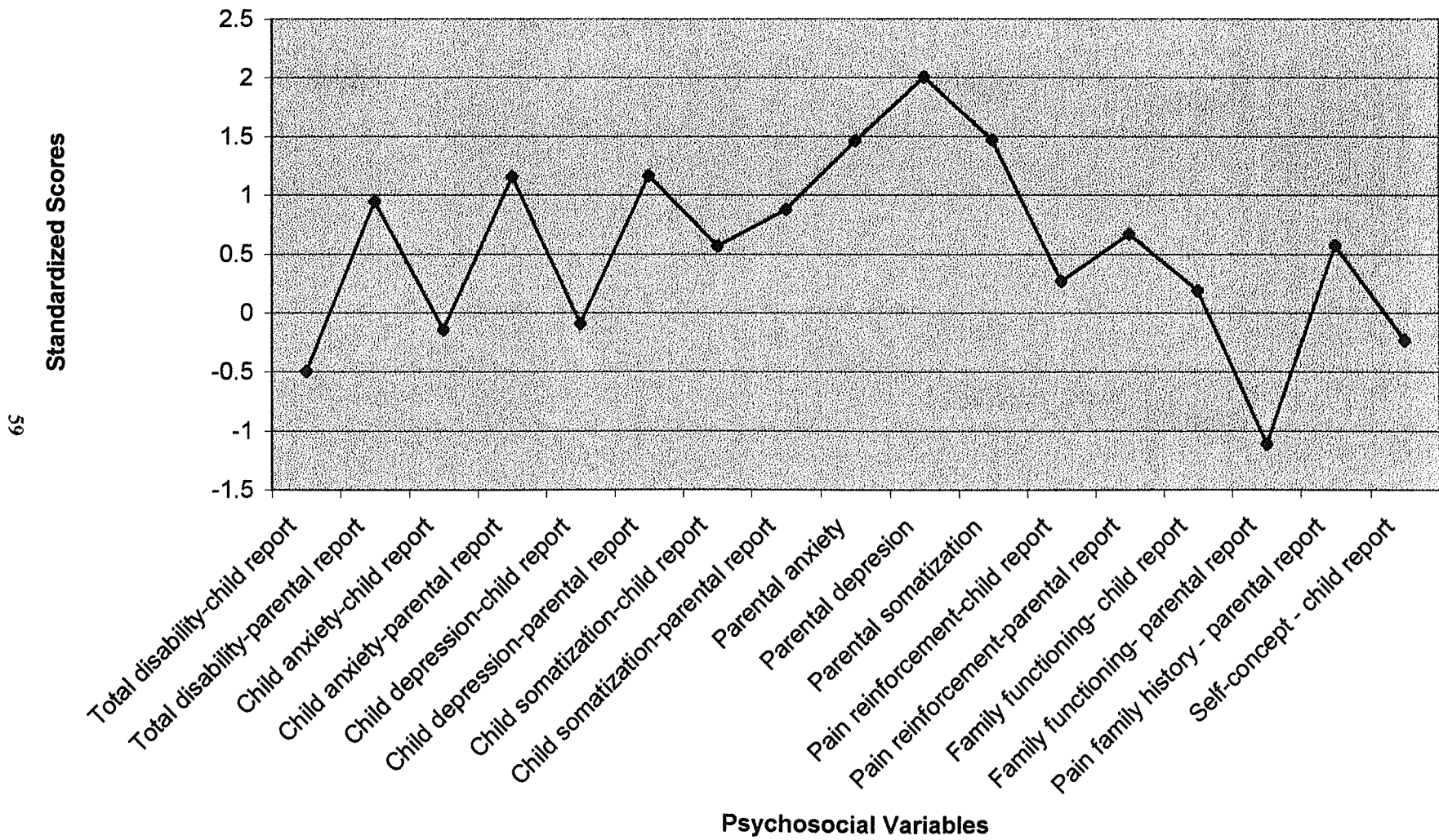


## Empirically Derived Cluster Profiles



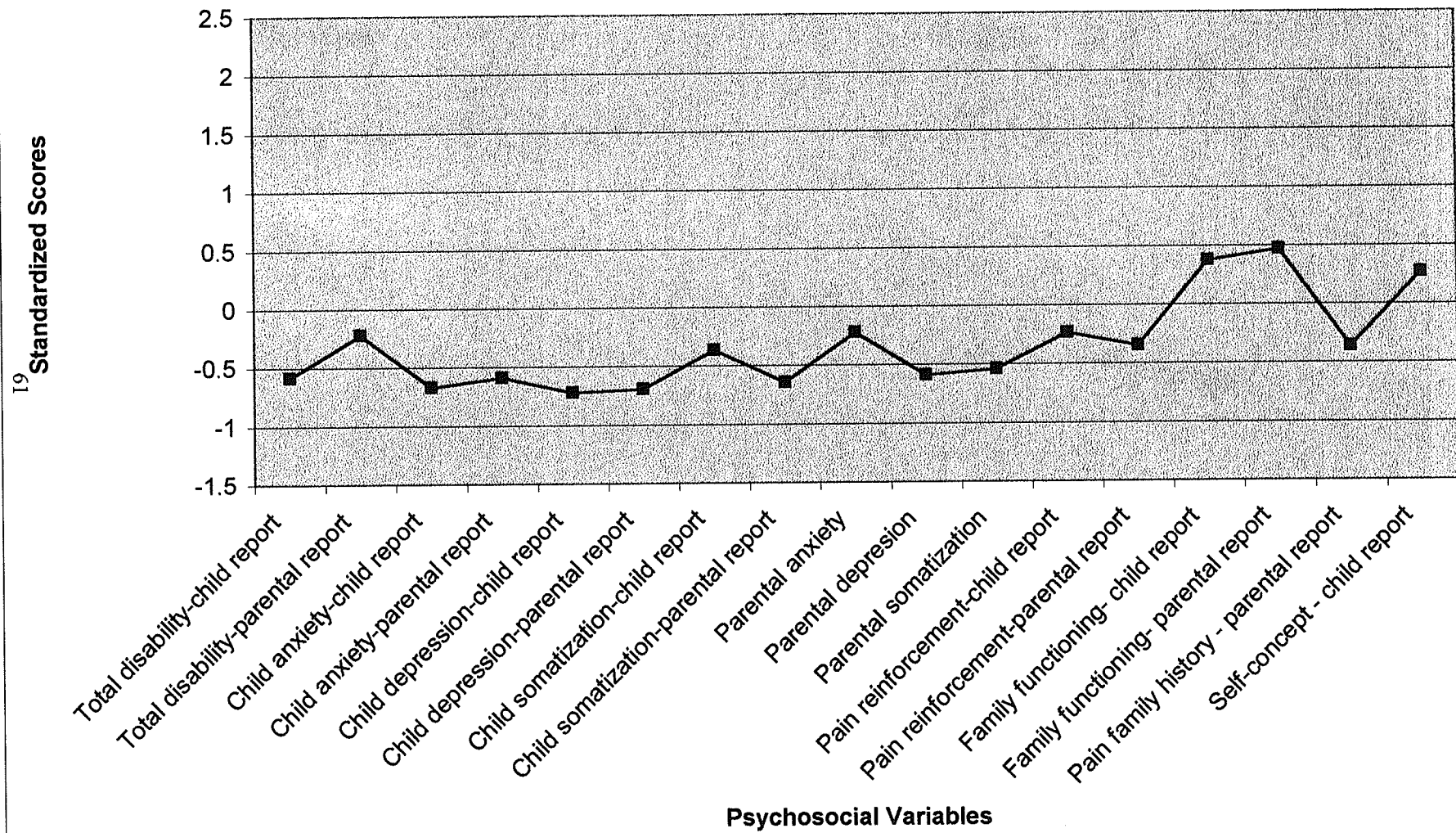
**Figure 5. *Parental Distress* Cluster Profile**

## Parental Distress Cluster Profile



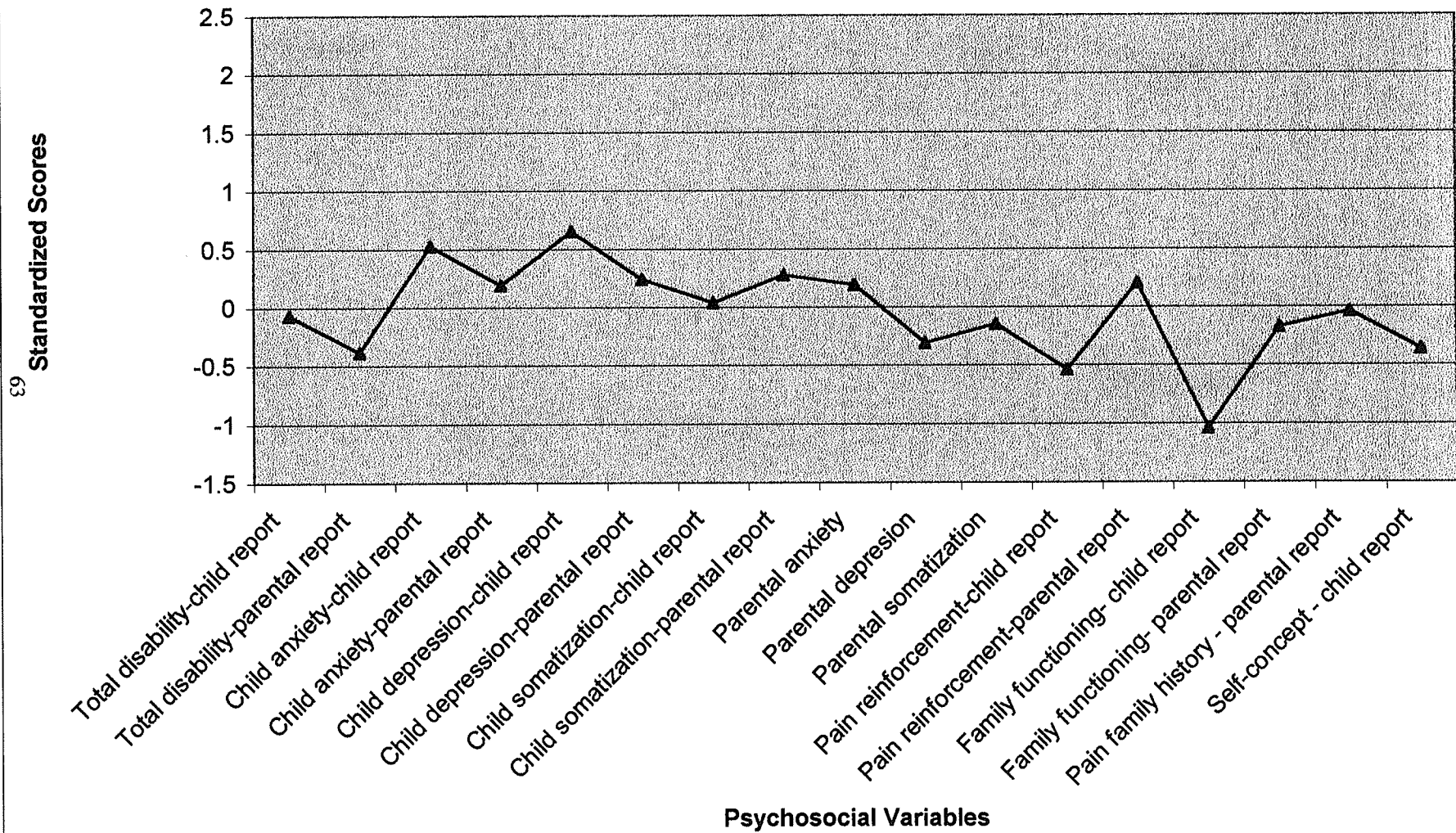
**Figure 6. *Adaptive Coping* Cluster Profile**

### Adaptive Coping Cluster Profile



**Figure 7. *Family Dysfunction* Cluster Profile**

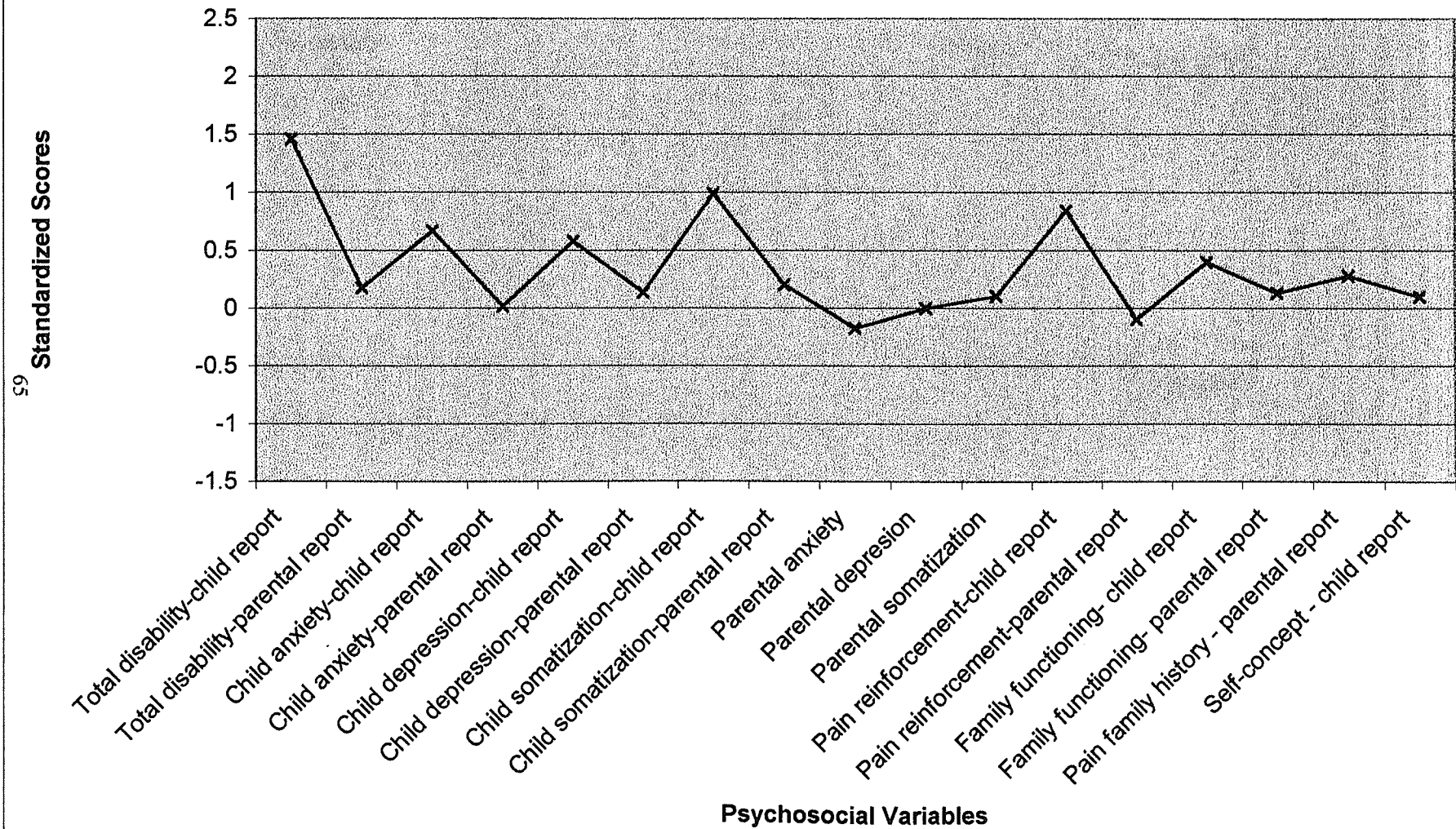
### Family Dysfunction Cluster Profile



**Figure 8. *Child Distress with Reinforcement* Cluster Profile**



Child Distress with Reinforcement Cluster Profile



### Discriminant Function Analysis to Evaluate Cluster Differentiation

A discriminant function analysis (SAS Institute Inc., 1990) was used to assess the differentiation of the four derived cluster profiles with the 17 parental and child measured variables. Table 10 shows the results of the discriminant function analysis that clearly differentiates between the derived cluster profiles.

Table 10. Discriminant Function Analysis to Evaluate Cluster Differentiation.

	Discriminant Function Analysis Groupings				
	1	2	3	4	% Agreement
1) <i>Parental Distress Cluster</i>	9	0	0	0	100%
2) <i>Adaptive Coping Cluster</i>	0	20	3	0	87%
3) <i>Family Dysfunction Cluster</i>	0	2	12	1	80%
4) <i>Child Distress with Reinforcement Cluster</i>	1	1	0	11	85%

### Cluster Validation with the Child Behavior Checklist

Next, standard cluster analytic methodology dictates that the empirically derived clusters of children with RAP be evaluated with an external measure. Thus, the CBCL Syndrome Subscales were used. The CBCL has different normative data for boys and girls and for children between 4-11 and 12-18. Thus, this study grouped children with RAP similarly for this analysis. Although there were 20 boys and 29 girls in the younger ages for this study, there were only seven boys and four girls in the older age group. Therefore, validation analysis was not completed for the older age groups because of inadequate sample size. Table 11 reports the standardized means and standard deviations of each of the derived clusters with the CBCL Syndrome Subscales. Also shown are the strength-of-association values for each variable ( $\eta^2$ ). Tukey's honestly significant difference (HSD) showed that significant differences were found between the clusters. Withdrawn, thought problems, and attention problems were significant in the group of boys and withdrawn, anxious/depressed, thought problems, and aggressive problems were significant in the group of girls.

Table 11. Standardized Means and Standard Deviations of Clusters with the Child Behavior Checklist.

CBCL Subscales	<i>Parental Distress</i>		<i>Adaptive Coping</i>		<i>Family Dysfunction</i>		<i>Child Distress with Reinforcement</i>		$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>Boys aged 6-11 n=20</b>	<b>n=1</b>		<b>n=8</b>		<b>n=5</b>		<b>n=6</b>		
Withdrawn	1.55 <sup>ab</sup>	--	-.60 <sup>a</sup>	.60	.76 <sup>b</sup>	1.22	.15 <sup>ab</sup>	.43	.46
Somatic Complaints	1.24 <sup>a</sup>	--	-.33 <sup>a</sup>	.91	.14 <sup>a</sup>	.90	.59 <sup>a</sup>	1.62	.16
Anxious/Depressed	.59 <sup>a</sup>	--	-.33 <sup>a</sup>	.80	.84 <sup>a</sup>	1.14	-.31 <sup>a</sup>	.75	.30
Social Problems	.27 <sup>a</sup>	--	-.44 <sup>a</sup>	.38	.78 <sup>a</sup>	1.09	.27 <sup>a</sup>	1.08	.29
Thought Problems	1.01 <sup>ab</sup>	--	-.55 <sup>a</sup>	.41	1.18 <sup>b</sup>	.97	-.33 <sup>a</sup>	.74	.59
Attention Problems	.63 <sup>ab</sup>	--	-.40 <sup>a</sup>	.48	1.19 <sup>b</sup>	1.11	-.50 <sup>a</sup>	.36	.59
Delinquent Behavior	.53 <sup>a</sup>	--	-.14 <sup>a</sup>	1.03	1.00 <sup>a</sup>	1.42	.13 <sup>a</sup>	.90	.18
Aggressive Behavior	-.08 <sup>a</sup>	--	-.02 <sup>a</sup>	.88	.97 <sup>a</sup>	.95	-.08 <sup>a</sup>	.94	.23
<b>Girls aged 6-11 n=29</b>	<b>n=7</b>		<b>n=11</b>		<b>n=6</b>		<b>n=5</b>		
Withdrawn	1.04 <sup>a</sup>	.90	-.61 <sup>b</sup>	.13	-.43 <sup>b</sup>	.54	-.30 <sup>b</sup>	.65	.61
Somatic Complaints	.34 <sup>a</sup>	1.39	-.51 <sup>a</sup>	.41	.33 <sup>a</sup>	1.04	-.09 <sup>a</sup>	.81	.17
Anxious/Depressed	1.01 <sup>a</sup>	1.40	-.61 <sup>b</sup>	.30	.06 <sup>ab</sup>	.75	.10 <sup>ab</sup>	.69	.39
Social Problems	.27 <sup>a</sup>	.79	-.53 <sup>a</sup>	.62	-.51 <sup>a</sup>	.43	.37 <sup>a</sup>	1.22	.25
Thought Problems	.50 <sup>a</sup>	1.01	-.69 <sup>b</sup>	.27	-.18 <sup>ab</sup>	.72	.30 <sup>ab</sup>	.74	.38
Attention Problems	.14 <sup>a</sup>	.76	-.61 <sup>a</sup>	.36	.01 <sup>a</sup>	1.27	-.22 <sup>a</sup>	.40	.18
Delinquent Behavior	.44 <sup>a</sup>	1.52	-.39 <sup>a</sup>	.49	-.27 <sup>a</sup>	.49	-.31 <sup>a</sup>	.53	.15
Aggressive Behavior	.95 <sup>a</sup>	1.20	-.77 <sup>b</sup>	.30	-.02 <sup>ab</sup>	1.30	-.15 <sup>ab</sup>	.47	.40

Note: Different letters indicate a significant difference at a .05 level using Tukey's Honestly Significant Difference (HSD).

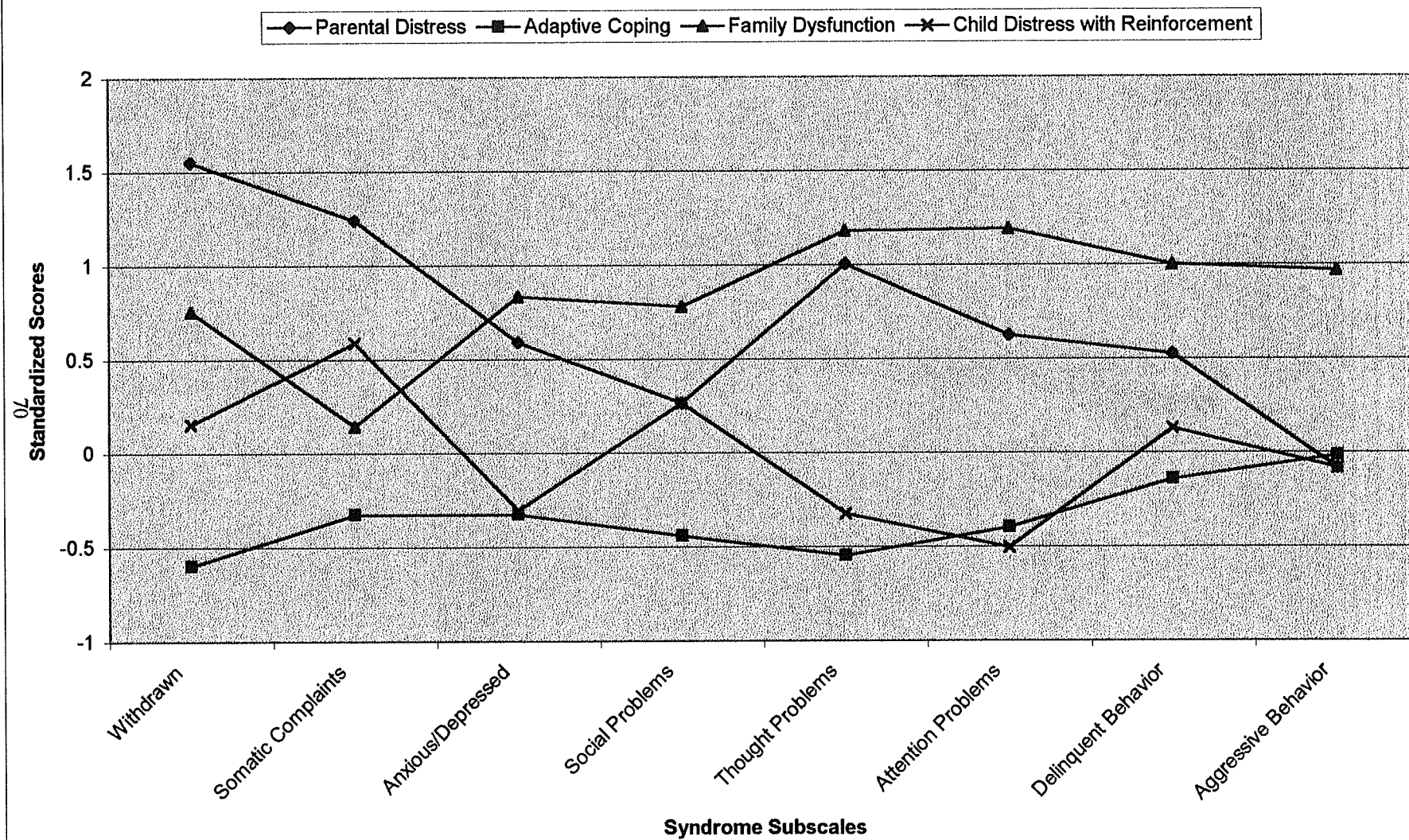
Figure 9 shows the cluster profiles that revealed well-discriminated groups in boys from the younger age group. From the *Parental Distress* cluster, boys had higher withdrawn and somatic complaints scores. From the *Adaptive Coping* cluster, boys had no elevated scores, which was similar to the cluster's results with the 17 child and parental psychosocial variables. From the *Family Dysfunction* cluster, boys had higher scores anxious/depressed, social problem, thought problems, attention problems, delinquent behavior, and aggressive behavior compared to other clusters. From the *Child Distress and*

*Reinforcement* cluster, boys had higher scores of somatic complaints than those from the *Adaptive Coping* cluster or the *Family Dysfunction* cluster.

Figure 10 shows the cluster profiles that revealed well-discriminated groups in girls from the younger age group also. From the *Parental Distress* cluster, girls had higher withdrawn, anxious/depressed, thought problems, attention problems, delinquent behavior, and aggressive behavior scores than the other clusters. From the *Adaptive Coping* cluster, girls had no elevated scores, which was similar to the cluster's results with the 17 child and parental psychosocial variables. From the *Family Dysfunction* cluster, girls had higher scores in somatic complaints compared to the *Adaptive Coping* cluster and the *Child Distress with Reinforcement* cluster. From the *Child Distress and Reinforcement* cluster, girls had slightly higher scores of social problems compared to other clusters.

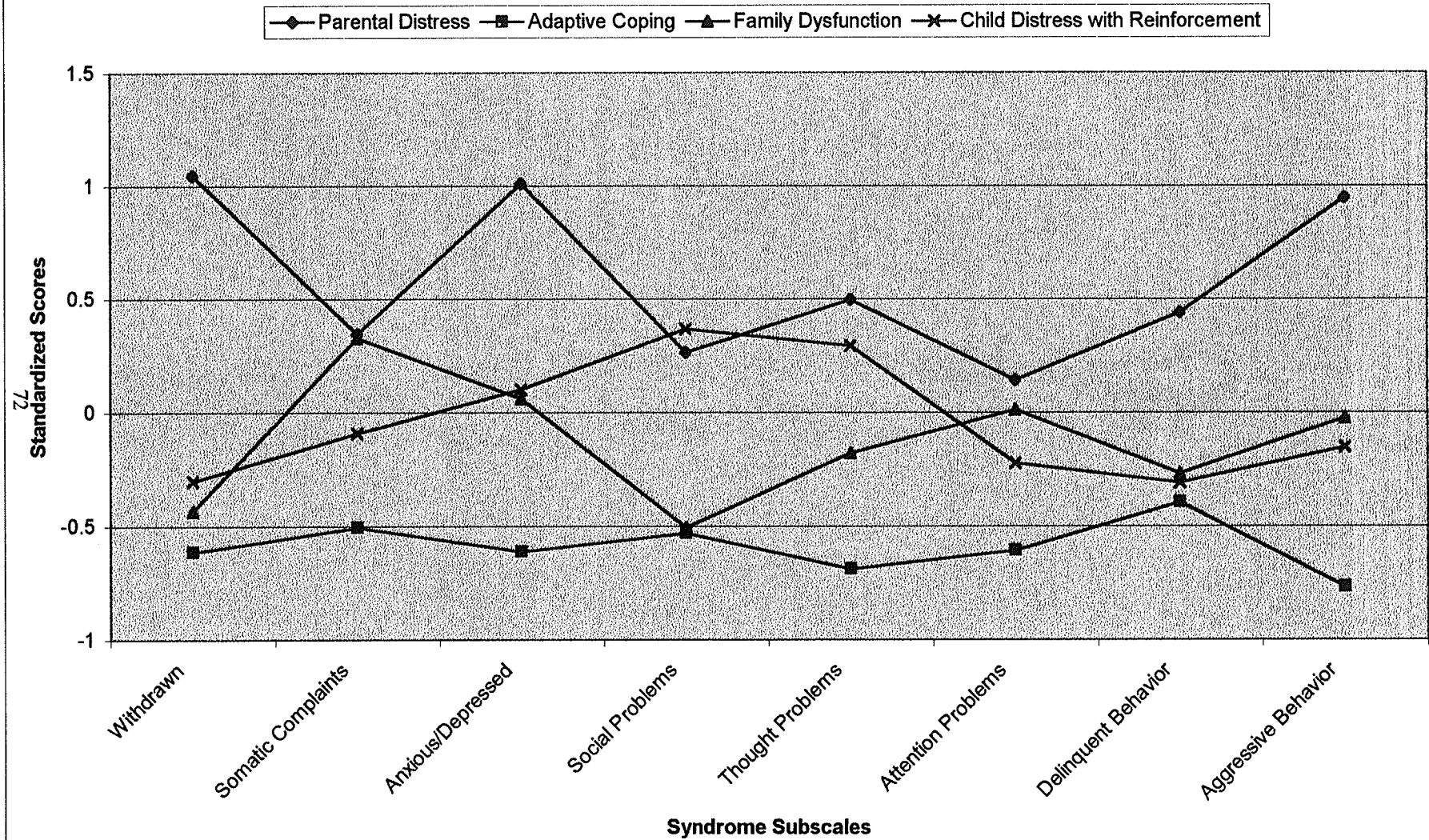
**Figure 9. Derived Clusters with CBCL Boys 4-11 Syndrome Subscales (n=20)**

### Derived Clusters with CBCL Boys 4-11 Syndrome Subscales (n=20)



**Figure 10. Derived Clusters with CBCL Girls 4-11 Syndrome Subscales (n=29)**

### Derived Clusters with CBCL Girls 4-11 Syndrome Subscales (n=29)





#### Discriminant Function Analysis with Barr's (1983) Tripartite Method of Categorization

The RAP pathology was categorized according to Barr's (1983) tripartite model of categorization: organic, dysfunctional, or psychogenic. Recruitment targeting both children with RAP with and without an organic cause was attempted in this study. As shown in Table 12, I was unable to recruit any subjects that would have been assigned to the organic group according to Barr's (1983) tripartite method of categorization of the children with RAP. Table 1 revealed that the parents of six children (who were referred but did not participate) believed that their child's pain had an "organic cause." In fact, the pediatrician's referral notes indicated that only two of these children had been diagnosed with an organic cause (both having Crohn's Disease), where as the other four did not have an identified organic diagnosis.

Table 12. Barr's (1983) Tripartite Model of Categorization

Category	N (%)
Organic	0 (0)
Dysfunctional	44 (73.3)
Psychogenic	16 (26.7)

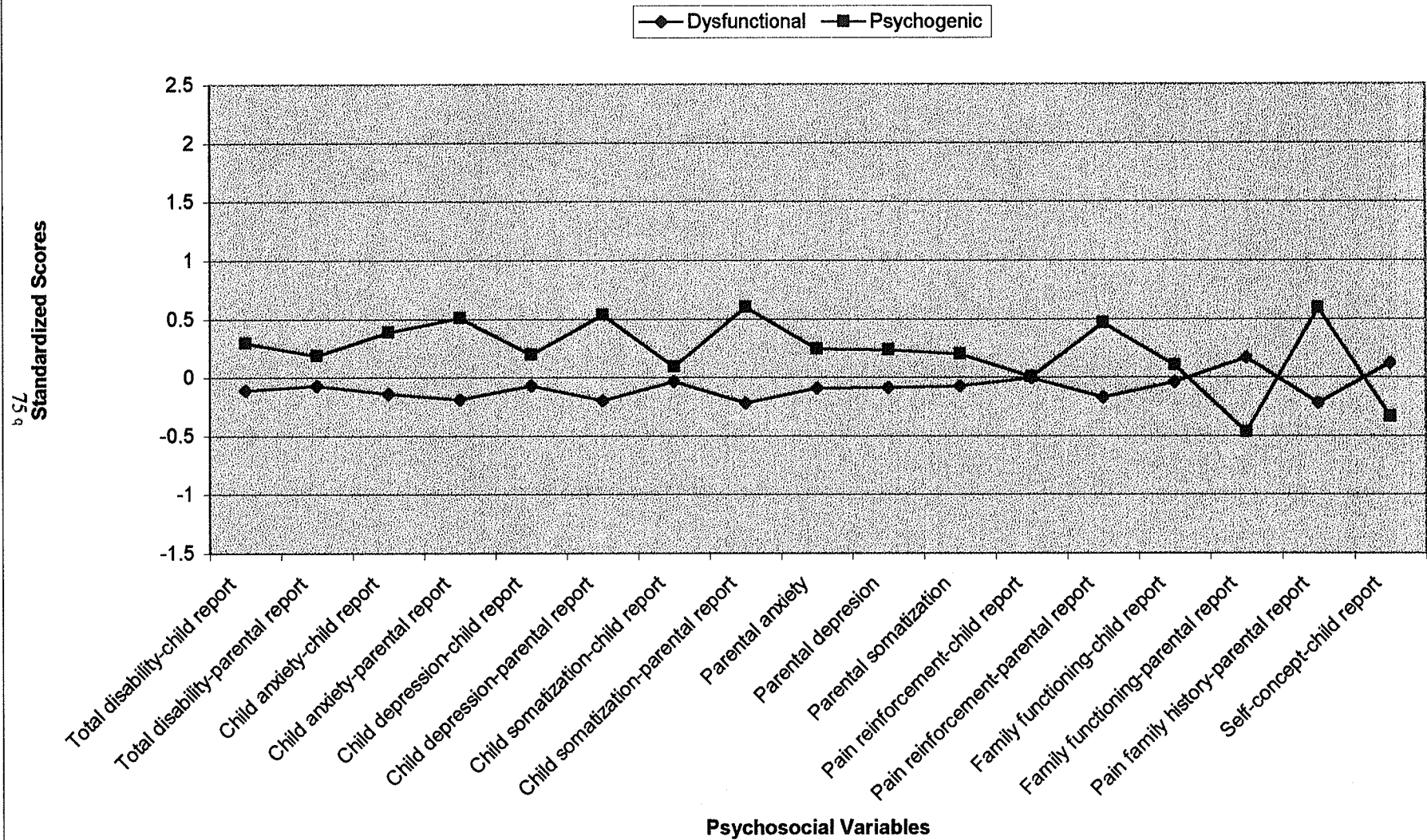
Nevertheless, a discriminant function analysis was used to assess the discriminative ability of Barr's (1983) tripartite method of categorization with the 17 parental and child measured variables (See Table 13). In addition, the empirically derived subgroups of children with RAP were compared to Barr's (1983) tripartite method of categorization by evaluating the generated profiles using this method along the 17 child and parental psychosocial variables (see Figure 11). T-tests were performed that showed non-significant results between the dysfunctional and psychogenic groups on all 17 psychosocial variables.

Table 13. Discriminant Function Analysis with Barr's (1983) Tripartite Method of Categorization.

Physician's Diagnosis	Discriminant Function Analysis Groupings		
	Dysfunctional	Psychogenic	% Agreement
Dysfunctional (n=44)	34	10	77%
Psychogenic (n=16)	6	10	63%

**Figure 11. Barr (1983) Tripartite Method of Categorization along 17 Psychosocial Variables**

# Barr (1983) Tripartite Method of Categorization along 17 Psychosocial Variables



### Post hoc Analyses

Post hoc analyses were conducted using the empirically derived RAP clusters and the demographic variables (see Table 14). Multiple Chi-square analyses yielded non-significant results along all demographic variables with the exception of the variable named the *number of parents in the household* ( $\chi^2(3, \underline{N} = 60) = 15.16, p < .05$ ), which showed children from the *Parental Distress* cluster had significantly more single parent households. In addition, the *Child Distress with Reinforcement* cluster had significantly more children who reported the presence of pain during the completion of their questionnaire ( $\chi^2(3, \underline{N} = 60) = 8.81, p < .05$ ).

Table 14. Frequency of Demographic Variables along Clusters

		<i>Parental Distress (n=9)</i>	<i>Adaptive Coping (n=23)</i>	<i>Family Dysfunction (n=15)</i>	<i>Child Distress with Reinforcement (n=13)</i>
	<b>Total (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>
<u>Age</u>					
6-11	<b>n=49 (82)</b>	8 (89)	19 (83)	11 (73)	11 (85)
12-16	<b>n=11 (18)</b>	1 (11)	4 (17)	4 (27)	2 (15)
<u>Gender</u>					
Boy	<b>n=27 (45)</b>	2 (22.2)	10 (43.5)	7 (46.7)	8 (61.5)
Girl	<b>n=33 (55)</b>	7 (77.8)	13 (56.5)	8 (53.3)	5 (38.5)
<u>Pediatrician</u>					
Pediatrician #1	<b>n=21 (35)</b>	2 (22)	9 (39)	5 (33)	5 (38)
Pediatrician #2	<b>n=16 (27)</b>	2 (22)	7 (30)	2 (13)	5 (38)
Pediatrician #3	<b>n=11 (18)</b>	1 (11)	6 (26)	2 (13)	2 (15)
Pediatrician #4	<b>n=3 (5)</b>	2 (22)	0 (0)	1 (7)	0 (0)
Pediatrician #5	<b>n=3 (5)</b>	1 (11)	0 (0)	2 (13)	0 (0)
Pediatrician #6	<b>n=2 (3)</b>	0 (0)	0 (0)	1 (7)	1 (8)
Pediatrician #7	<b>n=1 (2)</b>	0 (0)	0 (0)	1 (7)	0 (0)
Pediatrician #8	<b>n=1 (2)</b>	1 (11)	0 (0)	0 (0)	0 (0)
Pediatrician #9	<b>n=1 (2)</b>	0 (0)	1 (4)	0 (0)	0 (0)
Pediatrician #10	<b>n=1 (2)</b>	0 (0)	0 (0)	1 (7)	0 (0)
<u>Diagnosis</u>					
Psychogenic	<b>n=16 (27)</b>	3 (33)	4 (17)	4 (27)	5 (39)
Dysfunctional	<b>n=44 (73)</b>	6 (67)	19 (83)	11 (73)	8 (61)
Organic	<b>n=0 (0)</b>	0 (0)	0 (0)	0 (0)	0 (0)
<u>Constipation</u>					
Yes	<b>n=14 (23)</b>	3 (33)	2 (9)	4 (27)	5 (38)
No	<b>n=46 (77)</b>	6 (67)	21 (91)	11 (73)	8 (62)

Number of Siblings

Youngest	<b>n=20 (33)</b>	2 (22)	7 (30)	6 (40)	5 (39)
Middle	<b>n=7 (12)</b>	1 (11)	3 (13)	3 (20)	0 (0)
Oldest	<b>n=28 (47)</b>	5 (56)	12 (52)	6 (40)	5 (39)
Only Child	<b>n=5 (8)</b>	1 (11)	1 (4)	0 (0)	3 (22)

Number of Siblings

0	<b>n=5 (8)</b>	1 (11)	1 (4)	0 (0)	3 (23)
1	<b>n=38 (63)</b>	4 (44)	17 (74)	9 (60)	8 (62)
2	<b>n=12 (20)</b>	2 (22)	5 (22)	4 (27)	1 (8)
3	<b>n=3 (5)</b>	2 (22)	0 (0)	1 (7)	0 (0)
4	<b>n=2 (3)</b>	0 (0)	0 (0)	1 (7)	1 (8)

Number of Parents in Household

One Parent	<b>n=10 (17)</b>	5 (56)	1 (4)	1 (7)	3 (23)
Two Parent	<b>n=49 (82)</b>	4 (44)	21 (91)	14 (93)	10 (77)
Other	<b>n=1 (2)</b>	0 (0)	1 (4)	0 (0)	0 (0)

Pain Episode during Questionnaire Completion

Yes	<b>n=14 (23)</b>	1 (11)	4 (17)	2 (13)	7 (54)
No	<b>n=46 (77)</b>	8 (89)	19 (83)	13 (87)	6 (46)

---

Table 15. Means and Standard Deviations of Demographic Variables along Clusters

Variables	<i>Parental Distress</i> (n=9)		<i>Adaptive Coping</i> (n=23)		<i>Family Dysfunction</i> (n=15)		<i>Child Distress with Reinforcement</i> (n=13)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family Income	55.4	17.7	57.2	18.9	64.0	35.0	58.6	22.9
<u>Parental Report</u>								
No. of pain days in past 2 weeks	3.8	2.6	5.9	4.4	6.9	4.0	6.5	5.1
Duration of RAP (in months)	17.1	12.4	14.8	11.1	15.3	18.9	21.3	13.2
Typical episode length (in hours)	2.6	5.1	1.6	1.7	3.2	4.6	3.1	2.6
<u>Child Report</u>								
No. of pain days in past 2 weeks	6.3	5.5	7.9	4.5	7.9	4.6	8.6	4.4
Duration of RAP (in months)	13.7	11.8	20.3	21.8	21.6	35.7	21.3	13.2
Typical episode length (in hours)	3.3	7.8	1.8	2.5	2.9	4.3	4.6	4.3

Note: All clusters comparisons along variables were non-significant at the  $p < .05$  level using ANOVAs.

Analysis of variance (ANOVA) found non-significant findings in child and parental reports of pain duration, pain frequency, and length of pain episode variables across each cluster (see Table 15). In addition, no significant difference was found between reported family income among families regardless of which cluster they were in.

Finally, each cluster was evaluated on the six measures (child disability, child depression, child anxiety, child somatization, pain reinforcement, and family functioning) that both the child and parent reported on. Table 16 shows that from the *Parental Distress* Cluster, parents reported significantly higher scores on child disability, child depression, child anxiety, and child somatization and significantly lower family functioning scores. From the *Family Dysfunction* cluster, parents reported significantly higher pain reinforcement and family functioning scores compared to their children. From the *Child Distress*



*with Reinforcement* cluster, children reported significantly higher child disability, child somatization, and pain reinforcement.

Table 16. Paired T-test of Parental – Child Variables by Cluster

Cluster	Variable	<i>N</i>	<i>M</i>	<i>SE</i>	<i>t</i>
<i>Parental Distress</i>	Child Disability	9	14.89	3.01	4.94 <sup>***</sup>
	Child Depression	9	10.78	2.60	4.14 <sup>**</sup>
	Child Anxiety	9	24.22	3.92	6.18 <sup>***</sup>
	Child Somatization	9	17.00	4.78	3.55 <sup>**</sup>
	Pain Reinforcement	9	4.89	2.49	1.97
	Family Functioning	9	-2.89	1.16	-2.49 <sup>*</sup>
<i>Adaptive Coping</i>	Child Disability	23	4.35	2.37	1.84
	Child Depression	23	1.61	1.04	1.55
	Child Anxiety	23	8.48	2.36	3.60 <sup>**</sup>
	Child Somatization	23	-4.13	3.42	-1.21
	Pain Reinforcement	23	-.13	1.66	-.07
	Family Functioning	23	2.74	.84	3.26 <sup>**</sup>
<i>Family Dysfunction</i>	Child Disability	15	-2.07	1.86	-1.11
	Child Depression	15	.93	1.67	.56
	Child Anxiety	15	-2.40	1.87	-1.28
	Child Somatization	15	-.93	4.04	-.23
	Pain Reinforcement	15	6.73	2.16	3.12 <sup>**</sup>
	Family Functioning	15	5.40	1.51	3.58 <sup>**</sup>
<i>Child Distress with Reinforcement</i>	Child Disability	13	-11.08	2.76	-4.02 <sup>**</sup>
	Child Depression	13	.62	1.60	.39
	Child Anxiety	13	-.92	4.56	-.20
	Child Somatization	13	-19.08	6.49	-2.94 <sup>*</sup>
	Pain Reinforcement	13	-5.77	1.68	-3.43 <sup>**</sup>
	Family Functioning	13	1.31	1.12	1.16

Note: Negative *M* scores indicate that the children reported variable scores higher than their parents did.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

## DISCUSSION

### EMPIRICALLY DERIVED RECURRENT ABDOMINAL PAIN CLUSTERS

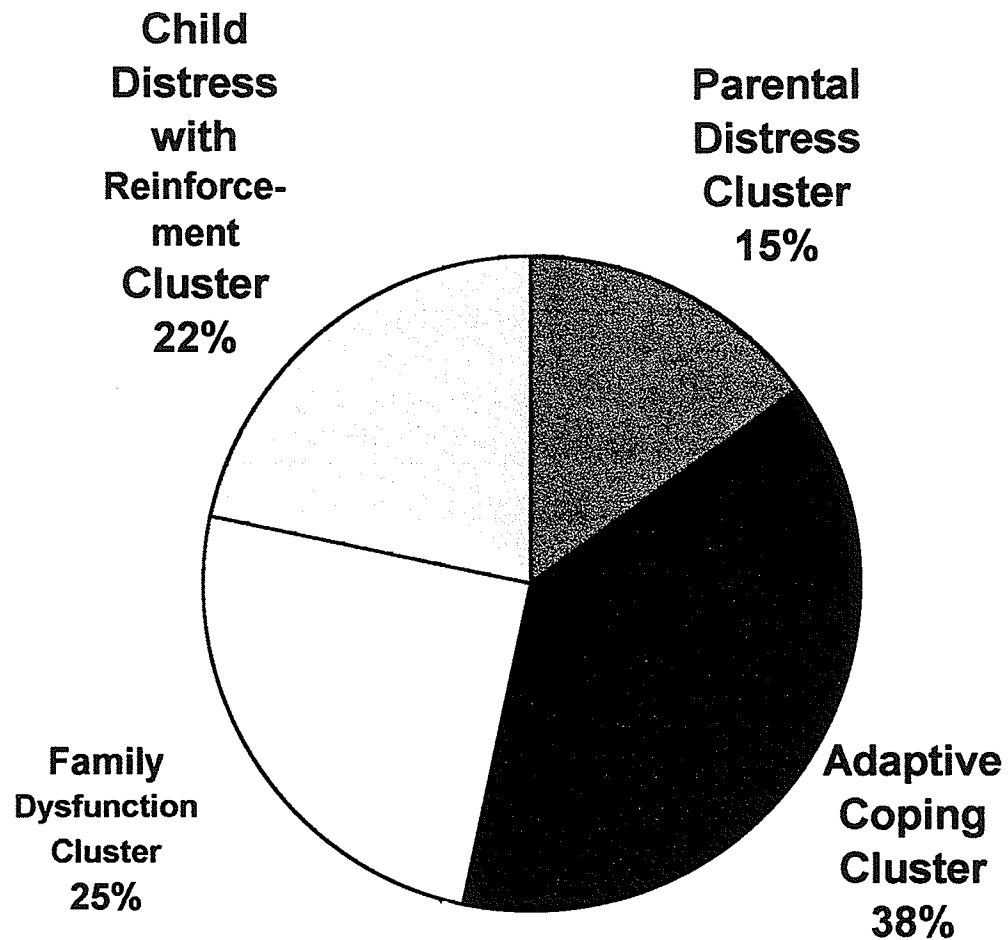
This study revealed findings that strongly demonstrate that the RAP population is a heterogeneous population with four distinct clusters of children that can be described along salient psychosocial variables. Using a cluster analytic approach, four empirically derived clusters were identified and named (a) the *Parental Distress* cluster, (b) the *Adaptive Coping* cluster, (c) the *Family Dysfunction* cluster, and (d) the *Child Distress with Reinforcement* cluster. This finding reveals a preliminary taxonomy regarding children who experience RAP. No longer are children with RAP going to be categories as either psychogenic, dysfunctional, or organic (Barr, 1983). Rather, children with RAP will be view as having a similar pain complaint and in addition fitting into one of four clusters based on salient psychosocial variables. Figure 12 shows the preliminary taxonomy of children with RAP with approximate proportions.

The clusters showed significant differences on 15 of the 17 child and parental variables. Specifically, the *Parental Distress* cluster was noted as having parents whom reported high emotional distress, the *Adaptive Coping* cluster had child and parental reports all at a non-clinical level, the *Family Dysfunction* cluster had children whom reported emotional distress with family dysfunction, and the *Child Distress with Reinforcement* cluster had children whom reported emotional distress with high pain reinforcement by parent(s). Clusters did not differ on demographic and pain-related items with the exception of the variables named the *number of parents in household* and *experiencing RAP while completing the questionnaire*.

Discriminate function analysis revealed that the clusters had excellent discriminative ability along the 17 child and parental variables. In addition, the Child Behavior Checklist, used as an external measure, validated the distinctiveness of these clusters by revealing well-discriminated clusters among the syndrome subscales of the CBCL. These clusters have significant clinical relevance and will be useful for treatment planning.

**Figure 12. Empirically Derived RAP Clusters – A Preliminary Taxonomy**

### Empirically Derived RAP Clusters



### The Parental Distress Cluster

Within the *Parental Distress* cluster, level of parental depression was the most salient variable and strongest indicator of divergence compared to the other clusters. Zuckerman et al. (1987) found that depressed mothers of children with RAP were significantly more likely to give greater attention to their children, which possibly reinforced the pain behaviors of their children. This hypothesis is strongly supported by this study because those parents in the *Parental Distress* cluster reported the highest scores on the pain reinforcement variable when compared to the other clusters.

Thus, administering a pain reinforcement questionnaire along with a parental depression inventory questionnaire (such as, the Beck Depression Inventory) would be necessary for a pediatrician to evaluate the possibility of a child with RAP belonging in this cluster. Although administering of a parental depression inventory during a pediatric appointment may be met with initial surprise and resistance, this in most cases can be minimized with a brief explanation stating that, "having a family member in pain adds considerable stress to a family thus we need to investigate which child and parent variables are important in your family."

Interestingly, the *number of parents in the household* was the only demographic variable to discriminant between the clusters. A greater number of single parent households were found in this cluster compared to the others. Added stress of being the only parent in the household may have played a part in these parent being emotionally distressed. Financial stress does not seem to be indicated in this study, as there was no difference in income level between the clusters.

In addition, the number of girls in this cluster was approaching significance revealing that more girls than boys may internalize a parent's distress into somatic complaints. Another possibility is that these girls would more likely request to go to the doctor in hopes that their parent would receive some help or guidance emotionally. Alternatively, depressed parents may be more likely to bring their daughter to her pediatrician than their son when somatic complaints are reported.

If a pediatrician evaluated the emotional distress of a child with RAP solely on parental reports (which is not uncommon, see e.g., Robinson, et al., 1990), parents that would be found to belong in the *Parental Distress* cluster would report much higher child distress than the child would report. Thus,

child-focused psychological treatment could be erroneously suggested when in fact the parent might be the one in need of psychological intervention. Canning (1994) and Engel, Rodrigue, and Geffken (1994) both reported that large discrepancies can be found between child and parental reports of child psychopathology if the parents themselves are experiencing emotional distress. Thus, both child and parental reports are necessary for assessment of the child's psychopathology.

So in summary, a pain reinforcement questionnaire, a parental depression inventory, and child emotional distress questionnaires completed by both the parent and child would be necessary to adequately categorize families in this cluster.

#### The Adaptive Coping Cluster

Within the *Adaptive Coping* cluster, the distinguishing features of this cluster are that the parental and child scores of child distress are insignificant, the parental and child scores of family functioning are in the adaptive range, and parental and child scores for pain reinforcement are low. Interesting, this cluster does not significantly differ from the others on length of pain episode in hours, duration of pain in months, and number of days in two weeks pain episodes are experienced. Thus, from this finding, we can assume that these children are not coping better because they are experiencing shorter pain episodes, less daily episodes, or have had pain for a shorter duration of time. Other variables appear to be more important in understanding why these families are coping well.

Family functioning scores reported by both the parents and the children were in the adaptive range signifying that the families were cohesive, expressive, and had less conflict. This type of family functioning appears to be able to insulate family members from emotional distress especially for the children. Children with physical problems who are in a supportive family tend to report better adjustment (Wallander & Thompson, 1995). In addition, both the child and the parent reports of pain reinforcement were low. It seems that pain reinforcement produces unnecessary and maladaptive emphasize on the child's pain and its expression. Thus, adaptive coping appears to necessitate a supportive family that does not overemphasize or draw unnecessary attention to the child's pain.

Overall, it appears that these families are adaptively coping and may not need further medical or psychological intervention. . Therefore, a pediatrician needs to be careful not to assume that the absence

of psychosocial variables supports that possibility of an organic etiology. In fact, Walker et al. (1993) reported that children with RAP with or without an organic cause were similarly likely to have significantly higher psychological distress scores when compared to healthy controls. Nonetheless, Edwards, Mullins, Johnson and Bernardy (1994) reported that although pediatricians recognize the psychosocial nature of RAP, many have the tendency of falling back in to thinking of RAP as bipartite in nature, that is, either psychogenic or organic. In fact, all these children may need is a "wait-and-see" approach. This cluster of children is likely to be the ones that experience "spontaneous remission" of the RAP. Apley and Hale (1973) and Stickler and Murphy (1979) both reported that a number of children with RAP in their sample had pain that went away without formal treatment. Most likely, they came from the *Adaptive Coping* cluster.

Therefore, by evaluating, pain reinforcement, family functioning, child and parental psychopathology, these variables would be able to distinguish this cluster from the others.

#### The Family Dysfunction Cluster

Within the *Family Dysfunction* cluster, the distinguishing features of this cluster are that the child reports of family functioning were low, in addition to higher reported anxiety and depressive scores by the child when compared to other clusters. Although the parental reports of family functioning in this cluster were within an adaptive range, it is suspected that parents in this cluster tended to be minimizing any difficulties. These parents reported lower overall child distress scores and significantly higher pain reinforcement scores than their children did. Poor family functioning has been noted to be an important predictive variable in evaluating a child's pain coping ability (Varni, Blount, Waldron, & Smith, 1995). Poor family functioning, for this study, may be families that are over concerned with their children's pain, encouraging them to use passive coping strategies, such as stop an activity, rest, or take medication. Varni et al. (1995) commented that families that encourage adaptive coping techniques and discourage maladaptive ones tend to have children who were coping better with their pain. In addition, Dunn-Geier et al. (1986) reported that mothers of "non-coper" tended to discourage coping behaviors.

As in the *Parental Distress* cluster, to evaluate whether a child with RAP belongs in this cluster, both child and parental reports are needed. With only the parental reports of child psychopathology, pain



reinforcement, and family functioning, there would be little difference in measures collected from them and those from the *Adaptive Coping* cluster. However, when the child reports on these measures is collected, it becomes clear that family relationship issues may be playing an important part in the RAP. Merritt, Thompson, Keith, and Johndrow (1993) again highlight that it is imperative to collect reports from both the child and the parent for optimal diagnostic accuracy.

Thus, in summary, evaluation of family functioning, and child psychopathology (evaluated by both the child and parent) is needed for accurate discrimination and assignment into this cluster.

#### The Child Distress with Reinforcement Cluster

Within the *Child Distress with Reinforcement* cluster, the distinguishing features of this cluster are that these children reported significantly higher pain disability, child somatization, and pain reinforcement scores. Furthermore, these children reported higher depression and anxiety scores thus noting greater overall distress compared to those children in other clusters. In addition, children in this cluster reported that they had pain during their questionnaire completion significantly more often than children from other clusters did. Interestingly, although these children report the most emotional and physical distress among the clusters, they also report significantly higher pain reinforcement. Thus, it appears that, as in the *Family Dysfunction* cluster, pain reinforcement rewards a child when they are in pain but also contributes to the maintenance of their distress emotional state. Furthermore, similar to Sanders, Cleghorn, Shepherd, and Patrick (1996) study, parents who reinforced maladaptive coping strategies had children that reported more distress. The operant conditioning model of pain would best explain this finding, where the pain behaviors, such as that child's emotional distress is positively reinforced by others, primarily the parents. An alternative explanation would be that the child's distressed emotional state would solicit others in the family to reinforce the pain behaviors. It would be difficult for family members to cease from reinforcing pain behaviors if the child is emotionally distressed during these episodes.

Walker and Zeman (1992) investigated the level of parental encouragement of pain behaviors among a group of pediatric patients. They found that parents of children with RAP were more sympathetic than parents of children who reported other health concerns. Possibly, parents are responding

to their children's emotional distress, trying to help them feel better by providing more attention, gifts and treats, and encouraging others in the family to respond sympathetically to them.

Thus, in summary, evaluation of child psychopathology, disability, and pain reinforcement would provide adequate discrimination between this cluster and the others.

#### THE DERIVED CLUSTERS AND THE BARR (1983) TRIPARTITE MODEL OF CATEGORIZATION

The identification of four empirically derived clusters in the current study greatly improves upon the Tripartite Model of Categorization introduced by Barr (1983). When the derived clusters were compared against the Barr (1983) Tripartite Model of Categorization, the derived clusters showed superior discriminative ability along the psychosocial variables. Unfortunately, without subjects from the organic group, it was not a complete test of comparison. It is unclear what differences in the data would have been observed with organic subjects included in the analysis. Nonetheless, only 77% of the children from the Dysfunctional group and 63% of the children from the Psychogenic group were successfully differentiated along the 17 child and parental variables. In contrast, the empirically derived RAP clusters successfully discriminated 100%, 87%, 80%, & 85% (clusters 1-4, respectively) along the 17 child and parental variables. In addition, the tripartite categories were not significantly differentiable along any of the 17 psychosocial variables. Thus, the dysfunctional and psychogenic categories were essentially indistinguishable along the 17 child and parental variables. In contrast, the derived RAP clusters were differentiated along 15 of the 17 child and parental variables included in this study.

#### PRIMARY CARE PEDIATRICIANS

This study's finding that the dysfunctional and psychogenic categories were essentially indistinguishable along the 17 child and parental variables emphasizes the variable diagnostic accuracy within the RAP population among primary care pediatricians. Given how children and parents in the *Adaptive Coping* cluster revealed no psychological distress, it could be assumed that this group would have more children with dysfunctional diagnoses. However, there were no differences between the children in the *Adaptive Coping* cluster given a psychogenic diagnosis compared to those children given this diagnosis in the other clusters. In addition, in the *Family Dysfunction* and *Child Distress with Reinforcement* clusters, pediatricians were no more likely to give the children a psychogenic diagnosis

than a dysfunctional one. Even in the *Parental Distress* cluster, six of the nine children were given dysfunctional diagnoses despite their parents being clinically depressed.

Furthermore, Barr and Feuerstein (1983) described that to make a psychogenic diagnosis, the child clearly has to have "stressful, emotional, or psychosocial factors [that] have some [primary] role in the production of the syndrome" (p. 16). To make a dysfunctional diagnosis, the child would not present with either psychological distress or a physical condition that could explain the pain. However, many of the children in this study had significant psychological distress that seemed to go undetected by their pediatrician. This is not surprising since pediatricians are not extensively trained in child mental health diagnosis. Florenzano (1991) commented that "pediatricians appear poorly trained to identify emotional and behavioral problems" (p. 142). These findings are consistent with the recent concern about the "new morbidity," which suggests that primary care pediatricians tend to miss psychological problems that frequently are accompanied with somatic complaints (Costello, Edelbrock, Costello, Dulcan, Burns, & Brent, 1988). Noting the variability between pediatricians regarding their thoroughness in evaluating the child with RAP's psychosocial history, Edwards et al. (1994) suggested that greater effort is needed "to educate pediatricians about the contributions that mental health evaluation can make to the management of children with RAP" (p. 251). Thus, whether pediatricians are thoroughly trained to make mental health diagnoses or trained with mental health screening instruments that would guide in determining if a mental health referral was necessary, improved primary care mental health diagnosis is needed.

Edwards et al. (1994) described an assessment and treatment model consisting of mental health practitioners being integrated into the primary care setting. They noted that "such a joint practice would allow the mental health professional to have access to the patient in a setting that is less threatening to the family, allowing the mental health professional to be included early in the evaluation process, develop rapport with the family, and intervene where appropriate" (p. 251). Garber et al. (1990) commented that early identification and treatment of emotional problems among medical patients that present with somatic complaints is imperative to serve more comprehensively the needs of these patients. Clearly, with studies indicating that as many as a quarter of the children who present in a primary care medical setting

have a mental health diagnosis, great involvement of the mental health professional in the primary care setting is needed (Costello, Costello, Edelbrock, Burns, Dulcan, & Brent, 1988)

### THE ORGANIC CLASSIFICATION

Many studies have revealed that there are no differences on psychosocial variables between children with RAP with or without an organic diagnosis (Hodges, et al., 1985; Walker & Greene, 1989; Garber, et al., 1990). In addition, there is significant controversy as to the specific etiology of many children with RAP with an organic diagnosis. For example, although many children with Crohn's disease report recurrent abdominal pain as a major symptom, other children with Crohn's disease do not report pain at all (McGrath & Unruh, 1987). Furthermore, McGrath and Unruh noted that a change in "psychological stress or family pathology" might contribute to the onset, maintenance, or remission of this disease (p. 146).

Although no children with an organic diagnosis participated in this study, speculation can be made as to whether this group would have been found to be in a fifth cluster or whether these children would have been dispersed among the four clusters, depending of which salient psychosocial variables were important. Many studies have shown that children with RAP with an organic diagnosis experience significant psychological distress and the parents of these children also experience psychological distress (Walker, et al., 1994; Walker, et al., 1991). Thus, it is reasonable to assume that these children with RAP would have been spread among the clusters and that these psychosocial variables would in fact play a role in the experience of the RAP.

Thus, having a RAP organic diagnosis appears to be an incomplete classification label because of the mixed research regarding to what extent organic variables play in the pain's development or maintenance in combination with the significant contribution that psychosocial variables play (Sammons, 1988). Most likely, interactions between biological, psychological, social, and environmental variables best described RAP. This preliminary taxonomy, using psychosocial variables, is the first step in providing clusters that have greater utility in etiological research, outcome research, and treatment than the present classification system.

## IMPLICATIONS FOR ETIOLOGICAL RESEARCH, OUTCOME RESEARCH, AND TREATMENT.

Clearly, the empirically derived RAP clusters have the best discriminative and descriptive ability among the psychosocial variables examined in this study. Children with RAP should no longer be diagnosed as either psychogenic, dysfunctional, or organic but rather classified into one of four clusters based on psychosocial variables. With the identification of this preliminary taxonomy, it is now possible to undertake a more focused investigation in outcome research and the etiology of RAP. Results of this study contribute to our understanding of the possible psychosocial variables that may prove to be etiologically important to these children. This study is a necessary step in the investigation of psychosocial variables that provides an important preliminary taxonomy for further investigation.

### Etiological Research

With this preliminary taxonomy, the identification of four distinct clusters will generate more focused research into the differing multifactorial etiologies of RAP. Future studies will need to classify children with RAP into one of the four clusters to provide samples that are more homogeneous for study. In addition, longitudinal studies will need to evaluate the salient psychosocial variables to correctly categorize the children with RAP and parents. Special attention will be given to periodically assessing those variables that are salient to each cluster to determine changes in regards to the changes of the RAP. Structural equation modeling will likely play an important role in the identification of specific variable relationships that have the most influence on the dynamic nature of the RAP.

### Outcome Research

With the development of four clusters along salient psychosocial variables, cluster-specific treatment outcome research will need to be conducted. Specific cognitive-behavioral family treatment procedures targeting the salient psychosocial variables can now be developed to attempt to provide change to the RAP and its context. For example, the treatment focus of families from the *Parental Distress* cluster will be primarily on the parent(s). Measuring parental distress variables at pre and post-treatment along with child pain variables will provide meaningful findings. In addition, for the *Family Dysfunction* cluster, family therapy would need to be a component of the treatment.

### Treatment

Now individualized treatment programs can be developed that will take into consideration the complexity of RAP in children. Treatments will use play, cognitive-behavioral, and family therapies, in addition to, therapy for the distressed parents. Treatments for the *Parental Distress* cluster will necessitate treatment for both the child and the parent(s). For children with RAP in the *Adaptive Coping* cluster, children and parents may greatly benefit from learning pain management strategies as many of the environmental and psychological factors hindering improvement appear to be non-existent. Treatments for families within the *Family Dysfunction* cluster will need to target the child's emotional distress along with family issues, using family therapy. Treatments for families within the *Child Distress with Reinforcement* cluster will need to target the child's emotional distress along with the parent's pain reinforcement contingencies.

### RESEARCH LIMITATIONS

The limited sample size, the sample recruitment and composition, and the lack of cross-validation for the derived clusters are limitations of this study. Due to the research design, an obvious limitation of this study is that a high score on a particular measure for a cluster does not imply that this measure is causative. For instance, within the *Parental Distress* cluster, parents reported high depressive, anxious, or somatization symptomatology, yet it can not be determined if the RAP was a predisposing variable of this distress, if this distress was a predisposing variable in the development of RAP, or if some other variable was influencing each of them.

To overcome some of the barriers presented in previous RAP research, the study took place in a primary care setting. The rate of participation was consistent with other studies conducted in a primary care setting (Bergman, et al., 1982). Table 1 lists reasons why parents did not agree to participate in this study. It is uncertain if these parents with differing reasons for not participating depict different family characteristics. Most likely, each of these parents lacked insight into the role of psychosocial variables that played a part in their children's experience of pain. In addition, the rate of participation of families was influenced by the pediatricians' effectiveness in communicating the importance of psychological factors in RAP and encouraging with enthusiasm their participation in the research.

Recruiting from a pediatric clinic (e.g., see Bury, 1987) rather than a hospital (e.g., see Crossley, 1982) or a gastroenterologist clinic (e.g., see McGrath, et al., 1983) provided a larger heterogeneous sample. That is, children from primary care pediatric clinic represented a broader sample of the population of children that may be experiencing RAP. Furthermore, the children with RAP from a primary care clinic were probably significantly more heterogeneous on psychosocial variables than samples taken from a gastroenterologist, child psychiatrist, or hospital. However, three of the ten pediatricians supplied 80% of the referrals for this study. During informal conversations with the other seven pediatricians, it appeared that some doctors made a diagnosis of RAP very infrequently, that some doctors did not referral some RAP patients to this study because it was diagnosed as "organic" and "they would never see a psychologist", and some doctors did not referral some RAP patients to this study because they choose to treat the children themselves. Pediatricians noted that certain specific organic diagnoses did not necessitate a referral as it was felt that a psychological intervention program would be ineffective. They were gynecological conditions and late complications of trauma, such as splenic trauma. It is uncertain to what effect the idiosyncratic referral tendencies of these pediatricians had on this study's sample makeup. Dulcan, Costello, Costello, Edelbrock, & Burns (1990) reported that "parental level of distress, family psychiatric history, and discussion of parental concerns with the pediatrician were important influences on identification and referral" (p. 453). In addition, Edward et al. (1994) commented that family reluctance to see a mental health provider (i.e., a psychologist or psychiatrist) was a serious impediment to receiving a mental health referral.

It was unfortunate that no organically diagnosed children with RAP participated in this study. Apply (1975) noted that the number of children with RAP with an organic diagnosis is small, at approximately 10% of children with RAP (Barr, 1983). Pediatricians seemed much more willing to referral *dysfunctional* or *psychogenic* labeled children with RAP. For example, Pediatrician #4 referred three children with RAP, who had two parents that were emotional distress and one family showing significant family dysfunction. Likely, this pediatrician would have been less willing to refer children if the parents, child, or family were coping satisfactory or if there was an organic diagnosis. It is uncertain to what extent the varying degrees of participation among the pediatricians had on this study. However,

the referral patterns of the three pediatricians who referred 80% of the children were similar as they seemed to refer heterogeneous patients who met the criteria regardless of functioning. Therefore, receiving the majority of referrals from these three pediatricians lessened the effect of a "referral filter bias" (p. 148; McGrath & Unruh, 1987) that has been present in a number of RAP studies (e.g., see McGrath, et al., 1983).

#### CONCLUDING REMARKS

The strength of this study is that its findings provided a more comprehensive categorization of children with RAP with similar psychosocial variables. In addition, this study attempted to integrate the various lines of research with children with RAP by investigating a variety of psychological and environmental variables that have been investigated in the literature. It is clear that RAP is a significant problem that needs a greater focus of inquiry. The usage of empirical derived RAP clusters provides an opportunity for the evaluation of homogeneous groups that could further the knowledge of multifactorial etiological variables. Further prospective research investigating these clusters along their salient psychosocial variables will begin to reveal important causal influences in children with RAP. In addition, based on their relevant psychosocial variables, patients would be provided with a more effective treatment approach. Psychosocial clusters are the first step in providing better patient care for children with RAP.



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## **APPENDIX A: Abdominal Pain Study: Letter to Parent**

Dear Parent:

We are presently conducting a research project with children who are experiencing stomach/abdominal pain. This study addresses issues of how to assess comprehensively these children. This is important because better assessment of children's pain experience leads to more effective treatment.

Having a family member in pain adds considerable stress to the family. Therefore, we will be investigating which child and family variables are related to your child's pain experience. Your participation in this study will be of direct benefit to you and your child because after your participation, we will schedule a feedback session to discuss the assessment results. Also, we will schedule treatment appointments as necessary and desired.

I am asking that you and your child participate in this study by answering several questionnaires, which are commonly used to assess children and adults. Your participation is anticipated to take an hour.

Your participation is completely voluntary and will not affect the medical treatment your child receives at the Manitoba Clinic. You and your child may withdraw from the study at any time. Other than the sharing of certain assessment information with your child's paediatrician at the Manitoba Clinic, the information will be strictly confidential and used only for research purposes. I have taken the following step to ensure anonymity. No names appear on the questionnaires, only a family identification number.

I would very much appreciate your cooperation. This study is my final doctoral requirement. In order to participate in the study, you will need to sign the consent form that is attached.

---

Ian Mogilevsky, M.A.,  
Psychological Consultant,  
Department of Psychology,  
University of Manitoba

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Michael R. Thomas, Ph.D., C.Psych.  
Supervising Psychologist  
Department of Psychology,  
University of Manitoba

**APPENDIX B: Abdominal Pain Study: Consent Form for Participation**

**CONSENT FORM FOR PARTICIPATION**

**AND AUTHORIZATION FOR EXCHANGE OF INFORMATION**

1. I have had the contents of the abdominal pain study letter explained to me. I understand the contents of this letter and have received a copy for my own use.

2. NAME OF CHILD

\_\_\_\_\_

I am the parent or legal guardian of the child named above.

YES \_\_\_\_\_ NO \_\_\_\_\_

I give permission for the child named above to participate in the study.

YES \_\_\_\_\_ NO \_\_\_\_\_

Also, I agree to participate in the study.

YES \_\_\_\_\_ NO \_\_\_\_\_

3. I authorize the exchange of information that is gathered by Ian Mogilevsky that will be helpful in my child's treatment at this office.

YES \_\_\_\_\_ NO \_\_\_\_\_

NAME OF PARENT (PLEASE PRINT):

\_\_\_\_\_

SIGNATURE OF PARENT:

\_\_\_\_\_

TELEPHONE NUMBER:

\_\_\_\_\_

SIGNATURE OF RESEARCHER:

\_\_\_\_\_

DATE: \_\_\_\_\_

## APPENDIX C: Demographic information Sheet

### INFORMATION SHEET

CHILD:

Birthday \_\_\_\_\_ Age in Years \_\_\_\_\_

Sex \_\_\_\_\_ Grade \_\_\_\_\_ Ethnic Background \_\_\_\_\_

Number of Children in the Family \_\_\_\_\_

1. The child is the:

\_\_\_\_ Youngest \_\_\_\_ Middle \_\_\_\_ Oldest \_\_\_\_ Only Child

2. The child's relationship to you:

\_\_\_\_ Biological child                      \_\_\_\_ Step-child  
\_\_\_\_ Foster child                          \_\_\_\_ Adopted child  
\_\_\_\_ Other (Please Explain) \_\_\_\_\_

3. Have you lived in the same home with the child for the past six months?

\_\_\_\_ YES \_\_\_\_ NO

PARENTS:

4. \_\_\_\_ One Parent Family (child lives with one parent only)  
\_\_\_\_ Two Parent Family (child lives with two parents)  
\_\_\_\_ Other (Please Explain) \_\_\_\_\_

5. MOTHER:

Highest Level of Education \_\_\_\_\_ AGE \_\_\_\_\_

Employment Status:

\_\_\_\_ Employed Full Time                      \_\_\_\_ Employed Part Time  
\_\_\_\_ Full Time Homemaker                      \_\_\_\_ In School Full Time  
\_\_\_\_ Unemployed                                  \_\_\_\_ Other (Please Explain)  
\_\_\_\_\_

Occupation if working outside the home

\_\_\_\_\_ Annual Income \_\_\_\_\_

Marital Status:

\_\_\_\_ Married                                      \_\_\_\_ Divorced  
\_\_\_\_ Separated                                      \_\_\_\_ Widowed  
\_\_\_\_ Commonlaw                                      \_\_\_\_ Never Married  
\_\_\_\_ Other (Please Explain) \_\_\_\_\_

6. FATHER:

Highest Level of Education \_\_\_\_\_ AGE \_\_\_\_\_

Employment Status:

<input type="checkbox"/> Employed Full Time	<input type="checkbox"/> Employed Part Time
<input type="checkbox"/> Full Time Homemaker	<input type="checkbox"/> In School Full Time
<input type="checkbox"/> Unemployed	<input type="checkbox"/> Other (Please Explain)

Occupation if working outside the home

\_\_\_\_\_ Annual Income \_\_\_\_\_

Marital Status:

<input type="checkbox"/> Married	<input type="checkbox"/> Divorced
<input type="checkbox"/> Separated	<input type="checkbox"/> Widowed
<input type="checkbox"/> Commonlaw	<input type="checkbox"/> Never Married
<input type="checkbox"/> Other (Please Explain)	_____



## APPENDIX D: Child's experience of Pain

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

1. In the past two weeks, how many days has the stomach/abdominal pain been experienced?

\_\_\_\_\_ Days

If zero days, then how many days in the past 3 months: \_\_\_\_\_ Days.

2. How many months have gone by since the first time the stomach/abdominal pain was experienced?

\_\_\_\_\_ Months

3. How long in hours is a typical stomach/abdominal pain episode?

\_\_\_\_\_ Hours

\_\_\_\_\_ Check here, if the stomach/abdominal pain episode is typically less than one hour.

Then, how many minutes: \_\_\_\_\_ minutes.

## APPENDIX E: Functional Disability Inventory (Child Report)

FDI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

When people are sick or not feeling well it is sometimes difficult for them to do their regular activities. In the last few days, would you have had any physical trouble or difficulty doing these activities?

Please circle the number the best describes how much difficulty you had in doing these activities.

### 1. Walking to the bathroom.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

### 2. Walking up stairs.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

### 3. Doing something with a friend (for example, playing a game).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

### 4. Doing chores at home.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

### 5. Eating regular meals.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

6. Being up all day without a nap or rest.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

7. Riding the school bus or traveling in the car.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

Remember, you are being asked about difficulty due to physical health.

8. Being at school all day.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

9. Doing the activities in gym class (or playing sports).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

10. Reading or doing homework.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

11. Watching TV.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

12. Walking the length of a playground (or football field).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

13. Running the length of a playground (a football field).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

14. Going shopping.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

15. Getting to sleep at night and staying asleep.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

## APPENDIX F: Functional Disability Inventory (Parental Report)

### FDI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

When people are sick or not feeling well it is sometimes difficult for them to do their regular activities. In the last few days, would your child have had any physical trouble or difficulty doing these activities?

Please circle the number the best describes how much difficulty your child had in doing these activities.

#### 1. Walking to the bathroom.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

#### 2. Walking up stairs.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

#### 3. Doing something with a friend (for example, playing a game).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

#### 4. Doing chores at home.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

#### 5. Eating regular meals.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

6. Being up all day without a nap or rest.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

7. Riding the school bus or traveling in the car.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

Remember, you are being asked about difficulty due to physical health.

8. Being at school all day.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

9. Doing the activities in gym class (or playing sports).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

10. Reading or doing homework.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

11. Watching TV.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

12. Walking the length of a playground (or football field).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

13. Running the length of a playground (a football field).

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

14. Going shopping.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

15. Getting to sleep at night and staying asleep.

No Trouble	A little Trouble	Some Trouble	A Lot of Trouble	Impossible
0	1	2	3	4

## APPENDIX G: Children's Depression Inventory (Child Report)

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group, pick one sentence that describes you best for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right or wrong answer. Just pick the sentence that best describes the way you have been feeling recently. Circle the letter next to your answer.

Here is an example of how this form works. Try it. Circle the letter next to the sentence that describes how you feel best.

Example:

- a. I read books all the time.
- b. I read books once in a while.
- c. I never read books.



Remember, pick out the sentence that describes you feelings and ideas in the past two weeks.

1. a. I am sad once in a while.  
b. I am sad many times.  
c. I am sad all the time.
2. a. Nothing will ever work out for me.  
b. I am not sure if things will work out for me.  
c. Things will work out for me O.K.
3. a. I do most things O.K.  
b. I do many things wrong.  
c. I do everything wrong.
4. a. I have fun in many things.  
b. I have fun in some things.  
c. Nothing is fun at all.
5. a. I am bad all the time.  
b. I am bad many times.  
c. I am bad once in a while.
6. a. I think about bad things happening to me once in a while.  
b. I worry that bad things will happen to me.  
c. I am sure that terrible things will happen to me.
7. a. I hate myself.  
b. I do not like myself.  
c. I like myself.
8. a. All bad things are my fault.  
b. Many bad things are my fault.  
c. Bad things are not usually my fault.
9. a. I do not think about hurting myself.  
b. I think about hurting myself but I would not do it.  
c. I want to hurt myself.
10. a. I feel like crying everyday.  
b. I feel like crying many days.  
c. I feel like crying once in a while.
11. a. Things bother me all the time.  
b. Things bother me many times.  
c. Things bother me once in a while.
12. a. I like being with people.  
b. I do not like being with people many times.  
c. I do not want to be with people at all.
13. a. I cannot make up my mind about things.  
b. It is hard to make up my mind about things.  
c. I make up my mind about things easily.

14. a. I look O.K.  
b. There are some bad things about my looks.  
c. I look ugly.
15. a. I have to push myself all the time to do my schoolwork.  
b. I have to push myself many times to do my schoolwork.  
c. Doing schoolwork is not a big problem.
16. a. I have trouble sleeping every night.  
b. I have trouble sleeping many nights.  
c. I sleep pretty well.
17. a. I am tired once in a while.  
b. I am tired many days.  
c. I am tired all the time.
18. a. Most days I do not feel like eating.  
b. Many days I do not feel like eating.  
c. I eat pretty well.
19. a. I do not worry about aches and pains.  
b. I worry about aches and pains many times.  
c. I worry about aches and pains all the time.
20. a. I do not feel alone.  
b. I feel alone many times.  
c. I feel alone all the time.
21. a. I never have any fun at school.  
b. I have fun at school only once in a while.  
c. I have fun at school many times.
22. a. I have plenty of friends.  
b. I have some friends but I wish I had more.  
c. I do not have any friends.
23. a. My schoolwork is all right.  
b. My schoolwork is not as good as before.  
c. I do very badly in subjects I used to be good in.
24. a. I can never be as good as other kids.  
b. I can be as good as other kids if I want to.  
c. I am just as good as other kids.
25. a. Nobody really loves me.  
b. I am not sure if anyone loves me.  
c. I am sure that somebody loves me.
26. a. I usually do what I am told.  
b. I do not do what I am told most times.  
c. I never do what I am told.

27. a. I get along with people.  
b. I get into fights many times.  
c. I get into fights all the time.

## APPENDIX H: Children's Depression Inventory (Parental Report)

CDI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group, pick one sentence that describes your child best for the past two weeks. After you pick a sentence from the first group, go on to the next group. Circle the letter next to your answer.

1. a. He/she is sad once in a while.  
b. He/she is sad many times.  
c. He/she is sad all the time.
2. a. He/she thinks that nothing will ever work out for him/her.  
b. He/she is not sure if things will work out for him/her.  
c. He/she thinks that things will work out O.K. for him/her.
3. a. He/she thinks that he/she does most things O.K.  
b. He/she thinks that he/she does many things wrong.  
c. He/she thinks that he/she does everything wrong.
4. a. He/she has fun in many things.  
b. He/she has fun in some things.  
c. Nothing is fun for him/her at all.
5. a. He/she thinks that he/she is bad all the time.  
b. He/she thinks that he/she is bad many times.  
c. He/she thinks that he/she is bad once in a while.
6. a. He/she thinks about bad things happening to him/her once in a while.  
b. He/she worries that bad things will happen to him/her.  
c. He/she is sure that terrible things will happen to him/her.
7. a. He/she hates himself/herself.  
b. He/she does not like himself/herself.  
c. He/she likes himself/herself.
8. a. He/she thinks that all bad things are his/her fault.  
b. He/she thinks that many bad things are his/her fault.  
c. He/she thinks that bad things are not usually his/her fault.
9. a. He/she does not think about hurting himself/herself.  
b. He/she thinks about hurting himself/herself but I would not do it.  
c. He/she wants to hurt himself/herself.
10. a. He/she cries everyday.  
b. He/she cries many days.  
c. He/she cries once in a while.
11. a. Things bother him/her all the time.  
b. Things bother him/her many times.  
c. Things bother him/her once in a while.

12. a. He/she likes being with people.  
b. He/she does not like being with people many times.  
c. He/she does not want to be with people at all.
13. a. He/she cannot make up his/her mind about things.  
b. It is hard for him/her to make up his/her mind about things.  
c. He/she makes up his/her mind about things easily.
14. a. He/she thinks he/she looks O.K.  
b. He/she thinks that there are some bad things about his/her looks.  
c. He/she thinks that he/she looks ugly.
15. a. He/she has to push himself/herself all the time to do his/her schoolwork.  
b. He/she has to push himself/herself many times to do his/her schoolwork.  
c. Doing schoolwork is not a big problem for him/her.
16. a. He/she has trouble sleeping every night.  
b. He/she has trouble sleeping many nights.  
c. He/she sleeps pretty well.
17. a. He/she is tired once in a while.  
b. He/she is tired many days.  
c. He/she is tired all the time.
18. a. Most days he/she does not feel like eating.  
b. Many days he/she does not feel like eating.  
c. He/she eats pretty well.
19. a. He/she does not worry about aches and pains.  
b. He/she worries about aches and pains many times.  
c. He/she worries about aches and pains all the time.
20. a. He/she does not feel alone.  
b. He/she feels alone many times.  
c. He/she feels alone all the time.
21. a. He/she never has any fun at school.  
b. He/she has fun at school only once in a while.  
c. He/she has fun at school many times.
22. a. He/she has plenty of friends.  
b. He/she has some friends but he/she wishes he/she had more.  
c. He/she does not have any friends.
23. a. His/her schoolwork is all right.  
b. His/her schoolwork is not as good as before.  
c. He/she does very badly in subjects he/she used to be good in.
24. a. He/she thinks he/she can never be as good as other kids.  
b. He/she thinks he/she can be as good as other kids if I want to.  
c. He/she thinks he/she is just as good as other kids.

- 25. a. He/she thinks that nobody really loves him/her.  
b. He/she is not sure if anyone loves him/her.  
c. He/she is sure that somebody loves him/her.
- 26. a. He/she usually does what he/she is told.  
b. He/she does not do what he/she is told most times.  
c. He/she never does what he/she is told.
- 27. a. He/she gets along with people.  
b. He/she gets into fights many times.  
c. He/she gets into fights all the time.

## APPENDIX I: Beck Depression Inventory

BDI

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

The next sets of questions are groups of statements. Please read each group of statements carefully. Then pick out one statement in each group, which best describes the way you have been feeling the past week, including today. Circle the number beside the statement you picked. If several statements in the group seem to apply equally well, CIRCLE EACH ONE. Be sure to read all the statements in each group before making your choice.

1.   0   I do not feel sad.  
      1   I feel sad.  
      2   I am sad all the time and I can't snap out of it.  
      3   I am so sad or unhappy that I can't stand it.
2.   0   I am not particularly discouraged about the future.  
      1   I feel discouraged about the future.  
      2   I feel I have nothing to look forward to.  
      3   I feel that the future is hopeless and that things cannot improve.
3.   0   I do not feel like a failure.  
      1   I feel that I have failed more than the average person.  
      2   As I look back on my life, all I can see is a lot of failures.  
      3   I feel I am a complete failure as a person.
4.   0   I get as much satisfaction out of things as I used to.  
      1   I don't enjoy things the way I used to.  
      2   I don't get real satisfaction out of anything anymore.  
      3   I am dissatisfied or bored with everything.
5.   0   I don't feel particularly guilty.  
      1   I feel guilty a good part of the time.  
      2   I feel guilty most of the time.  
      3   I feel guilty all of the time.
6.   0   I don't feel I am being punished.  
      1   I feel I may be punished.  
      2   I expect to be punished.  
      3   I feel I am being punished.
7.   0   I don't feel disappointed in myself.  
      1   I am disappointed in myself.  
      2   I am disgusted with myself.  
      3   I hate myself.
8.   0   I don't think I am any worse than anybody else.  
      1   I am critical of myself for my weaknesses or mistakes.  
      2   I blame myself all the time for my faults.  
      3   I blame myself for everything bad that happens.

9. 0 I don't have any thoughts of killing myself.  
1 I have thoughts of killing myself, but I would never carry them out.  
2 I would like to kill myself.  
3 I would kill myself if I had the chance.
10. 0 I don't cry anymore than usual.  
1 I cry more than I used to.  
2 I cry all the time now.  
3 I used to be able to cry, but now I can't cry even though I want to.
11. 0 I am no more irritated than I ever am.  
1 I get annoyed or irritated more easily than I used to.  
2 I feel irritated all the time now.  
3 I don't get irritated at all by the things that used to irritate me.
12. 0 I have not lost interest in other people.  
1 I am less interested in other people than I used to be.  
2 I have lost most of my interest in other people.  
3 I have lost all my interest in other people.
13. 0 I make decisions about as well as I ever could.  
1 I put off making decisions more than I used to.  
2 I have greater difficulty in making decisions than before.  
3 I can't make decisions at all anymore.
14. 0 I don't feel I look any worse than I used to.  
1 I am worried that I am looking old and unattractive.  
2 I feel that there are permanent changes in my appearance that make me look unattractive.  
3 I believe that I look ugly.
15. 0 I can work about as well as before.  
1 It takes an extra effort to get started at doing something.  
2 I have to push myself very hard to do anything.  
3 I can't do any work at all.
16. 0 I can sleep as well as usual.  
1 I don't sleep as well as I used to.  
2 I wake up 1-2 hours earlier than I used to and find it hard to get back to sleep.  
3 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 0 I don't get more tired than usual.  
1 I get tired more easily than I used to.  
2 I get tired from doing almost anything.  
3 I am too tired to do anything.
18. 0 My appetite is no worse than usual.  
1 My appetite is not as good as it used to be.  
2 My appetite is much worse now.  
3 I have no appetite at all anymore.
19. 0 I haven't lost much weight, if any lately.  
1 I have lost more than 5 pounds.  
2 I have lost more than 10 pounds.  
3 I have lost more than 15 pounds.

I am purposely  
trying to lose  
weight. YES \_\_\_\_ NO \_\_\_\_



20. 0 I am no more worried about my health than usual.  
1 I am worried about my problems such as aches and pains: or upset stomach or constipation.  
2 I am very worried about physical problems and it's hard to think of much else.  
3 I am so worried about my physical problems, that I cannot think about anything else.
21. 0 I have not noticed any recent change in my interest in sex.  
1 I am less interested in sex than I used to be.  
2 I am much less interested in sex now.  
3 I have lost interest in sex completely.

# **APPENDIX J: State-Trait Anxiety Inventory for Children – Trait Scale (Child Report)**

## **STAIC**

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

A number of statements which boys and girls use to describe themselves are given below. Read each statement and decide if it is hardly-ever, or sometimes, or often true of you. Then for each statement, circle the word that describes you best. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, choose the word which seems to describe how you usually feels.

1. I worry about making mistakes	Hardly-ever	Sometimes	Often
2. I feel like crying	Hardly-ever	Sometimes	Often
3. I feel unhappy	Hardly-ever	Sometimes	Often
4. I have trouble making up my mind	Hardly-ever	Sometimes	Often
5. It is difficult for me to face my problems . . . . .	Hardly-ever	Sometimes	Often
6. I worry too much	Hardly-ever	Sometimes	Often
7. I get upset at home	Hardly-ever	Sometimes	Often
8. I am shy	Hardly-ever	Sometimes	Often
9. I feel troubled	Hardly-ever	Sometimes	Often
10. Thoughts run through my mind and bother me . . . . .	Hardly-ever	Sometimes	Often
11. I worry about school	Hardly-ever	Sometimes	Often
12. I have trouble deciding what to do	Hardly-ever	Sometimes	Often
13. I notice that my heart beats fast	Hardly-ever	Sometimes	Often
14. I am secretly afraid	Hardly-ever	Sometimes	Often
15. I worry about my parents . . . . .	Hardly-ever	Sometimes	Often
16. My hands get sweaty	Hardly-ever	Sometimes	Often
17. I worry about things that may happen	Hardly-ever	Sometimes	Often
18. It is hard for me to fall asleep at night	Hardly-ever	Sometimes	Often

- |   |             |           |       |
|---|-------------|-----------|-------|
| 19. I get a funny feeling in my stomach                 | Hardly-ever | Sometimes | Often |
| 20. I worry about what others will think of me. . . . . | Hardly-ever | Sometimes | Often |

# **APPENDIX K: State-Trait Anxiety Inventory for Children – Trait Scale (Parental Report)**

## **STAIC**

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

A number of statements which boys and girls use to describe themselves are given below. Read each statement and decide if it is hardly-ever, or sometimes, or often true of your child. Then for each statement, circle the word that describes your child best. Remember, choose the word which seems to describe how your child usually feels.

1. He/she worries about making mistakes	Hardly-ever	Sometimes	Often
2. He/she feels like crying	Hardly-ever	Sometimes	Often
3. He/she feels unhappy	Hardly-ever	Sometimes	Often
4. He/she has trouble making up his/her mind	Hardly-ever	Sometimes	Often
5. It is difficult for him/her to face his/her problems . . . . .	Hardly-ever	Sometimes	Often
6. He/she worries too much	Hardly-ever	Sometimes	Often
7. He/she gets upset at home	Hardly-ever	Sometimes	Often
8. He/she is shy	Hardly-ever	Sometimes	Often
9. He/she feels troubled	Hardly-ever	Sometimes	Often
10. Thoughts run through his/her mind and bother him/her. .	Hardly-ever	Sometimes	Often
11. He/she worries about school	Hardly-ever	Sometimes	Often
12. He/she has trouble deciding what to do	Hardly-ever	Sometimes	Often
13. He/she notices that his/her heart beats fast	Hardly-ever	Sometimes	Often
14. He/she is secretly afraid	Hardly-ever	Sometimes	Often
15. He/she worries about his/her parents. . . . .	Hardly-ever	Sometimes	Often
16. His/her hands get sweaty	Hardly-ever	Sometimes	Often
17. He/she worries about things that may happen	Hardly-ever	Sometimes	Often
18. It is hard for him/her to fall asleep at night	Hardly-ever	Sometimes	Often

- |  |             |           |       |
|--|-------------|-----------|-------|
| 19. He/she gets a funny feeling in his/her stomach             | Hardly-ever | Sometimes | Often |
| 20. He/she worries about what others will think of him/her . . | Hardly-ever | Sometimes | Often |

## APPENDIX L: State-Trait Anxiety Inventory – Trait Scale

### STAI

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate 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.

	Almost Never	Sometimes	Often	Almost Always
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	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 feel content	1	2	3	4
17. Some unimportant thoughts runs through my mind and bothers me	1	2	3	4

	Almost Never	Sometimes	Often	Almost Always
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

## APPENDIX M: Children's Somatization Inventory (Child Report)

### CSI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

### Your Symptoms

Below is a list of symptoms that children and teenagers sometimes have. Circle a number telling how much you were bothered by each symptom during the past two weeks.

In the last 2 weeks, how much were you  
bothered by each symptom?

	Not at All	A little	Some	A lot	A whole lot
1. Headaches	0	1	2	3	4
2. Faintness or dizziness	0	1	2	3	4
3. Pain in the heart or chest	0	1	2	3	4
4. Feeling low in energy or slowed down	0	1	2	3	4
5. Pain in the lower back	0	1	2	3	4
6. Sore muscles	0	1	2	3	4
7. Trouble getting his/her breath (when not exercising)	0	1	2	3	4
8. Hot or cold spells (feeling hot or cold for no reason)	0	1	2	3	4
9. Numbness or tingling in parts of the body	0	1	2	3	4
10. A lump in the throat	0	1	2	3	4
11. Weakness in parts of the body	0	1	2	3	4
12. Heavy feelings in arms or legs	0	1	2	3	4
13. Nausea or upset stomach	0	1	2	3	4
14. Constipation (hard to have a B.M.)	0	1	2	3	4
15. Loose (runny) bowel movements or diarrhea	0	1	2	3	4
16. Pain in stomach or abdomen (stomach aches)	0	1	2	3	4
17. Heart beating too fast (even when not exercising)	0	1	2	3	4



In the last 2 weeks, how much were you  
bothered by each symptom?

	Not at All	A little	Some	A lot	A whole lot
18. Difficulty swallowing	0	1	2	3	4
19. Loss of voice	0	1	2	3	4
20. Deafness	0	1	2	3	4
21. Double vision (even with glasses on)	0	1	2	3	4
22. Blurred vision (even with glasses on)	0	1	2	3	4
23. Blindness	0	1	2	3	4
24. Fainting or loss of consciousness (passing out)	0	1	2	3	4
25. Memory loss or amnesia	0	1	2	3	4
26. Seizures or convulsions (body moving or shaking uncontrollably)	0	1	2	3	4
27. Trouble walking	0	1	2	3	4
28. Paralysis or muscle weakness (muscles too weak to move)	0	1	2	3	4
29. Difficulty urinating (peeing)	0	1	2	3	4
30. Vomiting (throwing up)	0	1	2	3	4
31. Bloating (gassy)	0	1	2	3	4
32. Food making child sick	0	1	2	3	4
33. Pains in knees, elbows or other joints	0	1	2	3	4
34. Pain in arms or legs	0	1	2	3	4
35. Pain when urinate	0	1	2	3	4

## APPENDIX N: Children's Somatization Inventory (Parental Report)

### CSI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

### Your Child's Symptoms

Below is a list of symptoms that children and teenagers sometimes have. Circle a number telling how much your child was bothered by each symptom during the past two weeks.

In the last 2 weeks, how much was your  
child bothered by each symptom?

	Not at All	A little	Some	A lot	A whole lot
1. Headaches	0	1	2	3	4
2. Faintness or dizziness	0	1	2	3	4
3. Pain in the heart or chest	0	1	2	3	4
4. Feeling low in energy or slowed down	0	1	2	3	4
5. Pain in the lower back	0	1	2	3	4
6. Sore muscles	0	1	2	3	4
7. Trouble getting his/her breath (when not exercising)	0	1	2	3	4
8. Hot or cold spells (feeling hot or cold for no reason)	0	1	2	3	4
9. Numbness or tingling in parts of the body	0	1	2	3	4
10. A lump in the throat	0	1	2	3	4
11. Weakness in parts of the body	0	1	2	3	4
12. Heavy feelings in arms or legs	0	1	2	3	4
13. Nausea or upset stomach	0	1	2	3	4
14. Constipation (hard to have a B.M.)	0	1	2	3	4
15. Loose (runny) bowel movements or diarrhea	0	1	2	3	4
16. Pain in stomach or abdomen (stomach aches)	0	1	2	3	4
17. Heart beating too fast (even when not exercising)	0	1	2	3	4

In the last 2 weeks, how much was your  
child bothered by each symptom?

	Not at All	A little	Some	A lot	A whole lot
18. Difficulty swallowing	0	1	2	3	4
19. Loss of voice	0	1	2	3	4
20. Deafness	0	1	2	3	4
21. Double vision (even with glasses on)	0	1	2	3	4
22. Blurred vision (even with glasses on)	0	1	2	3	4
23. Blindness	0	1	2	3	4
24. Fainting or loss of consciousness (passing out)	0	1	2	3	4
25. Memory loss or amnesia	0	1	2	3	4
26. Seizures or convulsions (body moving or shaking uncontrollably)	0	1	2	3	4
27. Trouble walking	0	1	2	3	4
28. Paralysis or muscle weakness (muscles too weak to move)	0	1	2	3	4
29. Difficulty urinating (peeing)	0	1	2	3	4
30. Vomiting (throwing up)	0	1	2	3	4
31. Bloating (gassy)	0	1	2	3	4
32. Food making child sick	0	1	2	3	4
33. Pains in knees, elbows or other joints	0	1	2	3	4
34. Pain in arms or legs	0	1	2	3	4
35. Pain when urinate	0	1	2	3	4

## APPENDIX O: General Health Questionnaire

### MMPI-2 (Scale 1)

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

This questionnaire consists of numbered statements. Read each statement and decide whether it is true as applied to you or false as applied to you.

You are to circle your answers on the right. If a statement is true or mostly true, as applied to you, circle T. If a statement is false or not usually true, as applied to you, circle F. Give a response to every statement.

Remember to give your own opinion of yourself.

- |   |   |   |
|---|---|---|
| 1. I have a good appetite.  | T | F |
| 2. I wake up fresh and rested most mornings.  | T | F |
| 3. My hands and feet are usually warm enough.   | T | F |
| 4. I am about as able to work as I ever was.  | T | F |
| 5. I am troubled by attacks of nausea and vomiting . . . . .  | T | F |
| 6. I am very seldom troubled by constipation.   | T | F |
| 7. I am bothered by an upset stomach several times a week.  | T | F |
| 8. My sleep is fitful and disturbed.  | T | F |
| 9. I am in just as good physical health as most of my friends.  | T | F |
| 10. I am almost never bothered by pains over my heart or in my chest . . . . .                          | T | F |
| 11. Parts of my body often have feelings like burning, tingling, crawling,<br>or like "going to sleep." | T | F |
| 12. I hardly ever feel pain in the back of my neck.   | T | F |
| 13. I am troubled by discomfort in the pit of my stomach every few days or oftener.                     | T | F |
| 14. I have little or no trouble with my muscles twitching or jumping.                                   | T | F |
| 15. There seems to be a fullness in my head or nose most of the time. . . . .                           | T | F |
| 16. Often I feel as if there is a tight band around my head.  | T | F |
| 17. I have a great deal of stomach trouble.   | T | F |
| 18. I have never vomited blood or coughed up blood.   | T | F |

19. During the past few years, I have been well most of the time.	T	F
20. I am neither gaining nor losing weight.....	T	F
21. The top of my head sometimes feels tender.	T	F
22. I do not tire quickly.	T	F
23. I seldom or never have dizzy spells.	T	F
24. I can read a long while without tiring my eyes.	T	F
25. I feel weak all over much of the time. ....	T	F
26. I have very few headaches.	T	F
27. I have had no difficulty in keeping my balance in walking.	T	F
28. I hardly ever notice my heart pounding and I am seldom short of breath.	T	F
29. I have few or no pains.	T	F
30. I have numbness in one or more places on my skin .....	T	F
31. My eyesight is as good as it has been for years.	T	F
32. I do not often notice my ears ringing or bussing.	T	F

## APPENDIX P: Illness Behavior Encouragement Questionnaire (Child Report)

### IBEQ

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

What happens when your are experiencing stomach/abdominal pain?

The next questions are about what your parents do when you are in pain. For each question, choose one of the answers.

Never	means that your parent(s) never do this.
Hardly ever	means that your parent(s) only do this once in a while.
Sometimes	means that your parent(s) do this some of the time.
Often	means that your parent(s) usually do this.
Always	means that your parent(s) always do this.

1. How often do your parent(s) let you stay home from school when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

2. How often do your parent(s) say you do not have to do regular chores such as taking out trash or cleaning up when you are is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

3. How often do your parent(s) say you don't have to finish all of your homework when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

4. How often do your parent(s) bring you special treats, or little gifts when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

5. How often do your parent(s) insist that you go to school when you is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

6. How often do your parent(s) still expect you to do chores and homework when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

7. How often do your parent(s) take you to the doctor when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

8. How often do your parent(s) spend more time than usual with you when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

9. How often do your parent(s) give you special privileges or let you do things you aren't usually allowed to do when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

10. How often do your parent(s) stay home from work or come home early (if they don't work, how often do they stay home instead of going out or running errands, etc.), when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

11. How often do your parent(s) pamper or spoil you when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

12. How often do your parent(s) tell other people in the family not to bother you or to be especially nice to you when you are experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

## APPENDIX Q: Illness Behavior Encouragement Questionnaire (Parental Report)

### IBEQ

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

What happens when your child is in pain?

The next questions are about what you do when your child is in pain. For each question, choose one of the answers.

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

1. How often do you let your child stay home from school when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

2. How often do you say your child does not have to do regular chores such as taking out trash or cleaning up when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

3. How often do you say your child doesn't have to finish all of his or her homework when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

4. How often do you bring your child special treats, or little gifts when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

5. How often do you insist that your child go to school when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4



6. How often do you still expect your child to do chores and homework when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

7. How often do you take your child to the doctor when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

8. How often do you spend more time than usual with your child when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

9. How often do you give your child special privileges or let him or her do things he or she isn't usually allowed to do when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

10. How often do you stay home from work or come home early (if you don't work, how often do you stay home instead of going out or running errands, etc.), when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

11. How often do you pamper or spoil your child when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

12. How often do you tell other people in the family not to bother your child or to be especially nice to your child when he/she is experiencing stomach/abdominal pain?

Never	Hardly ever	Sometimes	Often	Always
0	1	2	3	4

## APPENDIX R: Family Illness Questionnaire

### FIQ

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

Has anyone in your family ever had abdominal or gastrointestinal problems (for example, Crohn's disease, ulcerative colitis, irritable bowel, nervous stomach, or other problems involving abdominal pain)? If yes, for EACH PERSON in the family who has had abdominal pain, answer the question below:

1. Person's relationship to your child \_\_\_\_\_  
Type of abdominal problem \_\_\_\_\_  
Is this person living? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem in the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem before the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Does he/she live with you? \_\_\_\_\_ yes \_\_\_\_\_ no
2. Person's relationship to your child \_\_\_\_\_  
Type of abdominal problem \_\_\_\_\_  
Is this person living? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem in the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem before the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Does he/she live with you? \_\_\_\_\_ yes \_\_\_\_\_ no
3. Person's relationship to your child \_\_\_\_\_  
Type of abdominal problem \_\_\_\_\_  
Is this person living? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem in the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Has he/she had the problem before the last 12 months? \_\_\_\_\_ yes \_\_\_\_\_ no  
Does he/she live with you? \_\_\_\_\_ yes \_\_\_\_\_ no
4. (List additional persons and provide information on the back of this sheet)

Has anyone in your family recently (in the past 12 months) had any other serious health problem or disability? For EACH PERSON, answer the questions below. Include acute problems such as pneumonia or an injury and chronic problems such as diabetes:

1. Person's relationship to your child \_\_\_\_\_  
Health problem \_\_\_\_\_  
Does he/she live with you? \_\_\_\_\_yes \_\_\_\_\_no
2. Person's relationship to your child \_\_\_\_\_  
Health problem \_\_\_\_\_  
Does he/she live with you? \_\_\_\_\_yes \_\_\_\_\_no
3. Person's relationship to your child \_\_\_\_\_  
Health problem \_\_\_\_\_  
Does he/she live with you? \_\_\_\_\_yes \_\_\_\_\_no
4. (List additional persons and provide information on the back of this sheet)

## APPENDIX S: Family Relationships Index (Child Report)

### FRI

Date: \_\_\_\_\_ Family #: \_\_\_\_\_ Admin.: \_\_\_\_\_

The statements listed below describe situations which could happen in a family. For each statement below, please circle "T" if the statement describes your family most of the time, or "F" if the statement does not describe your family most of the time.

- T F 1. Family members really help and support one another.
- T F 2. Family members often keep their feelings to themselves.
- T F 3. We fight a lot in our family.
- T F 4. We often seem to be killing time at home.
- T F 5. We say anything we want to around home.
- T F 6. Family members rarely become openly angry.
- T F 7. We put a lot of energy into what we do at home.
- T F 8. It's hard to "blow off steam" at home without upsetting somebody.
- T F 9. Family members sometimes get so angry they throw things.
- T F 10. There is a feeling of togetherness in our family.
- T F 11. We tell each other about our personal problems.
- T F 12. Family members hardly ever lose their tempers.
- T F 13. We rarely volunteer when something has to be done at home.
- T F 14. If we feel like doing something on the spur of the moment we often just pick up and go.
- T F 15. Family members often criticize each other.
- T F 16. Family members really back each other up.
- T F 17. Someone usually gets upset if you complain in our family.
- T F 18. Family members sometimes hit each other.
- T F 19. There is very little group spirit in our family.
- T F 20. Money and paying bills is openly talked about in our family.
- T F 21. If there's a disagreement in our family, we try hard to smooth things over and keep the peace.
- T F 22. We really get along well with each other.
- T F 23. We are usually careful about what we say to each other.
- T F 24. Family members often try to one-up or out do each other.
- T F 25. There is plenty of time and attention for everyone in our family.
- T F 26. There are a lot of spontaneous discussions in our family.
- T F 27. In our family, we believe you don't ever get anywhere by raising your voice.

## APPENDIX T: Family Relationships Index (Parental Report)

### FRI

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

The statements listed below describe situations which could happen in a family. For each statement below, please circle "T" if the statement describes your family most of the time, or "F" if the statement does not describe your family most of the time.

- T F 1. Family members really help and support one another.
- T F 2. Family members often keep their feelings to themselves.
- T F 3. We fight a lot in our family.
- T F 4. We often seem to be killing time at home.
- T F 5. We say anything we want to around home.
- T F 6. Family members rarely become openly angry.
- T F 7. We put a lot of energy into what we do at home.
- T F 8. It's hard to "blow off steam" at home without upsetting somebody.
- T F 9. Family members sometimes get so angry they throw things.
- T F 10. There is a feeling of togetherness in our family.
- T F 11. We tell each other about our personal problems.
- T F 12. Family members hardly ever lose their tempers.
- T F 13. We rarely volunteer when something has to be done at home.
- T F 14. If we feel like doing something on the spur of the moment we often just pick up and go.
- T F 15. Family members often criticize each other.
- T F 16. Family members really back each other up.
- T F 17. Someone usually gets upset if you complain in our family.
- T F 18. Family members sometimes hit each other.
- T F 19. There is very little group spirit in our family.
- T F 20. Money and paying bills is openly talked about in our family.
- T F 21. If there's a disagreement in our family, we try hard to smooth things over and keep the peace.
- T F 22. We really get along well with each other.
- T F 23. We are usually careful about what we say to each other.
- T F 24. Family members often try to one-up or out do each other.
- T F 25. There is plenty of time and attention for everyone in our family.
- T F 26. There are a lot of spontaneous discussions in our family.
- T F 27. In our family, we believe you don't ever get anywhere by raising your voice.

## APPENDIX U: Child Behavior Checklist (Parent Form)

### CBCL

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

Below is a list of items that describe children. For each item that describes your child now or within the past 6 months, please circle: "TT" if the item is very true or often true of your child, "T" if the item is somewhat true or sometimes true of your child, and "F" if the item is not true of your child.

TT T F 1. Acts too young for his/her age.

TT T F 2. Allergy (DESCRIBE) \_\_\_\_\_

TT T F 3. Argues a lot.

TT T F 4. Asthma

TT T F 5. Behaves like opposite sex

TT T F 6. Bowel movements outside toilet

TT T F 7. Bragging/boasting

TT T F 8. Can't concentrate, can't pay attention for long

TT T F 9. Can't get his/her mind off certain thoughts: obsessions

(DESCRIBE) \_\_\_\_\_

TT T F 10. Can't sit still, restless or hyperactive

TT T F 11. Clings to adults or too dependent

TT T F 12. Complains of loneliness

TT T F 13. Confused or seems to be in fog

TT T F 14. Cries a lot

TT T F 15. Cruel to animals

TT T F 16. Cruelty, bullying or meanness to others

TT T F 17. Daydreams or gets lost in his/her thoughts

TT T F 18. Deliberately harms self or attempts suicide

TT T F 19. Demands a lot of attention

TT T F 20. Destroys his/her own things

TT T F 21. Destroys things belonging to his/her family or others

TT T F 22. Disobedient at home

TT T F 23. Disobedient at school

TT T F 24. Does not eat well

TT T F 25. Does not get along well with other kids

TT T F 26. Does not seem to feel guilty after misbehaving

TT T F 27. Easily jealous

TT T F 28. Eats or drinks things that are not food

(DESCRIBE) \_\_\_\_\_

TT T F 29. Fears certain animals, situations or places

(DESCRIBE) \_\_\_\_\_

TT T F 30. Fears going to school

TT T F 31. Fears he/she might think or do something bad

TT T F 32. Feels he/she has to be perfect

TT T F 33. Feels or complains no one loves him/her

TT T F 34. Feels others are out to get him/her

TT T F 35. Feels worthless or inferior

TT T F 36. Gets hurt a lot, accident prone

TT T F 37. Gets in many fights

TT T F 38. Gets teased a lot

TT T F 39. Hangs around with others who get into trouble

TT T F 40. Hears things that are not there

(DESCRIBE) \_\_\_\_\_

TT T F 41. Impulsive or acts without thinking

TT T F 42. Would rather be alone than with others

TT T F 43. Lying or cheating

TT T F 44. Bites fingernails

TT T F 45. Nervous, highstrung, tense

TT T F 46. Nervous movements or twitching

(DESCRIBE)\_\_\_\_\_

TT T F 47. Nightmares

TT T F 48. Not liked by other kids

TT T F 49. Constipated, does not move bowels

TT T F 50. Too fearful or anxious

TT T F 51. Feels dizzy

TT T F 52. Feels too guilty

TT T F 53. Overeating

TT T F 54. Overtired

TT T F 55. Overweight

56. Physical problems without known medical cause:

TT T F a. aches or pains (not stomach or headaches)

TT T F b. headaches

TT T F c. nausea, feels sick

TT T F d. problem with eyes (DESCRIBE)\_\_\_\_\_

TT T F e. rashes or other skin problems

TT T F f. stomachaches or cramps

TT T F g. vomiting, throwing up

TT T F h. other (DESCRIBE)\_\_\_\_\_

TT T F 57. Physically attacks people

TT T F 58. Picks nose, skin or other parts of body

TT T F 59. Plays with own sex parts in public

TT T F 60. Plays with own sex parts too much

TT T F 61. Poor school work

TT T F 62. Poorly coordinated or clumsy

TT T F 63. Prefers being with older kids

TT T F 64. Prefers being with younger kids

TT T F 65. Refuses to talk



TT T F 66. Repeats certain acts over and over; compulsions

(DESCRIBE)\_\_\_\_\_

TT T F 67. Runs away from home

TT T F 68. Screams a lot

TT T F 69. Secretive, keeps things to self

TT T F 70. Sees things that are not there

(DESCRIBE)\_\_\_\_\_

TT T F 71. Self-conscious or easily embarrassed

TT T F 72. Sets fires

TT T F 73. Sexual problems (DESCRIBE)\_\_\_\_\_

TT T F 74. Showing off or clowning

TT T F 75. Shy or timid

TT T F 76. Sleeps less than most kids

TT T F 77. Sleeps more than most kids during day and/or night

(DESCRIBE)\_\_\_\_\_

TT T F 78. Smears or plays with bowel movements

TT T F 79. Speech problems (DESCRIBE)\_\_\_\_\_

TT T F 80. Stares blankly

TT T F 81. Steals at home

TT T F 82. Steals outside the home

TT T F 83. Stores up things he/she does not need

(DESCRIBE)\_\_\_\_\_

TT T F 84. Strange behavior (DESCRIBE)\_\_\_\_\_

TT T F 85. Strange ideas (DESCRIBE)\_\_\_\_\_

TT T F 86. Stubborn, sullen, irritable

TT T F 87. Sudden change in mood or feeling

TT T F 88. Sulks a lot

- TT T F 89. Suspicious
- TT T F 90. Talks about killing self
- TT T F 91. Swearing or obscene language
- TT T F 92. Talks or walks in sleep (DESCRIBE)\_\_\_\_\_
- TT T F 93. Talks too much
- TT T F 94. Teases a lot
- TT T F 95. Temper tantrum or hot temper
- TT T F 96. Thinks about sex too much
- TT T F 97. Threatens people
- TT T F 98. Thumb-sucking
- TT T F 99. Too concerned with neatness or cleanliness
- TT T F 100. Trouble sleeping
- TT T F 101. Truancy, skips school
- TT T F 102. Underactive, slow moving, or lacks energy
- TT T F 103. Unhappy, sad or depressed
- TT T F 104. Unusually loud
- TT T F 105. Uses alcohol or drugs for nonmedical purposes:  
(DESCRIBE)\_\_\_\_\_
- TT T F 106. Vandalism
- TT T F 107. Wets self during day
- TT T F 108. Wets the bed
- TT T F 109. Whining
- TT T F 110. Wishes to be of the opposite sex
- TT T F 111. Withdrawn, does not get involved with others
- TT T F 112. Worries

## APPENDIX V: Piers-Harris Children's Self-Concept Scale

**DIRECTIONS:** Here is a set of statements that tell how some people feel about themselves. Read each statement and decide whether or not it describes the way you feel about yourself. If it is true or mostly true for you, circle the word "yes" next to the statement. If it is false or mostly false for you, circle the word "no." Answer every question, even if some are hard to decide. Do not circle both "yes" and "no" for the same statement.

Remember that there are no right or wrong answers. Only you can tell us how you feel about yourself, so we hope you will mark the way you really feel inside.

1. My classmates make fun or me	yes	no
2. I am a happy person	yes	no
3. It is hard for me to make friends	yes	no
4. I am often sad	yes	no
5. I am smart	yes	no
6. I am shy	yes	no
7. I get nervous	yes	no
8. My looks bother me	yes	no
9. When I grow up, I will be an important person	yes	no
10. I get worried when we have tests in school	yes	no
11. I am unpopular	yes	no
12. I am well behaved in school	yes	no
13. It is usually my fault when something goes wrong	yes	no
14. I cause trouble to my family	yes	no
15. I am strong	yes	no
16. I have good ideas	yes	no
17. I am an important member of my family	yes	no
18. I usually want my own way	yes	no
19. I am good at making things with my hands	yes	no
20. I give up easily	yes	no
21. I am good in my school work	yes	no
22. I do many bad things	yes	no
23. I can draw well	yes	no
24. I am good in music	yes	no
25. I behave badly at home	yes	no
26. I am slow in finishing my school work	yes	no
27. I am an important member of my class	yes	no
28. I am nervous	yes	no
29. I have pretty eyes	yes	no
30. I can give a good report in front of the class	yes	no
31. In school, I am a dreamer	yes	no
32. I pick on my brother(s) and sister(s)	yes	no
33. My friends like my ideas	yes	no
34. I often get into trouble	yes	no
35. I am obedient at home	yes	no
36. I am lucky	yes	no
37. I worry a lot	yes	no
38. My parents expect too much of me	yes	no
39. I like being the way I am	yes	no
40. I feel left out of things	yes	no
41. I have nice hair	yes	no
42. I often volunteer in school	yes	no

43. I wish I were different	yes	no
44. I sleep well at night	yes	no
45. I hate school	yes	no
46. I am among the last to be chosen for games	yes	no
47. I am sick a lot	yes	no
48. I am often mean to other people	yes	no
49. My classmates in school think I have good ideas	yes	no
50. I am unhappy	yes	no
51. I have many friends	yes	no
52. I am cheerful	yes	no
53. I am dumb about most things	yes	no
54. I am good-looking	yes	no
55. I have lots of pep (energy)	yes	no
56. I get into a lot of fights	yes	no
57. I am popular with boys	yes	no
58. People pick on me	yes	no
59. My family is disappointed in me	yes	no
60. I have a pleasant face	yes	no
61. When I try to make something, everything seems to go wrong	yes	no
62. I am picked on at home	yes	no
63. I am a leader in games and sports	yes	no
64. I am clumsy	yes	no
65. In games and sports, I watch instead of play	yes	no
66. I forget what I learn	yes	no
67. I am easy to get along with	yes	no
68. I loss my temper easily	yes	no
69. I am popular with girls	yes	no
70. I am a good reader	yes	no
71. I would rather work alone than with a group	yes	no
72. I like my bother (sister)	yes	no
73. I have a good figure	yes	no
74. I am often afraid	yes	no
75. I am always dropping or breaking things	yes	no
76. I can be trusted	yes	no
77. I am different from other people	yes	no
78. I think bad thoughts	yes	no
79. I cry easily	yes	no
80. I am a good person	yes	no

## APPENDIX W: Rosenberg Self-Concept Scale

Date: \_\_\_\_\_

Family #: \_\_\_\_\_

Admin.: \_\_\_\_\_

FOLLOWING ARE A NUMBER OF STATEMENTS ABOUT THE WAY YOU FEEL ABOUT YOURSELF. PLEASE READ EACH STATEMENT AND CIRCLE THE LETTER THAT MOST CLOSELY CORRESPONDS TO YOUR PERSONAL BELIEF ABOUT THAT ITEM. TRY TO ANSWER ON THE BASIS OF WHAT YOU REALLY THINK AND NOT BASED ON WHAT "SOUNDS GOOD OR BAD".

STRONGLY	MODERATELY	MODERATELY	STRONGLY
DISAGREE	DISAGREE	AGREE	AGREE
A	B	C	D

- A B C D 1. I feel that I'm a person of worth, at least on an equal plane with others.
- A B C D 2. I feel that I have a number of good qualities.
- A B C D 3. All in all, I am inclined to feel that I am a failure.
- A B C D 4. I am able to do things as well as most other people.
- A B C D 5. I feel I do not have much to be proud of.
- A B C D 6. I take a positive attitude toward myself.
- A B C D 7. On the whole, I am satisfied with myself.
- A B C D 8. I wish I could have more respect for myself.
- A B C D 9. I certainly feel useless at times.
- A B C D 10. At times, I think I am no good at all.

## **APPENDIX X: QUESTIONNAIRE MODIFICATIONS**

Item 9 of the STAIC – “troubled” explained with the word “bothered.”

Item 4 of the FRI – “killing” explained with the word “wasting.”

Item 8 of the FRI – “blow of steam” explained with the words “showing anger.”

Item 19 of the FRI – “group spirit” explained with the words “working together.”

The Rosenberg Self-Concept Scale replaced with the Piers-Harris Children’s Self-Concept Scale.

Item 55 of the PHCSCS – “pep” explained with the word “energy.”

Item 73 of the PHCSCS – “figure” explained with the word “body.”

## APPENDIX Y: COGNITIVE-BEHAVIORAL PAIN MANAGEMENT PROGRAM

### ABSTRACT

Recurrent abdominal pain (RAP) in children appears to be a common problem, affecting as many as 15% of all school aged children. Of these, less than 10% have a clear organic cause for their pain. Thus, psychosocial factors appear to be important in the great majority of children with RAP. This paper outlines a comprehensive psychosocial assessment and a 6-session cognitive-behavioral treatment package for children with RAP. This package is broken down into three components which are providing information about RAP and a rationale for pain management procedures, contingency management training for parents, and self-training for children. Preliminary empirical evidence suggests that this cognitive-behavioral treatment package is an effective approach for treating RAP. However, more research is needed to replicate these initial positive findings.

### INTRODUCTION

The International Association for the Study of Pain (IASP) have defined RAP in children to be a syndrome consisting of abdominal pain that interferes with normal activities occurring at least three times over at least three months (Merskey, 1986). RAP is a common complaint in children, with an estimated 10 to 15% of school age children being affected (Apley, 1975). Notably, Apley (1975) found that less than 10% of these children had a definable organic cause. Without an organic cause, many doctors have assumed that RAP is a psychological problem. That is, with negative medical findings, physicians have tended to provide only reassurance to families (that a physical problem was not found) in hopes that the RAP would just go away (Levine & Rappaport, 1984). However, this does not appear to happen for a large number of these children. A number of longitudinal studies have reported that more than half of RAP children continue to have pain in adulthood (Apley & Hale, 1973; Christensen & Mortensen, 1975; Margi, Pierri, & Donzelli, 1987; Sticker & Murphy, 1979).

Oster (1972) observed that girls are slightly more likely to have RAP than boys, especially if initial onset is after the age of nine. However, RAP has been found in children as young as two years old and range into late adolescence. Thus, it appears RAP children are a heterogeneous group. Furthermore, these children have reported variable pain duration, describing episodes that last anywhere between a few minutes to many hours. In addition, RAP children report diverse levels of pain severity and intensity, as well as, variable number of episodes on any given week (Apley, 1975).

Adding to this complexity, investigations into the etiology of RAP have been directed in three divergent lines of research. Researchers have considered abnormal physiological processes (e.g., constipation, lactose intolerance), child psychological factors (e.g., anxiety, depression, somatization), or family characteristics (e.g., parental anxiety and depression, patterns of family interactions) as possible causes of RAP (McGrath & Unruh, 1987). Also, social learning processes have been considered to be important in understanding the child's pain coping strategies and the influence that the child's social environment may have on pain expression (Walker & Zeman, 1992). The purpose of this paper is to outline a 6-session cognitive-behavioral treatment package that utilizes a variety of procedures with RAP children and their parents.

### COGNITIVE-BEHAVIORAL TREATMENT

The assumption behind a cognitive-behavioral treatment program for RAP children is that the perception of pain depends on many physical, emotional, situational, familial, and behavioral factors. Thus, theoretically, it should be possible to alter a child's perception of pain by changing any of these factors (McGrath, 1990a). The framework of this 6-session treatment package was taken from McGrath (1990a). However, the treatment of RAP children necessitates specific considerations. That is, effective RAP treatment utilizes a balanced approach that provides information and cognitive-behavior techniques, however, does not speculate on the specific "cause" for the problem. Thus, parents are not made to feel that "out poor marriage is the cause of this problem" or "it our fault because out child is so anxious."

Cognitive-behavioral techniques have been found to be effective in modifying factors that may initiate, maintain, or exacerbate RAP in children (McGrath, 1990a). These techniques are aimed to provide children with accurate information about RAP, a variety of pain control techniques during painful episodes, and the ability to recognize and resolve stressful issues that could be triggering pain. In addition, children learn how to change their behaviors, thus, decreasing the frequency of painful episodes.

Also, parents are provided with accurate information about RAP, are taught how their own responses to their child's pain complaints can actually influence the frequency and intensity of their child's pain, and are instructed how to change their own behaviors to minimize the reinforcement of pain behaviors (Dunn-Geier, McGrath, Roucke, Latter, & D'Astous, 1986).

#### ASSESSMENT

Although a physical illness is rarely found in RAP children, a physician must assess the likelihood of a physical etiology. The standard medical work-up is the first step in the assessment process. Furthermore, it is important that the psychologist works in liaison with the physician throughout the psychosocial assessment and treatment to ensure that the pain problem does not evolve into a medical disorder. It is imperative that parents are taught to discriminate between RAP symptoms and other physical complaints requiring medical attention (e.g., to respond with care and attention and, if necessary, seek medical advice of the child is physically injured, develops a new symptomatic pattern of illness, or suffers for pain or discomfort arising from injury or viral infection). In addition, parents should be advised of "nonspecific 'red flags'," (p.81, Rappaport, 1989) such as, weight loss, dysuria (i.e., painful urination), and abdominal pain that awakes the child from sleep, which is suggestive of a need for further medical evaluation. Nevertheless, if the pain is discovered to be due to a physical illness, a cognitive-behavioral treatment package (in conjunction with medical treatment) still has much to offer a child and family.

The first step for the psychologist is working with a RAP child is to perform a comprehensive assessment by conducting a clinical interview and administering a variety of questionnaires (Walker, Garber & Greene, 1993, 1994). A clinical interview with the parents and child is vital to assess the pain problem and to identify the best treatment strategies (e.g., cognitive, behavioral, familial). Also, a comprehensive functional analysis of the child's behavior and family interactions would be very helpful when customizing intervention strategies.

If the child is at an appropriate reading level, the child would be asked to complete a variety of psychosocial self-report measures on anxiety, depression, somatization, disability, pain behavior reinforcement, in addition to measures of, pain frequency, duration, and a typical length of pain episode. The psychologist should read the questionnaires to children who were unable to read but could comprehend the questionnaire items verbally. In addition, parents would complete questionnaires rating their child's emotional and behavioral difficulties, as well as, a pain behavior reinforcement questionnaire. Furthermore, parents would complete questionnaire related to depression, anxiety, somatization, family history or illness and pain, and a family dynamics questionnaire (Garber, Zeman, & Walker, 1990; Walker & Zeman, 1992).

#### THE 6-SESSION PACKAGE

This 6-session package follows a consultation model of cognitive-behavior treatment as described in McGrath (1990). The treatment is effective in equipping children with active coping skills by way of instructions, modeling, feedback, and homework assignments. In each training session, both verbal and written instructions for both the parents and child, within-session demonstrations and practice of techniques, and specific weekly homework tasks are used. In addition, parents are encouraged to implement behavior change strategies with their child at home. This package attempts to provide a dual emphasis by teaching children pain management skills, as well as, providing instruction to the parents.

It is important to note that RAP appears to have a variety of physical, cognitive, behavioral, and familial factors that vary in importance among these children. Thus, the implementation of this treatment package must allow flexibility to focus on different emphasis (e.g., behavioral, cognitive, or familial) and to provide for different strategies to be used (e.g., concrete or abstract). Implementation of this package is directed by the primary factors important in the RAP and the unique needs of each child and parent. The child and parents need to feel supported and understood throughout the treatment for the program to be effective.

##### Session 1

Session 1 should include a discussion of the assessment findings with the parents and child, describe the rationale for the pain management procedures, and provide an introduction to the social learning explanation of pain. This may require challenging any maladaptive attributions or assumptions to the cause of the pain.



Based on the literature, RAP may be related to emotional factors, such as, anxiety and fear, an inability to relax, general anxiety about life, depression, an inability to identify and resolve stressful issues, excessively high expectations for achievement, inability to recognize and express emotions, and somatization of emotional distress (McGrath, 1990a). Each of these factors is discussed with reference to the initial interview and questionnaire results. Specific factors should be proposed as being of primary, secondary, or minimally importance in the RAP. Also, the psychologist must elicit parental input as to their perception of the relevance of these factors.

In addition, if common familial factors are identified, such as, family history of pain, high parental expectations for child's performance, strong dependence on parental reassurance, few or no active coping strategies, overprotective parents, and one parent relating to the child as an adult spouse and thus the child is expected to provide emotional support to the parent, these will need to be addressed (McGrath, 1990a). However, the psychologist must take particular care not to offend or alienate parents but instead to provide support and understanding as their situation is explored.

Furthermore, other common precipitation and maintaining factors that may not have been previously discussed are identified for discussion. For example, inconsistent parental responses, avoidance of unpleasant situations (e.g., social occasions, and school), decreased expectations for performance (e.g., scholastic achievement, sports, and household responsibilities), increased attention or special privileges, and conditioned pain triggers would be discussed as the behavioral factors that may be involved in the child's pain (McGrath, 1990a).

The focus of this feedback session is to provide an emphasis on the possible current factors that are maintaining the recurrent pain, rather than on trying to determine the cause of the pain. Thus, even when the recurrent pain is found to have began after a death of a loved one or a marital separation, the focus of treatment is still directed towards the factors that are responsible for the maintenance of the pain (McGrath, 1990a). Towards the end of the session, introductory information (as outlined above) will be given about the treatment of RAP.

Homework. For homework, the psychologist will ask the child and parents to complete a pain diary. The date and time of pain episodes are recorded, as well as, who was present, the activity that was taken place, the intervention used, thoughts/stresses, and any additional notes. These forms will be brought to the next session for discussion.

### Session 2

With Parent(s) Alone. The psychologist will review the completed pain diary noting the number of pain episodes during the week, the activities that were taking place, and the interventions that were used. Parents are asked to describe any insights that they may have had while completing the diary. The psychologist can use this information to provide specific suggestions about how the parents can help their child reduce the pain and the maladaptive pain behaviors. Specifically, parents are taught to respond consistently to their child in a manner that promotes active coping and encourages routine activities, especially school attendance. In addition, possible pain triggers are reviewed for the first session and compared to those identified from the pain diaries. Lastly, the psychologist can briefly outline the plans for the child's sessions.

With Child Alone. The child is asked to briefly describe the situations that he/she recorded in the pain diary. A special note is made if any stresses have been recorded. The child is asked to complete a form to rate the strength and unpleasantness of the RAP. Also, he/she is to record the effectiveness of all the interventions attempted or used. The psychologist discusses the possible triggers for the pain episodes, which is based on the diary and the initial assessment. The psychologist then summarizes this information to provide the child with feedback as to why some emotions and situations can lead to RAP, using language that is understandable to the child, using illustrations from the child's life, and providing examples that outline how the various components of this program can help to reduce the pain.

Homework. The child and parents are asked to continue to monitor recurrent pain episodes with the pain diary. In addition, parents are encouraged to use and monitor the interventions learned in the session.

### Session 3

With Parent(s) Alone. The focus of this session is to train parents to reinforce well behavior through contingent social attention (i.e., praise). Also, parents are reminded to respond to verbal pain complaints by prompting the child to engage in a competing behavior or a distracting activity. It may be

helpful for the parents to develop a "response set" to maintain consistency by providing the same verbal reassurances and same responses when their child is complaining about pain (McGrath, 1990a).

In addition, parents are taught to ignore nonverbal pain behaviors and to avoid modeling sick role behaviors. This is especially important if another family member has been experiencing pain or illness. A focus intervention using pain management strategies directed at this family member (usually a parent) may be necessary. Also, if the parents have inadvertently taught their child to not express emotions openly, they will be counseled about the aversive consequences of this and will be taught how to recognize the need for acceptable emotional outlets.

With Child Alone. The child is asked to describe notable events for the pain diary and completes the form. The psychologist will review the pain diary and identifies possible triggers (e.g., stress, school, family, peers, and competitive sports). The child is encouraged to discuss these factors and their influence on the RAP. Next, the child is taught progressive muscle relaxation and controlled breathing exercises. The purpose of relaxation and controlled breathing as pain control techniques is reviewed. An emphasis is placed on describing how relaxation and breathing techniques can influence one's emotional reactions and bodily sensations.

Homework. The parents and child continue the pain diary. In addition, the child is encouraged to practice the relaxation techniques at home and give a form to indicate practice days. Also, the child is asked to generate a list of feelings, places, people, or things that increase or decrease muscle tension and what are the signs to show when he/she is feeling tense or relaxed.

#### Session 4

With Child Alone. A review of the pain diary is conducted as in previous sessions. Next, relaxation homework is reviewed. The focus of this session is to teach the child positive self-talk, distraction (e.g., engagement in competing activities), and positive imagery skills. Modeling, role-playing, rehearsal, and feedback are used to practice these techniques. Although no studies have investigated the pain-coping styles of RAP children, clinical experience and research with children with other pain syndromes suggest that RAP children may have inadequate coping responses and perceive themselves as having little control over their pain (McGrath, 1990a). Thus, the use of these cognitive coping strategies will give these children a sense of mastery over their pain.

With Parent(s) Alone. Parents are reminded that a child's capacity to implement adaptive pain coping strategies can be strongly influenced by the family responses (Dunn-Geier, et al., 1986). That is, parents often unknowingly provide discriminative cues and selective reinforcement for expressions of pain. RAP is reinforced when parent attention is contingent on pain expression and the avoidance of activities. Consequently, parents should attempt to stop their reinforcement of pain behaviors and instead support their child's adaptive behavior or active coping strategies. The psychologist can provide the parents with suggestions for difficult situations, which the parents had difficulty determining the proper response. In addition, if the child has shown some improvement, the parents will more likely be willing to discuss situational, behavioral, emotional, and familial factors that they see as important in the maintenance of RAP. Additional triggers may be discussed and specific interventions planned.

Homework. Pain diary and monitoring of relaxation homework are continued. Also, the child is encouraged to use the cognitive coping strategies that were learned in the session and to monitor them in the pain diary.

#### Session 5

With Child Alone. Pain diary and relaxation homework is reviewed. Praise is given for any attempt at using cognitive coping strategies to manage the pain. Next, the child completes the form. The child is asked to describe the main points learned in the last session regarding cognitive coping strategies. Additional practice can take place if there is confusion as to how to use these strategies. The focus of the session is on teaching problem-solving technique. An emphasis is placed on problem identification and emotional reactions.

With Parent(s) Alone. The same format as in the preceding session is followed throughout the rest of the program. As sessions progress, greater emphasis is placed on the parents to assume the role of facilitator of the child's insights about the relationship between pain and emotional distress. In addition, parents are encouraged to promote their child's usage of active coping strategies.

Homework. Pain diary is continued. In addition, the child receives relaxation monitoring and problem-solving homework.

#### Session 6

With Child Alone. The same format (update, review, and discussion) is used by the psychologist to strengthen the child's awareness of the potential pain triggers and to teach the child how to modify situations and his/her reactions so as to minimize pain episodes. The problem-solving worksheet is used to discuss problem ownership and solutions, using both pain-related and non-pain-related examples. In addition, relapse prevention training, in which the child is taught problem-solving strategies for dealing with pain that might arise in future high-risk situations (e.g., when studying for a test or playing a competitive sport) is conducted.