COPING AND ADJUSTMENT IN PAEDIATRIC CHRONIC PAIN:
THE ROLE OF CHILD AND PARENT PAIN BELIEFS

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ABSTRACT

Coping and adjustment in paediatric chronic pain: The role of child and parent pain beliefs.

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Objectives: There is wide variation in psychological and functional adjustment to paediatric chronic pain. This study aimed to explore predictors of adjustment that are amenable to intervention. Relationships between children's and parents' causal and control beliefs were examined, as well as the relationships between these beliefs and coping and adjustment measures.

Methods: The study had a correlational design. Participants were 40 children aged 11-17 with non-pathological chronic pain, and their parents. Attributions and control beliefs were elicited by semi-structured interviews. Pain coping strategies, functional adjustment, and psychological adjustment were assessed by standardised questionnaires. Associations between measures were examined using non-parametric statistics.

Results: The findings show that paediatric pain patients and their parents make attributions about the cause of the pain, and that there are associations between children's and parents' pain beliefs. As predicted, children who made attributions to their own behaviour had higher beliefs in their ability to control pain. Children's attributions to their own behaviour also influenced coping and adjustment as predicted, but these associations were not statistically significant. Parents' attributions to the child's behaviour were also associated with the use of effective coping and good adjustment in the child, and had more associations with coping and adjustment than the children's attributions had. Children's attributions to pathological causes had several associations with control, coping, and adjustment measures as predicted. However, parental attributions to pathology were not found to have a clear relationship with children's coping and adjustment.

Conclusions: The study found that children's and parents' beliefs about pain were moderately related, which supports the use of family-based intervention in the treatment of paediatric chronic pain. In addition, the results suggest that intervention should focus on beliefs about the pain and on increasing the child's use of active coping strategies.

ACKNOWLEDGEMENTS

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"Pain is one of the most challenging problems in medicine and biology. It is a challenge to the sufferer who must often learn to live with pain for which no therapy has been found. It is a challenge to the physician or other health professional who seeks every possible means to help the suffering patient.... It is also a challenge to society, which must find the medical, scientific and financial resources to relieve or prevent pain and suffering as much as possible." Melzack and Wall, 1988.

1 INTRODUCTION

The current research aims to explore the relationship between adjustment to paediatric chronic pain and the beliefs that patients and their parents hold about the pain. The experience of pain, particularly chronic pain, leads to a need to seek attributions about its cause and controllability. In the case of paediatric chronic pain, both the parent and the child are likely to engage in an attributional search. Both pain coping strategies and adjustment to pain are affected by many psychosocial factors, including beliefs about the pain. These beliefs are likely to be even more important in pain conditions where there is no clear aetiology. Studies of chronic pain in adults have found relationships between pain control beliefs, coping strategies, and adaptation to the pain. In paediatric pain, it is likely that the beliefs of the parent, as well as the child, are important in influencing adjustment to the pain.

Childhood pain has, until recently, been under-researched; there are no published studies that have assessed children's, adolescents' or parents' beliefs about chronic pain conditions. The current research is an exploratory, interview-based study of beliefs, coping, and adjustment to paediatric pain. Identification of beliefs associated with adjustment to pain may guide future clinical intervention and may aid early identification of children likely to have adjustment problems. Exploration of the relationship between beliefs and adjustment will further the theoretical understanding of pain processes.

The following literature review covers the areas of psychosocial influences on chronic pain; coping strategies and adjustment to chronic pain; illness attributions; and control beliefs about chronic pain. Due to the dearth of literature regarding children's and adolescents' pain beliefs, coping and adjustment, the review is informed by literature regarding adults and paediatric chronic illnesses. Before presenting this review, current

theoretical and research literature regarding the nature of pain processes is discussed. Unless otherwise specified, the term "children" refers to both children and adolescents.

1.1 THE NATURE OF PAIN

1.1.1 Definitions

There are a number of diverse experiences that may be described as "pain". Melzack and Wall (1988) argue that the word pain represents a category of experiences: a multitude of different experiences having different causes, qualities and intensities. The most common definition of pain is "an unpleasant sensation and emotional experience which is associated with actual or potential tissue damage or is described in terms of such damage" (Mersky et al., 1979). There is general recognition that pain comprises both sensory and emotional elements.

1.1.2 The Gate-Control Theory

The most widely accepted pain theory is that proposed by Melzack and Wall (1965, 1988). The theory asserts that input from the peripheral nociceptors (i.e. the site of injury) passes through a neural "gate" in the spinal cord before being transmitted to the brain. The extent to which this gate is open determines the degree to which pain transmission fibres project to the cerebral cortex, and consequently, the degree to which pain is felt. This gate may be opened or closed according to the relative activity in small and large afferent fibres (e.g. touch receptors). Increased activity in large fibres inhibits the pain transmission cells (i.e. close the gate), whilst activity in the small fibres tends to facilitate transmission (i.e. open the gate). The gate is also influenced by descending pathways from the central cortical areas of the brain. Therefore, information from the brain to the gate is affected by the psychological state of the individual.

Melzack and Wall's (1965) conception of pain mechanisms was a major innovation and has contributed significantly to pain research and treatment. Prior to the gate-control theory, explanations of pain perception focused on specificity theories or pattern theories, both of which view pain as a direct consequence of injury and ignore psychological

factors. These theories of pain perception were rooted in the biomedical model of illness. The biomedical model is based on the assumptions that: disease experience is directly linked to pathogenic causes; and biological, psychological and social processes operate independently. Both of these pain theories have been found to be inadequate to account for a variety of physiological and psychological findings (Skevington, 1995).

The gate-control theory can account for the observed anomalies of both injury occurring without pain, and pain experienced without apparent injury. When injury occurs without pain, the model suggests that the pain information signals are blocked at the gate, either because of peripheral inhibitory nerve activity or because of inhibitory descending signals. When pain occurs without injury, explanations rely on the descending signals, which have been relatively unelaborated (Ogden, 1996).

There are some problems with this theory, mainly a lack of research evidence to confirm the existence of a "gate" or the interactions between the components (Ogden, 1996). However, the gate-control theory is a useful hypothetical model: it is now widely accepted that in all pain experiences, physiological and psychological processes interact.

1.1.3 Chronic versus acute pain

Pain is often defined it terms of its duration. However, the division between acute and chronic pain differs between definitions. For example, Bates and Rankin-Hill (1994) state that pain is chronic if it persists for more than three months, whereas McCaffery and Beebe (1989) define chronic pain as lasting for at least six months. Alternatively, Melzack and Wall (1988) define chronic pain as that which persists long after the pain can serve any useful function. The International Association for the Study of Pain (IASP) consider pain to be chronic if it has continued for more than three months and has failed to respond to interventions (Mersky, 1986).

The experience of chronic pain may also be affected by qualities of the pain other than duration. Turk, Meichenbaum, and Genest (1983) delineate three types of chronic pain: chronic/recurrent pain, a benign condition, characterised by repeated intense episodes of pain separated by periods without pain (e.g. migraine headaches, tension headaches); chronic/intractable/benign pain, in which discomfort is present continuously, with varying

levels of intensity (e.g. chronic low back pain); and chronic/progressive pain, which is associated with a malignant condition, with pain intensifying as the condition worsens (e.g. rheumatoid arthritis or cancer). Unless otherwise specified, this literature review focuses on the first two types of chronic pain disorders.

Chronic pain may become a pain syndrome, i.e. a medical problem in its own right. Treatment that is normally effective for acute pain may be ineffective or even detrimental when applied to chronic pain: for example, patients who are encouraged to rest in response to pain can become increasingly disabled. Medical treatment for pain usually centres on drug treatment. Medication is usually insufficient for controlling chronic pain without combining it with other approaches, such as physiotherapy and psychological therapy. The development of the gate-control theory, leading to acceptance of the importance of psychological factors in pain processes, has therefore resulted in advances in the treatment of chronic pain patients.

1.1.4 The impact of chronic pain

There is considerable heterogeneity amongst chronic pain patients, in terms of the impact of the pain on their lives (Von Korff, Dworkin, & Le Resche, 1990). However, severe and prolonged pain can come to dominate the lives of sufferers, impairing their general functioning, ability to work, social relationships and emotional adjustment. Chronic pain also has enormous social and economic impact. Approximately 11% of the population of the UK suffer from chronic pain (Shone, 1992) and each year several million working days are lost due to back pain alone (Williams & Erskine, 1995). Treatment of neck and back pain alone is estimated to cost the National Health Service over £190 million per year (Wells & Nown, 1993).

1.1.5 Psychological processes in chronic pain

The gate-control theory demonstrates that chronic pain may be influenced by behavioural, psychological (cognitive and emotional), and social and cultural factors.

1.1.5.1 Behavioural factors

Any behaviour resulting in a decrease of the pain is internally reinforced. Behaviours such as resting or taking medication may initially result in a decrease in pain, which will result in an increase of the frequency of this behaviour. Diminished activity may also lead to physical deterioration, which leads to progressively more pain and further reductions in activity (Sarafino, 1994).

Pain behaviours are often strengthened or maintained by operant conditioning (Fordyce, 1976). Pain behaviours (e.g. complaining, limping, avoiding activity, and requesting medication) may be positively reinforced by attention, care, and affection from family and friends. They can also be reinforced by the avoidance of unpleasant or disliked activities. Positive reinforcement of pain behaviours may increase the individual's pain perception and result in the adoption of a sick role, which can also increase pain perception (Skevington, 1995).

1.1.5.2 Cognitive factors

Cognitions play an important role in pain perception, pain behaviours, and response to treatment. Beecher (1956) compared the pain behaviours and perceptions of injured soldiers and civilians and argued that the observed differences were related to the meaning of the pain for the individual. For the civilian patients, the pain represented an unwelcome disruption in their lives, whereas the soldiers' pain represented an escape from fighting. This positive consequence resulted in the soldiers reporting less severe pain and exhibiting fewer pain behaviours despite similar (and extensive) injuries. Turk et al. (1983) argue that thoughts that focus on the unpleasant aspects of the pain experience will make the pain feel worse. Within a cognitive-behavioural framework (see Turk et al.), beliefs mediate between the pain-evoking situation and the individual's emotional and behavioural responses.

1.1.5.3 Emotional factors

Chronic pain can result in anxiety (about treatment, prognosis etc.). Chronic pain patients have been found to have elevated scores on anxiety measures (e.g. Breslau & Davis, 1993).

Anxiety may heighten pain perception, which will in turn increase anxiety, leading to a cycle of pain increase (Fordyce & Steger, 1979).

Depression also appears to be related to chronic pain. Patients with chronic pain have higher scores on depression scales than those with acute pain, irrespective of whether or not the chronic pain has a known organic cause (Sarafino, 1994). There is little evidence to support the hypothesis that depression causes, or predisposes, individuals to experience chronic pain. Evidence supports the view that chronic pain leads to a sense of helplessness, which leads to depression (e.g. Merikangas, Merikangas, & Angst, 1993). In further support, Holroyd, France, Nash, and Hursey (1993) found that elevated scores on psychological symptom measures were related to the presence of pain at the time of the assessment.

The research evidence shows that the relationship between pain perception and emotional adjustment is complex and interactional. Furthermore, different types of pain may have different relationships with anxiety and depression (Merikangas et al., 1993).

1.1.5.4 Social and cultural factors

Social and cultural group differences in pain behaviour and reported pain perception have been shown in experimental studies, clinical experiences and anthropological information (Horn & Munafo, 1997). Bates (1987) proposes a biocultural model of pain, in which social learning shapes not only overt responses to pain (pain behaviours and coping attempts), but also the physiological mechanism of pain perception. Bates argues that social learning is instrumental in the development of pain meanings, attitudes, and values. These cognitive factors influence pain perception via descending pathways from cortical areas to the pain "gate" as described above.

In summary, chronic pain disorders can best be understood with reference to the gate-control theory of pain. There are considerable and complex relationships between pain and psychological and social factors. Chronic pain in the adult population has significant social and economic impact. The negative impact of chronic pain on the quality of life of patients may be considerable.

1.1.6 Paediatric pain

Until relatively recently, pain in children has been under-researched and under-treated. Goodman and McGrath (1991) suggest that this may be due to the lack of economic impact that children's pain has (as compared with adults'). Currently, research into childhood pain is expanding, but Varni et al. (1996b) argue that paediatric chronic pain is still under-investigated in contrast to the extensive literature on adult chronic pain.

1.1.6.1 Definition

There are many different classification systems for childhood pain: some based on the cause of the pain, others on the frequency and duration of the pain. For example, Shapiro (1995) subdivides chronic pain by cause: underlying disease; perturbations in physiology; or no identifiable relationship to disease, trauma or physiology. Schechter, Berde, and Yaster (1993) distinguish between chronic persistent pain (near constant pain lasting three months or more) and recurrent pain (repetitive painful episodes alternating with pain free intervals).

Varni, Blount, Waldron, and Smith (1995) delineate four types of paediatric pain: pain associated with physical injury; pain associated with medical procedures; pain associated with chronic illness; and pain which is associated with no well-defined disease or disorder. The latter pain type includes the common childhood pain complaints of limb pain (neuropathic pain), recurrent abdominal pain, and chronic headache. This pain type is the focus of the current study. According to Rappaport and Leichtner (1993), pain disorders in this category share three factors: the pain appears real and interferes with the child's life; the aetiology of the pain is unclear (however, there is a possibility that the pain represents a significant organic problem); and there has often been extensive examination.

1.1.6.2 Prevalence

Pain complaints in childhood and adolescence are most usually associated with acute injury or illness (Smith, Tyler, Womack, & Chen, 1989). The prevalence of chronic pain disorders in childhood has not been well documented, because the majority of studies focus on one particular pain type (e.g. headache, recurrent abdominal pain). Goodman and

McGrath (1991) argue that methodological differences (such as sample populations; definitions of problem pain; collection methods etc.) lead to wide variations in estimates of the prevalence of pain problems.

Schechter et al. (1993) state that recurrent pains are common in childhood: headaches, abdominal pains, chest pains and limb pains occur in about 10% of non-clinically referred children. In their review of epidemiological studies of childhood pain disorders Goodman and McGrath (1991) report that estimates of the prevalence of headache and migraine in non-clinical settings vary between 3% and 12%, with prevalence increasing with age. They report stomach and abdominal pain prevalence in non-clinical samples between 9% and 12%. Goodman and McGrath also found estimates of prevalence of limb pain ranging from 4% to 18%. They report that the prevalence of back pain is about 30%; and the estimate of dysmenorrhea in adolescent girls varies from 13% to 37%.

Evidence suggests that gender ratios for some pain types (e.g. abdominal) change with age: in younger (school-aged) children, prevalence is similar for boys and girls, however in adolescence girls outnumber boys (Scharff, 1997). Goodman and McGrath (1991) state that the prevalence of all pain disorders increases with age.

Goodman and McGrath observe that no studies provide evidence about the intensity or frequency of the pains children are experiencing, or of the levels of disability in the community sample which result from childhood pain.

1.1.6.3 The impact of paediatric chronic pain

Chronic pain is a major economic and social problem in the adult population, and some evidence suggests that children with pain disorders develop into adults with pain disorders (Schechter et al., 1993). It is important to find pain treatments that are efficacious with children as, left untreated, pain is likely to be an ongoing problem for the individual and cause unnecessary suffering.

Chronic pain is a significant problem for those children who experience it. Chronic pain can disturb the child's emotional, physical and social development (Aasland, Flato, & Vandvik, 1997; Kaufman et al., 1997; Mathews, McGrath, & Pigeon, 1993). Schulz and

Masek (1996) assert that chronic pain may lead to multiple medical referrals, contributing to missing school (beyond days missed due to pain) and isolation from peers, which is particularly problematic in adolescence. Paediatric chronic pain will have an impact on the whole family. Pain may become the focus of family life and threaten children's developing sense of control: they could become dependent on their parents and fail to develop their independence and coping skills.

1.1.6.4 Developmental aspects

Children's reasoning about pain follows a developmental path from concrete to abstract, in Piagetian type stages (Gaffney, 1993). Gaffney and Dunne (1986) found three stages in the development of the concept of pain. They found that children aged 5-7 years defined pain in concrete terms (i.e. pre-operational thought), defining pain in relation to its location or association with illness. Children aged 8-10 years provided semi-abstract definitions (i.e. concrete operational thought), defining pain in relation to feelings. Children above 11 years provided abstract definitions (i.e. formal operational thought), using physiological and psychological terms. Hurley and Whelan (1988) also found that children's perception of pain progresses through these developmental stages.

Developmental level does not merely influence the child's understanding of the concept of pain, but also affects their perception and experience of it. In the case of acute pain, it appears that older children will report lower intensity than younger, whereas in chronic disorders older children report higher perceived pain (Beales, Keen, & Holt, 1983; Manne, Jacobsen, & Redd, 1992).

1.1.6.5 Psychosocial influences

Psychosocial factors moderate all childhood pain experiences. McGrath (1993) illustrates this point with the example of injections: different children, in different situations and at different times, will experience variations in the level of pain, even though the level of tissue damage is the same. McGrath argues that unless there is an understanding of the internal and environmental factors that modify a child's pain, attempts to control it will necessarily be inadequate.

Varni et al. (1996b) propose a theoretical framework to explain the influence of psychosocial factors on children's pain, and to account for the observed differences in children's pain experience. They present a biobehavioural model of paediatric pain (see Figure 1). The multivariate model reflects the complexity of pain perception and pain adjustment processes.
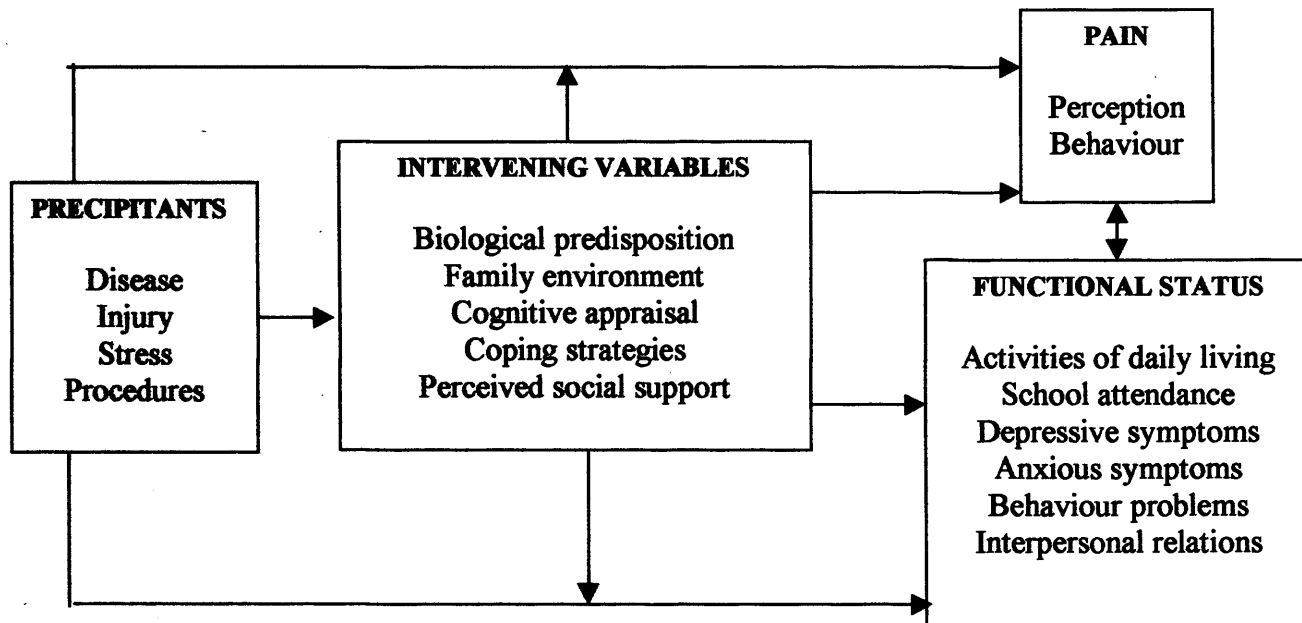
Figure 1. Biobehavioural model of paediatric pain. (Varni et al., 1996b)

The variables in the model, and the relationships between them, are hypothetical. The model identifies both physical and psychological precipitants of paediatric pain. Psychosocial "intervening variables" mediate between the precipitator of the pain and adjustment. Probable intervening factors are identified as biological predisposition (e.g. age, gender, cognitive development), family environment (e.g. family functioning, pain role-models), cognitive appraisal (e.g. meaning of pain), coping strategies, and perceived social support. The functional status variables (i.e. adjustment indicators) are hypothesised to have a bi-directional relationship with pain perception and pain behaviour. It is likely that relationships within the model are even more complex than the diagram indicates. For example, it is possible that the relationship between Depressive symptoms and Cognitive appraisal is bi-directional.

Varni et al. developed this model as an empirical guide for research and investigation into the modifiable psychosocial factors that influence paediatric chronic pain. Varni and

colleagues have evaluated several parts of the model (see Varni et al., 1996a; Varni et al., 1996b). The current study aims to contribute towards evaluation of the model, by focusing on the variables of Cognitive appraisal and Coping strategies, and the relationship between these and some elements of Functional status.

In summary, approximately 10% of children are reported to experience chronic pain. Chronic pain may have significant negative impact on the child and their family and can lead to severe adjustment problems for some sufferers. Children's pain experience will be influenced by many psychosocial factors, including their developmental level.

1.2 CHRONIC PAIN: ADJUSTMENT AND COPING

The following sections explore the research literature regarding coping with chronic pain, and adjustment and coping in paediatric chronic pain. Then the literature regarding pain and illness beliefs, and the relationships between beliefs and coping and adjustment are examined. This leads to the presentation of the specific research questions and hypotheses that are the focus of this study.

1.2.1 Adjustment to chronic pain

The concept of "adjustment" usually refers to psychological well-being. In the chronic pain literature the term has come to include dimensions relating to the ability to carry out normal physical and psychosocial activities. Jensen and Karoly (1991) identify three components of adjustment to chronic pain: activity level; psychological functioning; and medication and/or health services utilisation.

Individuals vary greatly in their ability to cope with chronic pain. Some chronic pain patients function very well, despite severe and persistent pain. Other patients experience significant problems related to the pain problem. For example, the prevalence of depression is higher in chronic pain patients than in individuals without pain, however, the majority of chronic pain patients are not clinically depressed (Romano & Turner, 1985). Similarly, whilst many chronic pain patients exhibit reduction in activity and disability,

many learn to function normally despite their pain (Jensen, Turner, Romano, and Karoly, 1991).

To explain observed differences in adjustment to chronic pain, many researchers have focused on the concept of coping.

1.2.2 Models of coping

"Coping" with pain can be defined as the thoughts and behaviours purposefully employed by the individual to manage or decrease pain and distress associated with pain. Strategies that are automatic, even if effective, are not considered to be "coping" strategies (Lazarus & Folkman, 1984). The concept of coping with chronic pain has generated much research interest, because it is hypothesised that coping strategies are amenable to intervention. If adaptive and maladaptive coping strategies for dealing with pain can be identified, then it may be possible to help adjustment to chronic pain by teaching patients adaptive strategies.

Coping efforts have been categorised along several different dimensions, using different conceptual models. Lazarus and Folkman (1984) propose a distinction between problem- and emotion-focused coping: problem-focused coping efforts include behaviours that are directed at changing the stressful environment; emotion-focused strategies are designed to alter internal reactions to stressors. The model was originally designed to explain differences in reactions to stress, but can be applied to coping with pain.

Several coping models have been designed to explain reactions to chronic pain. For example, the Active-Passive coping model (Brown & Nicassio, 1987): active coping attempts are adaptive behaviours that are designed to manage pain; whereas passive strategies include withdrawal, and suggest relinquishing control over the pain. Similarly, Tobin, Holroyd, Reynolds, and Wigal (1989) propose an Engagement-Disengagement model: engagement strategies are, for example, problem solving, social support seeking, cognitive restructuring, expression of emotion; disengagement strategies are avoidance, wishful thinking, self-criticism and social withdrawal. It is hypothesised that active (or engagement) strategies are associated with good adjustment, and passive (or disengagement) strategies are associated with poor adjustment to chronic pain.

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A more comprehensive model of coping process is described by Rosenstiel and Keefe (1983). They describe a Cognitive-Behavioural Model of pain coping, in which two processes are important: the specific cognitive and behavioural coping strategies used to deal with the pain; and the perceived effectiveness of those strategies.

1.2.3 Pain coping and adjustment

The different coping models have led to the development of different measures to assess the coping strategies that are used by individuals with chronic pain. Both the Ways of Coping Checklist (WCCL; Folkman & Lazarus, 1980), designed to assess problem-focused and emotion-focused coping, and the Vanderbilt Pain Management Inventory (VPMI; Brown & Nicassio, 1987), designed to assess active and passive coping, have been used with chronic pain populations. The measure most frequently used in pain research is the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe, 1983). These measures all identify a number of coping strategies, which are then grouped into general coping factors (coping styles). For example, Rosenstiel and Keefe identified seven coping strategies: Diverting Attention, Reinterpreting Pain Sensations, Coping Self-statements, Ignoring Pain Sensations, Praying and Hoping, Catastrophizing, and Increasing Activities. These strategies group into general coping styles labelled: Cognitive Coping and Suppression; Helplessness; and Diverting Attention and Praying.

Jensen et al. (1991) review the research relating to pain beliefs, coping strategies and adjustment to pain. Coping styles have been found to be associated with pain perception and adjustment in some studies but not others. Jensen et al. demonstrate that research using the above measures have found different factor structures in different populations. This makes it difficult to draw conclusions about the relationship between pain coping and adjustment.

Jensen et al. (1991) suggest that it may be more useful to look at individual, specific coping strategies in relation to adjustment rather than general coping styles. Lefebvre, Lester, and Keefe (1995) found that Catastrophizing strategies were associated with higher levels of pain and more frequent pain episodes in young adults. Jensen and Karoly (1991) found that the CSQ subscales of Ignoring Pain, Coping Self-statements, and Increasing Activities correlated positively with psychological functioning. The strategies Diverting

Attention, Ignoring Pain, and Coping Self-statements also correlated positively with activity level, but only for patients reporting less severe pain. This finding illustrates the complex nature of the relationship between pain coping and adjustment.

Some research into pain coping has been directly relevant to clinical practice. For example, Parker et al. (1989) found that changes in coping scores over 12 months were related to changes in pain intensity and psychological well-being. Other studies (e.g. Keefe et al., 1990) have shown that chronic pain patients can learn to increase use of adaptive coping strategies and decrease use of maladaptive strategies. These changes in coping strategies were related to lower levels of physical disability and better long-term outcomes.

In longitudinal research, Gil, Abrams, Phillips, and Williams (1992) found CSQ-measured pain coping factors were significantly related to psychosocial and functional adjustment in adults with sickle cell disease. They also found that pain coping is a relatively stable phenomenon, and in particular, adults who are negative in their thinking and rely on passive coping strategies tend to persist in these coping patterns. In conjunction with the above findings, this indicates that early identification of, and intervention with, pain patients using poor coping strategies could improve their long-term adjustment.

In summary, coping has received considerable research attention because it may be possible to design interventions based on adaptive coping in order to prevent adjustment difficulties in chronic pain patients. There is a considerable amount of literature examining the relationship between coping and adjustment in chronic pain in adults. Unfortunately, studies have employed different measures of coping, and some measures appear to have unreliable factor structures, which adds to the difficulty of drawing conclusions about this literature. However, Lester and Keefe (1997) compare research using the different coping models and conclude that coping efforts based on rational thinking and concrete actions are most effective, whilst coping efforts which lead the individual to withdraw or become passive are ineffective. In their summary of the literature, Gil, Wilson, and Edens (1997) reach the same conclusions. These conclusions are based on the adult literature, but may also apply to children and adolescents.

1.3 PAEDIATRIC PAIN: ADJUSTMENT AND COPING

1.3.1 Adjustment to paediatric chronic pain

Lavigne and Faier-Routman (1992) review the literature regarding psychological adjustment to paediatric chronic physical disorders. They conclude that children with health problems are at an increased risk for developing psychological problems, although the risk varies across different disorders. Holden, Chmielewski, Nelson, Kager, and Folzt (1997) and Wallander and Varni (1998) argue that ill children are approximately twice as likely to experience psychosocial problems, as compared with healthy peers. They qualify this by stating that there is considerable individual variation, and that only a minority of these children are maladjusted.

Children's responses to pain problems range from adaptive psychosocial and functional adjustment to severe maladjustment (Varni, Walco, & Katz, 1989). As discussed in section 1.1.6.5, Varni and colleagues have designed a biobehavioural model to explain variations in paediatric pain adjustment. Some of the variability in adjustment to chronic disorders is related to disease factors, for example in sickle cell disease, pain frequency and other disease severity variables have been found to be related to adjustment (Gil, Williams, Thompson, & Kinney, 1991). However, factors such as age, gender, and coping may be even more significant in predicting adjustment (Gil et al., 1991).

1.3.1.1 Psychological adjustment

Studies by Aasland et al. (1997), Apley and Naish (1958), Kaufman et al. (1997) and a review by Scharff (1997) all conclude that there are higher rates of emotional disturbance in children with chronic pain. Walker and colleagues (Walker, Garber, & Greene, 1993; Walker & Greene, 1989) have compared the psychological adjustment of children with chronic pain to those with psychiatric disorders, and to healthy controls. They found that the paediatric chronic pain patients had higher levels of emotional distress than healthy peers, but lower levels of problems than children with psychiatric disorders.

As with adult pain patients, an association between pain intensity and emotional distress has been found. Paediatric migraine sufferers who experience high levels of anxiety and

stress report more frequent and severe headaches than those with lower anxiety (Cooper, Bawden, Camfield, & Camfield, 1987). Varni et al. (1996b) found that perceived stress consistently accounted for variance of pain intensity. Varni et al. (1996a) found that higher pain levels were associated with higher levels of depression and anxiety, lower self-esteem and more behaviour problems in children (after controlling for demographic and disease variables).

The relationship between pain level and emotional distress is probably circular. McGrath (1993) argues that pain can cause emotional distress, and that emotional distress exacerbates pain. She proposes that this process is particularly important in unexplained recurrent pain, as the child's and parents' anxiety about the cause of the pain can cause emotional distress and increase pain perception.

Some evidence suggests that chronic pain in childhood may be related to adjustment problems in later life. Hotopf, Carr, Mayou, Wadsworth, and Wessley (1998), in a longitudinal cohort study, found that children who had suffered recurrent abdominal pain did not have a higher prevalence of physical problems in adulthood, but did have higher rates of psychiatric problems.

1.3.2.2 Functional Adjustment

Functional adjustment refers to the impact of illness on the child's everyday physical and social functioning. School attendance is frequently used to measure this, but other activities of daily living (e.g. social activities, participation in sport) are increasingly recognised as important (Walker & Greene, 1991). Reid, Lang, and McGrath (1997) found that paediatric chronic pain patients had significantly higher parent-rated functional disability and more school absences than healthy controls. They also found that disability was related to the child's psychological adjustment and pain coping strategies.

Bursch, Walco, and Zeltzer (1998) describe a pain-associated disability syndrome in which reduction of activity leads to a downward spiral of increasing disability and pain. When children withdraw from their everyday activities, the focus of their (and the family's) attention is increasingly on the pain. The child may try to return to normal activities but experience an exacerbation of symptoms. They therefore increasingly restrict activities:

decreased activities may result in physical deterioration and fatigue. The interruption of normal activities is demoralising and can lead to depression. Secondary gains (e.g. avoiding school, withdrawal from responsibilities) may prolong pain episodes or initiate new ones when children are stressed (McGrath, 1993). Some children also alter their behaviour (activity level) and posture due to fear of the pain. The abnormal sensory input from their altered behaviour may also trigger or prolong pain episodes.

1.3.3.3 Family influence on adjustment

Children's pain experiences are affected by a wide range of psychosocial factors, particularly the social environment in which the pain occurs. Parents serve as models for pain behaviours and agents of reinforcement (Zeltzer, Bursch, & Walco, 1997). Parental attitudes toward children with chronic or recurrent pain will influence children's perception of the pain and the level of their disability. Parents who expect children to live as normally as possible despite the pain may actually assist their children in experiencing less severe and disabling pain (McGrath, 1993). McGrath claims that, for example, encouraging school attendance maintains activity levels and peer contact, which will enhance physical and mental well-being.

O'Dougherty and Brown (1990) argue that assessment of the meaning an illness has for the child and family is critical in understanding the emotional and behavioural response. Stress or poor coping may not be inherent in the illness but may be a function of the child's and parents' perception of their illness. Parental illness perceptions are likely to be particularly important. For example, Garrison and McQuinston (1989) posit that although children receive some information about their illness from medical staff, the majority comes from parents.

In summary, there is a wide variation in adjustment to paediatric chronic pain disorders. However, like adult pain patients, children may experience significant psychological and functional difficulties related to their pain disorder. As with adult pain patients, the relationship between the pain disorder and psychological and functional factors appears to be interactional rather than linear. In paediatric disorders, family factors, including parental perception of the child's pain, will affect the child's adjustment.

1.3.2 Coping with paediatric chronic pain

1.3.2.1 Development of coping

Patterns of coping are less stable in children than in adults (Gil et al., 1997). As age increases, the use of coping strategies increases (Carter, 1994; Lansdown & Sokel, 1993). Thompson and Gustafson (1996) report that studies exploring coping stability in children and adolescents found that behavioural coping develops earlier and remains consistent across ages, whereas cognitive coping increases with age. Children may learn behavioural coping earlier through observation of others. Cognitive coping requires an ability to access and regulate internal emotions and is more difficult to learn through observation. The use of cognitive coping will also be determined by the child's cognitive-developmental level.

Bursch et al. (1998) assert that parents teach their children how to cope with pain, both by modelling pain responses and by reinforcing the child's coping attempts. Similarly, Gil et al. (1991) found relationships between child and parent pain coping strategies, which they attribute to modelling.

Jamison and Walker (1992) found that children of chronic pain patients had higher rates of pain complaints and more frequently used medication to manage their pain. They concluded that children learn their coping strategies from their parents. Similar conclusions were reached by Osbourne, Hatcher, and Richtsmeier (1989), who found that children with unexplained pain had high numbers of pain models in the family. Walker et al. (1993) also report that unexplained pain was more common when other family members exhibit pain behaviours. Therefore, both pain behaviours and pain coping strategies may be learnt via modelling processes.

Hotopf et al. (1998) found that mothers of children with abdominal pain had high levels of health anxiety. They argue that parental health anxiety may reinforce children's poor coping and illness behaviour. Parental reinforcement of coping strategies has been found to be important. Dunn-Geier, McGrath, Rourke, Latter, and D'Astous (1986) observed that mothers of paediatric chronic pain patients classified as "non-copers" generally discouraged positive coping efforts.

1.3.2.2 Pain coping and adjustment

Bursch et al. (1998) assert that children with persistent pain often have inadequate coping strategies. McGrath (1993) reports that the majority of children with recurrent pain, seen at a pain clinic, lacked age-appropriate strategies for coping with pain. Their coping often depended primarily on their parents, medications and rest, rather than independent physical, cognitive or behavioural coping attempts.

Much of the research on children's pain coping strategies has focused on children with sickle cell disease. For example, Gil et al. (1991) found that pain coping strategies in children with sickle cell disease could be reliably assessed using the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe, 1983). Three coping styles were identified in this study: Negative Thinking, Passive Adherence, and Coping Attempts. The Negative Thinking coping style included catastrophic thoughts and self-statements of fear and anger. Passive Adherence involved concrete and passive strategies such as resting. Coping Attempts described an active attempt to cope using multiple cognitive and behavioural strategies. Gil et al. found that children who scored highly on Coping Attempts were more active and required less frequent health care input. Children with high scores on the Negative Thinking and Passive Adherence factors were less active in school and social activities; they had higher levels of (self-rated) depression, anxiety and behavioural problems; and more frequent contact with health services.

Significant relationships between pain coping strategies and adjustment in children with sickle cell disease have been found in both cross-sectional (Gil et al., 1991; Thompson, Gil, Burbach, Keith, & Kinney, 1993) and longitudinal research (Gil et al., 1993). Research in other paediatric pain disorders is increasing, but the current literature is limited. Schanberg, Lefebvre, Keefe, Kredich, and Gil (1997) utilised an adapted CSQ to assess coping in children with juvenile chronic arthritis. They found two main coping factors: Coping Attempts; and Pain Control and Rational Thinking. The latter coping style accounted for a significant proportion of pain intensity. However, this study did not examine relationships between coping and measures of adjustment.

Walker, Smith, Garber, and Van Slyke (1997) found relationships between coping and adjustment in children with recurrent abdominal pain. They validated a paediatric pain

coping measure, the Pain Response Inventory (PRI), which comprised 13 specific coping strategies and 3 general coping styles: Active Coping, Passive Coping and Accommodative Coping (see section 2.5.1.3 for further discussion). Walker et al. found that Passive Coping was associated with higher levels of functional disability and depression. They also found that adjustment measures had different relationships with specific coping strategies. For example, functional disability was significantly associated with Behavioural Disengagement, Self-Isolation, and Social Support; whereas depression was positively related to Behavioural Disengagement, Self-Isolation, Catastrophizing, and Massage/Guard and was negatively related to Problem-Solving and Condition-Specific Strategies.

Sanders, Shepherd, Cleghorn, and Woolford (1994) state that the type of coping used by children mediates the impact of recurrent abdominal pain (RAP). They assert that active coping strategies increase the child's sense of control, whereas passive strategies lead to withdrawal, decreased activity and greater pain. They designed an intervention for RAP, focusing on increasing the child's active coping strategies and teaching parents to reinforce these. The treatment was very successful; both reducing perceived pain and increasing emotional and functional adjustment.

In summary, the growing literature on coping with and adjustment to paediatric chronic pain reflects findings in the adult literature. There appear to be specific relationships between coping strategies and adjustment. Longitudinal research on childhood sickle cell disease has shown pain coping strategies to be predictive of later adjustment, and interventions focused on coping have led to improvements in adjustment.

1.3.2.3 Coping strategies and pain beliefs

As coping has been found to affect adjustment to chronic pain, attention has focused on why or how individuals choose the strategies they use. Some research on adult chronic pain has examined whether beliefs about pain influence the individual's choice of coping strategy (e.g. Harkapaa, Jarvikoski, & Vakkari, 1996). Williams and Keefe (1991) found that beliefs about the nature of their pain affected patients' choice of coping strategy and their beliefs about controlling the pain. Therefore, in order to explore relationships

between beliefs, coping and adjustment it is necessary to consider the theoretical and research literature regarding patients' beliefs about pain.

1.4 PAIN AND ILLNESS BELIEFS

The beliefs that patients hold about their pain experience and the meaning they attribute to pain have long been considered important to their adjustment (Beecher, 1956; Sternbach, 1974). More recently, researchers have begun to explore the role of these beliefs in adjustment to chronic pain. Several types of cognitions have been examined: control beliefs; attributions; self-efficacy; and outcome efficacy beliefs regarding the use of coping (Jensen et al., 1991).

The importance of assessing pain beliefs when treating chronic pain patients has been emphasised. Williams and Keefe (1991) argue that gathering information about pain beliefs is important; an understanding of the patient's beliefs will help to choose appropriate intervention. Shutty, De Good, and Tuttle (1990) found that pre-treatment beliefs were associated with treatment outcomes. They claim that clinicians need to change beliefs that are incompatible with the treatment available or fit treatment to patient's beliefs. Flor, Behle, and Birbaumer (1993) state that, regardless of medical factors, individuals' pain beliefs are crucial in determining how disabled they become or remain.

Leventhal and colleagues provide a framework for understanding and exploring illness beliefs (Leventhal, Meyer, & Nerenz, 1980). They define illness cognitions as patients' implicit, common-sense beliefs about their illness. They identify five cognitive dimensions of illness beliefs: identity (the label and symptoms of the disease); perceived cause (attribution); time-line; consequences; and curability/controllability. These components have been found to be related to patients' adherence to treatment, health-care behaviour and emotional responses to illness (Moss-Morris, Petrie, & Weinman, 1996). Leventhal et al. (1997) assert that these illness beliefs provide a cognitive framework for coping with illnesses as well as understanding and predicting illness behaviours. The current study focuses on the dimensions of attribution and control beliefs.

1.4.1 Attribution theory

Individuals are often motivated to seek causal explanations (attributions) for events that affect them. Attribution theory (Heider, 1958) proposes that an attributional search is initiated to enable understanding, prediction and control of events. The more unexpected and unusual the event, the more likely it is that individuals will try to determine the cause (Wong & Weiner, 1981). Wong and Weiner argue that if an individual's experiences conform to his/her beliefs and expectations (cognitive schema) there is no need for the individual to search for an explanation. Attributional searches will take place if the new experience cannot be assimilated into the individual's schema. An attributional search is most likely if the experience is a negative one, as the individual is motivated to end the experience or prevent its recurrence.

Whilst Heider's original theory focused on social events (i.e. behaviour), attributions of other types of events appear to have a role in clarifying meaning and determining reaction to them (see Antaki & Brewin, 1982). The relationship between causal attributions and psychological consequences, in particular depression, has been the focus of much research interest. Considerable research has explored the relationship between depression and attributional styles (e.g. Abramson, Seligman, & Teasdale, 1978). Less research has focused on how attributions about specific events affect psychological outcome. However, one event that has been explored in the attribution literature is the experience of illness.

Wong and Weiner (1981) discovered that the most common dimensions of attributional searches were locus (e.g. "did I cause this, or was it someone/something else?") and control (e.g. "could I have controlled this?"). These two dimensions of causality have received most research attention in the area of illness attributions.

1.4.2 Chronic illness and attributions

Illness is a significant and threatening life-event that is likely to precipitate an attributional search. Watts (1982) claims that the vast majority of people with a serious illness make some attributions about the cause of the illness. Those involved in treating chronically ill individuals may find eliciting the attributions the patient holds useful in understanding their reaction (both behavioural and emotional) to the illness. Understanding and

accommodating patients' beliefs about their illness may also increase treatment adherence (Jaber, Steinhardt, & Trilling, 1991).

Not all individuals form attributions when faced with serious illness. For example, Lowery, Jacobsen, and Murphy (1983) found that 8 men of their sample of 55 with rheumatoid arthritis did not hold attributions. These eight were found to have poorer mental health than those who believed they knew the cause of their illness. Turnquist, Harvey, and Anderson (1988) review the literature regarding attributions and illness. They conclude that patients who make attributions cope better than those who do not, irrespective of the kind of attributions they are making. Witenberg et al. (1983) conclude that patients who held attributions were able to retain psychologically protective beliefs about the predictability of events. Therefore, it may be that finding any kind of meaning in the illness is adaptive.

Attempts have been made to ascertain which type of attribution is the most adaptive or useful when an individual is faced with a serious illness (see Turnquist et al., 1988, for review). Research findings in this area have been contradictory, not least because investigators have addressed different types of attributions and have measured these in different ways. It is also likely that the most adaptive attributional framework differs for different illnesses and the stage of illness (Benyamini, Leventhal, & Leventhal, 1997).

In the research literature, much interest has focused on whether self-blaming ("internal") attributions regarding the cause of illness are adaptive or maladaptive. A theoretical distinction has been made between behavioural self-blame and characterological self-blame (Janoff-Bulman, 1979). Behavioural self-blame implies the potential for future control, as the individual views the cause of a negative event to be specific behaviours, which may be avoided in the future. Characterological self-blame involves attributing responsibility for an event to unchangeable personality traits, and therefore implies no future control.

It has been hypothesised (see Taylor, Lichtman, & Wood, 1984) that attributions made to factors under the individual's control (i.e. behavioural self-blame) may be more adaptive, as they may lead to an increased sense of control over the illness. Alternatively, it may be that self-blaming attributions for negative events such as chronic illness may lead to poorer

adjustment (i.e. guilt, depression). The apparently contradictory literature (e.g. Bulman & Wortman, 1977; Ehlers, Moran, & Christensen, 1998) suggests that behavioural self-blame is adaptive, but only if the individual is able to exercise some control over the illness they are experiencing. For example, Witenberg et al. (1983) found that self-blame attributions were associated with lower perceived control over health, and poorer coping and compliance, in end-stage renal disease (an illness over which the individual has little control). Although much of the illness attribution literature implies or states that attributions affect adjustment to illness via an impact on control beliefs, few studies have included measures of both cause and control.

1.4.2.1 Pain attribution

Watts (1982) argues that the content of attributions is as important in predicting adjustment as whether they are "internal" or "external". Reviews of laboratory studies demonstrate how the attributional belief an individual holds, regarding the cause of a pain, affects their pain perception and reaction to the pain (see Reading, 1982; Weisenberg, 1998).

No published studies have investigated chronic pain patients' attributional beliefs. However, it has been stated that the experience of pain, especially chronic pain, invariably leads to a need to seek attributions about cause and controllability (Reading, 1982). As has been argued above, pain is a highly subjective experience: pain perception and adaptation to pain may be affected by many psychosocial factors. An individual's attributional beliefs may significantly influence the problem. If, for example, pain is attributed to severe tissue damage or to a life-threatening situation it may result in greater suffering than the same level of pain attributed to a different cause. If the patient is experiencing a chronic symptom, in the absence of a diagnosable problem, their attributions may influence the course and prognosis of the disorder by affecting their motivation to comply with recommended treatment (Schulz & Masek, 1996). For example, pain patients will have little motivation to comply with pain management advice if they believe that the pain is caused by an undiscovered progressive condition. Illness management may be particularly affected by an individual's attributions when the responsibility for treatment lies with the individual, as in the case of pain management.

1.4.2.2 Attributional style

Abramson et al. (1978) argue that an individual's attributional style may put them at risk for depression. People are more likely to become depressed following an negative event if they attribute these events to internal (caused by the individual), stable (caused by non-transient factors) or global (similar outcomes expected across a wide variety of situations) causes. Studies have attempted to link negative attributional style to depression in chronic pain patients, but results have been inconsistent and inconclusive (see Jensen et al., 1991).

Skevington (1995) concludes that there is little evidence to support the hypothesis that negative attributional style precedes depression in chronic pain populations. She argues that evidence supports the hypothesis that negative attributions develop concurrently with depression in this population.

In summary, attributions are a useful way of exploring individuals' beliefs about their illnesses. Individuals who make attributions may be better adapted to illness, and in certain illnesses, self-blaming attributions may have psychological benefits. Attributions about the cause of a pain condition are very likely to affect adjustment to the problem, due to the significant influence of psychosocial factors on pain processes.

1.5 ATTRIBUTIONS IN PAEDIATRIC ILLNESS

Children's attribution about illness is largely influenced by their cognitive developmental level (Bibace & Walsh, 1980; Kury & Rodrigue, 1995). Gratz and Piliavin (1984) found that older children had stronger beliefs in internal causation of illness. However, the older children had stronger beliefs in the majority of causative factors (i.e. the number of illness attributions increased with age).

Children's reasoning about the causes of pain and illness follows a developmental path from concrete to abstract (Gaffney, 1993). The explanations that represent formal operational thought are physiological or psychophysiological. The age at which children reach abstract (formal operational) thinking about illness varies between individuals. Bibace and Walsh (1980) found that the majority of the 11 year-olds they assessed had not

yet reached this stage. The large-scale studies of development of children's illness concepts have generally assessed healthy children's beliefs (e.g. Bibace & Walsh, 1980; Gaffney, 1993). However, Brewster (1982) found similar stage-like development amongst children with chronic illnesses, but also found that even the most cognitively sophisticated maintained "magical" beliefs in their own responsibility. It is probable that children's attributions and control beliefs about illness are not only a function of their level of cognitive development, but also of their experience of illness. Different attributions may also be elicited according to whether children are asked to explain the causes of illness in general, or the causes of their own illness.

1.5.1 Attributional style

Children's attributional style has been explored in a few studies of children with chronic illness. Attributional style has been correlated with psychological functioning in children with diabetes. Brown, Kaslow, Sansbury, Meacham, and Culler (1991) used a general measure of attributional style and found that diabetic children with a negative attributional style had better metabolic control than those with a more positive attributional style. Brown et al. argue that those self-blaming children take greater responsibility for control of their disease and therefore display better self-management. In contrast, Kuttner, Delamater, and Santiago (1990), using the same questionnaire, found that negative attributional style related to poorer metabolic control in their sample of diabetic children. Explanation for this contradiction may lie in the different measures of metabolic control the studies utilised, or in the cultural and socio-economic differences between their samples (Bates & Rankin-Hill, 1994).

Kuttner et al. (1990) demonstrated a relationship between negative attributional style and depression in diabetic children. Similarly, Schoenherr, Brown, Baldwin, and Kaslow (1992) found that a negative attributional style was predictive of poorer psychological functioning in three chronic illness groups. Unfortunately these studies do not elucidate the process of children's adaptation to illness, as the findings do little more than support the theory of a depressive attributional style that applies to children as well as adults.

1.5.2 Causal attributions

Few studies have examined children's illness attributions in relation to adjustment to paediatric chronic disorders. Tennen, Affleck, Allen, McGrade, and Ratzan (1984) employed a semi-structured interview to elicit children's attributions about the cause of their diabetes. They found that self-blaming children coped more successfully than those who attributed the disease to an external source (typically genetics) or those who held no attributions.

King (1983) proposes that self-blaming is adaptive if the patient can exercise some control over the outcome of the problem, but may be maladaptive if the patient has no control (see also section 1.4.2). Children with insulin dependent diabetes are able to exercise some control over their illness, insofar as they have considerable responsibility for following their treatment regime. Therefore, as found by Tennen et al. (1984), children with diabetes cope better if they make self-blaming attributions. In contrast, children with illness such as cancer are required to relinquish control over treatment to medical personnel; therefore, an external attribution would be more adaptive.

Causal attributions for childhood cancer have been examined by Bearison, Sadow, Granowetter, and Winkel (1993). The majority of children (55%) made no attribution about the cause of their cancer. The categories of attributions elicited from the children were: contagion, fate, trauma, constitutional susceptibility, self-blame, and no attribution. They found that children who attributed the cause to an external source coped better (as rated by nurses) than those who made internal, or no, attributions. This finding supports King's (1983) hypothesis (discussed above).

No studies have directly investigated children's attributions about chronic pain. However, Beales et al. (1983) showed that the meaning children give to a sensation determines their perception of its intensity and emotional reaction to it. In illness that has no clear biomedical aetiology, patients' attributional beliefs may play a more important part in influencing their psychological adjustment and behavioural response (Turnquist et al., 1988; Watts, 1982).

From the reviewed literature, it would be predicted that children's attributions regarding their pain problem are important in predicting their psychological adjustment. Because pain is a disorder that is potentially controllable by the patient, the above findings suggest that self-blaming attributions will be predictive of good adjustment.

1.5.3 Parental attributions

In childhood disorders, it is apparent that both the child and the parents make attributions about the problem. For example, Eiser, Havermans, and Eiser (1994) interviewed parents of children with cancer and found that 79% of mothers and 52% of fathers made at least one attribution about the cause of the illness. Turnquist et al. (1988), in their review, conclude that individuals close to the patient often make attributions about the cause of the illness, and tend to attribute the origin of the illness to the patient. Turnquist et al. claim that differences in attributions between the patient and their relative or friend are consistent with the actor-observer bias reported by Jones and Nisbett (cited in Antaki, 1982). However, Turnquist et al.'s review does not appear to include parent-child dyads and so it is unclear whether this bias will be found when the patient is a child.

A few studies have examined parents' illness attributions and their adjustment to their child's chronic illness. Affleck, Allen, Tennen, McGrade, and Ratzan (1985) used semi-structured interviews to elicit the causal attributions of a sample of mothers whose children had diabetes. Mothers produced four categories of causes: heredity; environment; physiology; and behavioural self-blame. Affleck et al. found a positive relationship between environmental attributions and mothers' adaptation to their child's illness (as rated by clinicians involved with the family). This study did not address mothers' perceived control over the illness, but the authors suggest that external attributions are adaptive where there is limited control over outcome.

In a study with similar findings, Bearison et al. (1993) interviewed parents of children with cancer as well as the children themselves. The majority of parents (70%) made attributions, despite being told by doctors that the cause of cancer is unknown. Bearison et al. found a strong association between parents and their children as to whether they made attributions or not. They found seven categories of causal attributions that were endorsed by parents. These were: environment, fate, trauma, constitutional susceptibility, heredity,

self-blame, and no attribution. This study found that parents who made external (environment, fate or trauma), rather than internal or no attributions, coped significantly better. They also conclude that external attributions are adaptive if there is little personal control over the health outcome.

Wright, Brownbridge, Fielding, and Stratton (1990) examined end-stage renal failure patients' and their parents' attributions, comparing groups of children classified as well- or poorly-adjusted. Wright et al. interviewed the families and then coded *all* attributional statements made by the family. Parents of the well-adjusted children made more external attributional statements than the parents of the poorly-adjusted children, especially concerning illness behaviour: however, this difference was not statistically significant. Wright et al. found that patients' attributional statements were very similar between the two groups. They conclude, therefore, that it was the parents' attributions that differentiated between the well- and poorly-adjusted groups.

Wright et al.'s (1990) findings support the importance of the parents' beliefs and responses in influencing their child's adjustment to illness. Similarly, Dadds, Stein, and Silver (1995) found that maternal attributions regarding illness behaviours were associated with the child's adjustment. However, no studies have examined parents' illness attributions in relation to children's coping with or adjustment to paediatric chronic illness. Research from outside of the paediatric illness literature suggests that parental attributions affect their care-giving and their child's psychological well-being (Bugental, Johnston, New, & Silvester, 1998).

In summary, the limited literature on parental attributions in paediatric disorders suggests that it is adaptive for parents to hold external attributions (i.e. not self-blame) because parents have little control over the child's symptoms. No studies have examined the relationship between parental attributions and children's adjustment. Despite the conclusions of authors in the above studies, linking adaptive illness attributions to level of control over the symptoms or course of the illness, no studies have examined child or parent illness attributions and control beliefs.

1.6 CONTROL BELIEFS IN PAIN AND ILLNESS

1.6.1 Locus of control

Rotter (1966), building on Heider's (1958) attribution theory, distinguished between beliefs in personal responsibility for events and beliefs in external responsibility for events. The concept of external locus of control was later divided into beliefs that other people were responsible, and beliefs that chance factors were responsible for events (Levenson, 1973). The beliefs that outcomes are under the control of one's own behaviour is described as reflecting an internal locus of control, whereas the belief that outcomes are controlled by factors such as fate, chance or other people reflects an external locus of control.

Wallston, Wallston, and DeVellis (1978) developed the Multidimensional Health Locus of Control (MHLC) scale to measure beliefs in control over heath and illness episodes. Studies using this tool have found that health outcomes are more positive in individuals who have strong beliefs in internal control over illness and who value their health (see Wallston 1997).

1.6.2 Self-efficacy

A self-efficacy belief is a judgement regarding one's ability to perform a specific behaviour. Bandura (1977) argued that self-efficacy is not a personality trait, but a belief regarding the individual's ability to perform certain behaviour within a particular environment. Social learning theory posits that these beliefs significantly influence the initiation and persistence of behaviour, such as coping strategies, which may then affect adjustment. For example, Blalock, DeVellis, and DeVellis (1989) found that beliefs regarding ability to perform activities of daily living were associated with self-esteem and positive affect amongst arthritis patients.

1.6.3 Control beliefs in chronic pain

Control beliefs are a well-researched area in adult chronic pain (e.g. Harkapaa, Jarvikoski, & Hurri, 1989; Toomey, Mann, Abashian, & Thompson-Pope, 1991). These studies have

utilised both locus of control measures and measures of self-efficacy in controlling pain. Internal control beliefs and strong self-efficacy are hypothesised to be positively associated with adjustment to chronic pain. External control beliefs and low self-efficacy are hypothesised to lead to feelings of helplessness, which may lead to higher perceived pain; failure to use coping strategies; low activity levels; and poor psychological adjustment.

1.6.3.1 Pain perception

It seems likely that there is a reciprocal relationship between perceived pain severity and control beliefs. For example, Skevington (1990) found that those patients with the most chronic pain problems had the lowest scores of belief in internal control of pain. Similarly, Harkapaa et al. (1989) found duration and severity of pain were associated with control beliefs. Skevington (1990) argues that chronic pain may undermine patients' beliefs in their personal ability to control pain. Similarly, the relationship of adaptive response to beliefs about personal control may be bi-directional: people who are coping poorly may have lower internal control beliefs in order to protect their self-esteem. In support of this, Tennen, Affleck, Urrows, Higgins, and Mendola (1992) found that individuals who had strong control beliefs, but reported severe pain, experienced more emotional distress than those with weaker control beliefs.

1.6.3.2 Control, coping and adjustment

Pain patients who manifest a higher internal locus of control are hypothesised to be better adjusted than those with external locus of control beliefs. Harkapaa, Jarvikoski, Mellin, Hurri, and Luoma (1991) found that strong beliefs in an internal health locus of control were related to reduction in disability. Jensen and Karoly (1991) also found patients' appraisals of pain control to be associated with their activity level, but only for those patients reporting relatively low levels of pain severity. Crisson and Keefe (1988) and Scharff, Turk, and Marcus (1995) found that pain patients' "chance" control beliefs were positively associated with psychological distress and helplessness.

"Chance" locus of control beliefs and low perceived self-efficacy have been found to be related to maladaptive coping strategies in chronic pain patients (Crisson & Keefe, 1988; Harkapaa et al., 1996; Toomey, Seville, & Mann, 1995). Jensen and Karoly (1991)

hypothesise that a strong belief in personal control over pain leads people to use, and persist in the use of, adaptive coping strategies; these then protect against psychological maladjustment. They found that there was a substantial decrease in the strength of the relationship between control beliefs and adjustment when coping strategies were controlled for.

There appear to be gender differences in associations between control beliefs and coping. Bucklew et al. (1990) found different clusters of locus of control beliefs in male and female chronic pain patients. The male cluster types were unrelated to pain coping behaviour, whereas the female patients differed in their use of coping strategies according to their pattern of locus of control beliefs.

Skevington (1995) concludes that the evidence shows that internal beliefs are conducive to adaptive pain coping strategies and to better adjustment, and that beliefs in chance external control are associated with poorer psychological health and poorer coping. In summary, patients who adapt well to chronic illness are typified by strong beliefs about personal control, strong beliefs in the powers of others and weak beliefs in chance happenings. The above literature, showing relationships between control, coping and adjustment, provides support for the pain coping model proposed by Rosenstiel and Keefe (1983; see section 1.2.2).

1.6.4 Control beliefs in paediatric disorders

Health control beliefs, like conceptualisation of illness and attributions, are related to children's cognitive development. Neuhauser, Amsterdam, Hines, and Steward (1978) reported that children's sense of control over healing increased with age. Altman and Revenson (1985) found that children (aged between 8 and 14) had higher internal than external health locus of control beliefs, and that beliefs in external health locus of control decreased with age. Shagena, Sandler, and Perrin (1988) found that children's beliefs in their personal control over health increased with age. They also found that children with chronic illness had more external health control beliefs than healthy peers. The chronic illnesses Shagena et al. studied were difficult to predict or control, so it is likely that external beliefs reflect the children's relative helplessness. As with attributional beliefs, it is likely that the most adaptive control beliefs depend on the illness and symptoms under

study. High internal control beliefs could lead to adjustment problems if the illness is uncontrollable and unpredictable.

Research on paediatric diabetes (e.g. Engstrom, 1991; Moffat & Pless, 1983) suggests that a belief in personal control over the symptoms of disease is related to better disease outcome and psychological adaptation. It is suggested by this research that internal control beliefs result in a sense of responsibility for treatment and therefore better self-care. Control beliefs in children with pain disorders have not been investigated. However, in a study of healthy children's health-care attitudes, children with an internal locus of control tended to rate medical stimuli as less painful than those with external control beliefs (Hackworth & McMahon, 1991).

Mathews et al. (1993) propose that both the child's and the parents' locus of control beliefs are important in influencing adjustment to chronic pain. However, parents' beliefs about health or pain control regarding their child's illness have not been studied.

In summary, research evidence from the literature on adult chronic pain indicates that strong beliefs in personal control and efficacy over pain will be associated with good adjustment. Research on other paediatric disorders provides support for this prediction. It is likely that parents' control beliefs are also important in predicting children's adjustment.

1.7 SUMMARY AND RESEARCH QUESTIONS

The current study aims to expand understanding of adjustment to paediatric chronic pain by investigating processes that have received limited research attention. Research should focus on potentially modifiable predictors of adjustment to paediatric chronic pain, as pain may lead to severe adjustment problems and interfere with the child's development. The study draws on theoretical literature regarding pain processes and adjustment, coping and attributional theory. It is apparent from the research literature that psychological processes affect adjustment to paediatric pain. Literature on adult chronic pain and (growing) literature on paediatric chronic pain indicates that the use of certain coping strategies and avoidance of other strategies will promote good psychological and functional adjustment. The limited outcome literature suggests that it is important to consider patients' beliefs

about pain when planning interventions based on improving coping strategies. The link between beliefs about pain, coping responses and adjustment is predicted by both the cognitive-behavioural literature and literature regarding pain processes (guided by the gate-control theory). In paediatric pain, it is likely that the beliefs of the parent will be at least as important as the beliefs of the child in influencing the child's adjustment.

One type of illness belief hypothesised to be particularly important with regard to pain is attributional belief. Literature regarding chronic illness has shown attributional beliefs to be predictive of adjustment. It is frequently hypothesised that the mechanism via which attributions affect adjustment involves control beliefs. Control beliefs, unlike attributions, have received research attention in the adult chronic pain literature, and control beliefs appear to be related to psychological and functional adjustment.

In brief, the cognitive-behavioural model of pain suggests that beliefs about pain, pain coping strategies, and psychological and behavioural responses to pain are inter-related. The relevant literature suggests attributional and control beliefs are likely to have implications for adjustment to pain, probably via the coping strategies used to manage the pain. From literature on other paediatric disorders, it appears that parental beliefs will be important in influencing adjustment to paediatric chronic pain.

Following Varni et al.'s (1996b) biobehavioural model (see Figure 1), the adult pain and paediatric illness literature, the relationship between child and parent beliefs (about the child's pain) and the child's adjustment to chronic pain is hypothesised to be:
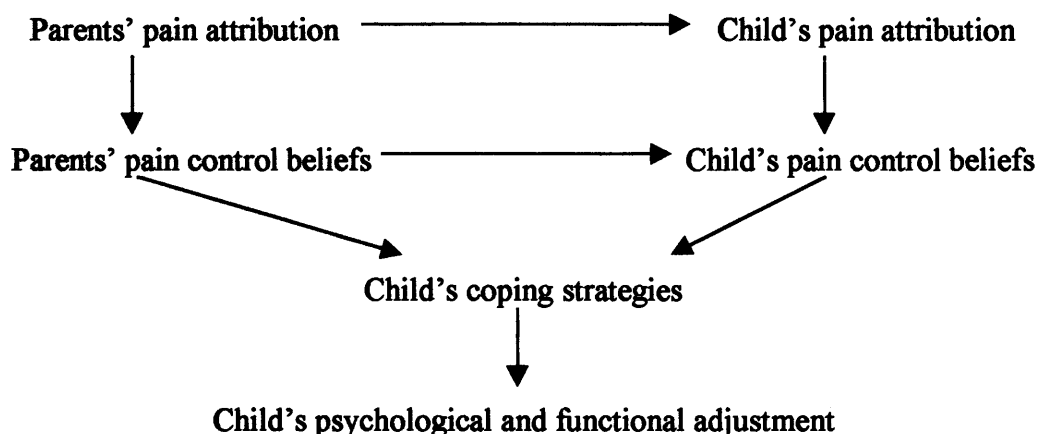
Figure 2. Hypothesised relationships between beliefs, coping and adjustment in paediatric chronic pain.

Variables that may moderate the relationships within the model are: the child's age (cognitive development) which, the literature has shown, affects attributions, control beliefs and pain perceptions; and pain severity and chronicity, which affect control beliefs and adjustment in adults with chronic pain. Some literature also suggests that gender may influence coping and adjustment in paediatric chronic pain (see McGrath, 1993).

1.7.1 Research questions

The current study aims to answer the following questions:

1. What kind of attributions do children with chronic pain and their parents make?
2. Do (child's and parents') attributions relate to their pain control beliefs?
3. Do parents' causal and control beliefs relate to the child's?
4. Do (child's and parents') attribution and control beliefs relate to the child's coping strategies?
5. Which coping strategies relate to good adjustment to the pain?
6. Do (child's and parents') attribution and control beliefs relate to the child's adjustment to the pain?
7. If there are relationships between pain beliefs and adjustment, whose beliefs are more important in predicting adaptation?

1.7.2 Statement of hypotheses

The attribution literature indicates that making any attributions about the pain will be adaptive because causal beliefs reduce uncertainty. The influence of attributions on adjustment may be more important if the aetiology of the disorder is unclear. The choice of coping strategy may be the mediating variable between attribution and control beliefs and adjustment. The reviewed literature indicates that paediatric chronic pain patients who make internal attributions, and have strong personal control beliefs, are more likely to use active coping strategies and have less functional impairment and better psychological adjustment. Literature on chronic pain suggests that attributing the pain to a life-threatening or pathological cause will be associated with poorer coping and adjustment.

The reviewed literature suggests that parents who make external attributions and have strong beliefs in their own and their child's ability to control pain, will have children who use more active coping strategies and who are well-adjusted. Parents' beliefs will affect adjustment by directly influencing their child's beliefs, and via reinforcement of coping strategies and illness behaviour. Given Wright et al.'s (1990) findings, it is predicted that parents' beliefs are more strongly related to adaptation than children's.

The following hypotheses and predictions are based on the research questions generated from the above model. Specific predictions are listed, due to the complexity of relationships being examined.

Hypothesis One: There will be a significant association between children's pain beliefs and parents' pain beliefs.
Prediction 1. There will be a significant association between children's attributions about the cause of the pain and parents' attributions about the cause of the pain.
Prediction 2. There will be a significant association between children's pain control beliefs and parents' pain control beliefs.
(The above predictions led to a set of very specific testable predictions, which are outlined in sections 3.3.1 and 3.3.2.)

Hypothesis Two: Children's use of coping strategies will be significantly associated with their adjustment
Prediction 1. The use of Active Coping strategies will be significantly associated with less missed school, lower functional disability and fewer psychological difficulties.
Prediction 2. The use of Accommodative Coping strategies will be significantly associated with less missed school, lower functional disability and fewer psychological difficulties.
Prediction 3. The use of Passive Coping strategies will be significantly associated with more missed school, higher functional disability, and more psychological difficulties.

Hypothesis Three: Children's and parents' attributions about the cause of the pain will be significantly associated with control beliefs, coping strategies and adjustment to the pain.

Prediction 1. Children who make any attributions will:

    (a) have lower fate/chance control beliefs,

    (b) use less passive and more active and accommodative coping strategies

    (c) have better functional and psychological adjustment

than those who make no attributions.

Prediction 2. Parents who make any attributions will:

    (a) have lower fate/chance control beliefs; and have children who:

    (b) have lower fate/chance control beliefs

    (c) use less passive and more active and accommodative coping strategies

    (d) have better functional and psychological adjustment

than those who make no attributions.

Prediction 3. Children who attribute their pain to their own behaviour will:

    (a) have higher self control beliefs,

    (b) use less passive and more active and accommodative coping strategies

    (c) have better functional and psychological adjustment

than those who make other or no attributions.

Prediction 4. Parents who attribute the pain to their child's behaviour will:

    (a) have higher child control beliefs, and have children who

    (b) have higher self control beliefs

    (c) use less passive and more active and accommodative coping strategies

    (d) have better functional and psychological adjustment

than those who make other or no attributions.

Prediction 5. Children who attribute their pain to a pathological cause will:

    (a) have lower self control beliefs,

    (b) use more passive and less active and accommodative coping strategies

    (c) have poorer functional and psychological adjustment

than those who make other or no attributions.

Prediction 6. Parents who attribute their child's pain to a pathological cause will:

    (a) have lower self control beliefs, and have children who

    (b) have lower self control beliefs

    (c) use more passive and less active and accommodative coping strategies

    (d) have poorer functional and psychological adjustment

than those who make other or no attributions.

2 METHODOLOGY

The methodology and results from the pilot study are first discussed, before the methodology of the main study is presented. Throughout this and the following chapters, the term "children" is used to refer to both the child and adolescent participants.

2.1 PILOT STUDY

A pilot study was carried out to assess both the validity of the interview questions and whether the questions were suitable for a range of ages. The pilot was also used to assess the length of time needed to complete the interview and questionnaire measures, and to establish the pace and ordering of the procedure. After each pilot interview, participants were asked to comment on the interview schedule; whether the questions were comprehensible, how questions could have been asked more clearly and which prompts had been useful in clarifying questions. Based on these discussions and feedback from colleagues the final interview schedule and standardised prompts were devised (discussed below).

2.1.1 Pilot procedure

Pilot participants were recruited from a paediatric rheumatology clinic and from a paediatric pain clinic. Six potential pilot participants were identified; five agreed to take part. Participants were selected on the basis of age (11-18) and length of pain problem (at least three months).

The interview procedure and the questionnaire measures used were the same as for the main study (see below for discussion).

2.1.2 Pilot sample

2.1.2.1 Demographics

The pilot sample comprised five children and their parents. The children's ages ranged from 11-18 (mean 13.80, standard deviation, S.D., 2.59). Four of the children were female

and all five interviewed parents were mothers. All five families were white, and social class ranged from one to four (Office of Population Censuses and Surveys, 1991). Three children lived with both parents; the other two lived with their mothers.

2.1.2.2 Pain characteristics

All five children had pain in one or more of their joints. Four had received diagnoses of juvenile chronic arthritis and one had received no diagnosis. Pain severity and chronicity are shown in Table 1.

Table 1. Pilot sample – child-rated pain severity and chronicity

Child rated measures	Range	Mean	S.D.
Months since onset	3-156	68.60	57.16
Days per month in pain	7-28	17.00	10.39
Pain today (0-100)	0-55	23.80	22.69
Worst pain last week (0-100)	0-75	41.00	35.95
Average pain last 3 months (0-100)	20-70	44.40	22.51

2.1.3 Pilot results

2.1.3.1 Attributional beliefs

Attributions were elicited and coded in a similar way to that for the main sample described below.

Two children and four parents attributed the pain to a pathological cause (arthritis). Two children attributed the pain to their own behaviour and one child and one parent attributed the pain to permanent damage caused by an operation.

Two of the children with arthritis did not attribute their pain to their illness, but to their own behaviour. Four of the children made some attribution to their own behaviour; none of the parents made any child-blaming attributions.

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2.1.3.2 Control beliefs

Control beliefs were rated using unmarked 10 cm lines; these were anchored with "no control/no influence" – "complete control/strong influence"; and "no decrease" – "very large decrease". (The measurement of control beliefs was altered considerably after piloting). Table 2 shows the means and standard deviations of the control measures.

Table 2. Pilot sample - means and standard deviations of control beliefs

	Children		Parents	
Control beliefs (rated 0-100)	Mean	S.D.	Mean	S.D.
Strength of belief in child's ability to reduce pain	52.00	11.51	50.00	12.25
Rating of decrease in pain due to child's actions	59.00	25.10	53.00	16.05
Strength of belief in parent's ability to reduce pain	39.00	30.08	20.00	15.81
Rating of decrease in pain due to parent's actions	41.00	36.12	38.00	30.12
Strength of belief in medical staff's ability to reduce pain	33.40	26.79	54.00	5.48
Rating of decrease in pain due to medical staff's actions	42.40	34.15	50.00	31.43
Strength of belief in fate/chance's ability to reduce pain	33.00	34.21	20.00	27.39
Rating of decrease in pain due to fate/chance	29.00	27.02	24.00	28.81

Children believed most in their own ability to reduce the pain, whilst parents held strongest beliefs in medical staff's ability to reduce the pain. However, both children and their parents rated decrease in pain due to the child's actions most highly.

2.1.3.3 Pain Coping

An adapted Pain Response Inventory (Walker et al., 1997), as described in section 2.5.4.1, was used to measure pain coping strategies. Table 3 shows the mean and standard deviations of scores on the three coping styles.

Table 3. Pilot sample - means and standard deviations of the Pain Response Inventory coping factors

Coping factors (range 0-4)	Mean	S.D.
Active coping	1.98	0.26
Accommodative coping	1.58	0.43
Passive coping	1.08	0.50

Active coping strategies were the most frequently used. Categorising children by their most strongly-rated coping style, three were classified as active copers, one as an accommodative coper and one as a passive coper.

2.1.3.4 Adjustment measures

Table 4 shows the frequency of school absence and Table 5 shows ranges, means and standard deviations for scores on the Functional Disability Inventory, Youth Self-Report and Child Behavior Checklist scales.

Table 4. Pilot sample - frequency of school absence

Number of missed school days (in last 3 months)	Child ratings	Parent ratings
None	3	2
1-2 weeks	2	3
More than 2 weeks	0	0

Table 5. Pilot sample - ranges, means and standard deviations of adjustment measures

Standardised measures	Child ratings			Parent ratings		
	Range	Mean	S.D.	Range	Mean	S.D.
FDI	2-25	14.80	8.70	7-27	14.80	8.04
YSR/CBCL internal score	3-31	17.60	14.06	2-12	9.40	4.34
YSR/CBCL external score	5-24	14.60	7.64	0-13	5.80	5.26
YSR/CBCL total score	20-80	54.20	30.10	3-29	22.60	10.99

No children had missed more than two weeks of school in the last three months. The Functional Disability scores were similar to those reported by Walker and Greene (1991) for children with abdominal pain of known organic origin. Of the Youth Self-Report profiles, two indicated clinical levels of problems; none of the Child Behavior Checklist reached clinical cut-off.

No further (hypothesis-testing) analyses were carried out with the pilot data.

The rest of this chapter describes the methodology for the main study.

2.2 DESIGN

The study employed a quantitative methodology, and was interview and questionnaire based. The study was correlational and investigated two main sets of relationships: relationships between child and parent attribution and control beliefs; and relationships between attributions, control beliefs, coping strategies and adjustment.

2.3 PARTICIPANTS

Participants were children with chronic pain disorders and their parents. Ideally, the children would have reached formal-operational thought in relation to the cause of illness; therefore, participants were aged between 11 and 18 (see Gaffney & Dunne, 1986). All participants were in secondary education. Chronic pain was defined as that which had continued for more than three months and failed to respond to the usual interventions (Bates & Rankin-Hill, 1994). Pain types that were included were headaches, migraines, recurrent abdominal pain, and neuropathic pains. Children with pain disorders associated with physical injury or chronic disease were not included. Children with illness or disability unrelated to the pain were also excluded (because of possible confounding influences on adjustment measures).

The pain patients were drawn from a paediatric chronic pain clinic, paediatric psychology clinics, and general paediatric clinics in two children's hospitals within the Trent region. Participants were selected on the following criteria:

> aged 11-18, in full-time secondary education;
>
> a pain problem of at least three months duration; and
>
> no clear organic aetiology of the pain (as determined by the child's paediatrician).

Participants were identified by a number of methods, including: the researcher identifying possible participants from clinic notes, the researcher attending clinics to identify possible participants, and paediatricians referring patients.

Recruitment strategy differed between consultants. However, all children and parents were approached in clinic either by the researcher or their consultant, and provided with the information sheets about the study (see Appendix 1). Those who agreed to be contacted were telephoned within two weeks and provided with more information about the study. Of the 50 children contacted, 10 families declined to take part, or agreed but later withdrew. Only one parent from each family was asked to participate, to reduce administration time and to simplify analysis. Families who agreed to take part were asked to select the parent most appropriate to answer questions about the child's pain.

2.3.1 Demographics

Forty children and their parents comprised the sample. The children's ages ranged from 11-17 (mean 13.65; S.D. 1.91). Girls comprised 67.5% (27) of the sample. Most of the interviewed parents were mothers (95%; 38), the other 5% (2) were fathers. The majority of the participants were white (92.5%; 37); 7.5% (3) were Asian. The social class of participants ranged from one to four, with the majority of the sample (67.5%; 27) in classes two and three (Office of Population Censuses and Surveys, 1991); in 15% (6) of families the main wage-earner was unemployed. The majority of children lived with both parents (75%; 30), 22.5% (9) lived with their mother and 2.5% (1) lived with her father.

There was no demographic or medical information available on the families who declined to participate.

2.3.2 Pain Characteristics

The frequency of reported pain types and the measures of severity and chronicity of pain are shown in Tables 6 and 7 below.

Table 6. Frequency of pain type

Pain type	Number of children
Back	10% (4)
Head	45% (18)
Stomach	15% (6)
Limb/Joint	17.5% (7)
Mixed	12.5% (5)

Table 7. Child-rated pain severity and chronicity

Pain severity (Child ratings)	Range	Mean	S.D.
Months since onset	3-144	33.10	31.19
Days per month (4 weeks) in pain	1-28	14.80	9.49
Pain today (0-100)	0-75	21.62	24.58
Worst pain last week (0-100)	0-95	49.75	29.20
Average pain last 3 months (0-100)	10-95	55.13	20.24

When asked about pain problems in the rest of the family, 50% (20) of parents identified another close family member with a similar pain to the child's. High prevalence of pain role models has been found in other studies of children with unexplained pain (Aasland et al., 1997; Osbourne et al., 1989).

2.4 PROCEDURE

Permission was obtained from the ethical committees of the NHS Trusts involved in the study. Whilst the different committees had differing requirements regarding consent forms (see Appendix 2), the study procedure was standard across Trusts.

Parents provided informed consent for themselves and children less than 16 years (who also indicated their assent on a separate form). Adolescents aged 16 years and above provided informed consent for themselves. (See Appendix 2.) Assessment measures were completed during a single data collection session, which took approximately 2 hours (15 minutes introduction, 45 minutes child interview and questionnaires, and 60 minutes parent interview and questionnaires).

Interviews were arranged at the participants' convenience, either at their home or in the hospital they attended. The majority of interviews took place in participants' homes (77.5%; 31), the other 22.5% (9) were hospital-based. Most of the children agreed to be interviewed separately from their parents (90%; 36): in 10% (4), both child and parent were in the room for the interviews and the child was interviewed first.

Interviews comprised the interview schedules and administration of the questionnaire measures (see Appendices 3 & 4). The measures were administered in a standard order.

Children were interviewed first; then the child-rated coping, psychological adjustment and functional adjustment questionnaires were administered. Then parents were interviewed, before the parent-rated psychological and functional adjustment measures were administered. The questionnaires were given to the participants to complete themselves (three parents had reading difficulties so questionnaires were read aloud to them), but the researcher was present at all times to answer queries and to check that no questions had been missed.

After the interview, participants were sent a brief letter to thank them for taking part in the study.

2.5 MEASURES

2.5.1 Selection of measures

2.5.1.1 Attributions

Rating scales, open-ended questions about causality, and spontaneous attributional statements have all been used to measure attributions in the literature regarding attributions and adjustment to illness (see Turnquist et al., 1988). Some paediatric research has used general attributional style questionnaires (e.g. Brown et al., 1991; Schoenherr et al., 1992). However, the apparent assumption that children's illness attributions are related to their general attributional style has not been tested.

Watts (1982) reviewed methods of eliciting patients' attributions about illness and concluded that the best assessment method was semi-structured interview. Whereas rating scales limit respondents to researchers' preconceived items, and spontaneous attributions may not include illness beliefs, interviews can directly explore individuals' beliefs. Semi-structured interviews have been used in much of the related literature. For example, Affleck et al. (1985) and Bearison et al. (1993) both used interviews in which questions were posed in uniform sequence, but interviewers were allowed flexibility to probe for clarification. In the study by Affleck et al., interviewers attempted to trace the causal chain from proximal to distal causes of the illness. Tennen et al. (1984) showed that attributional

interviews could be successfully used with children with chronic disorders.

There are, however, some problems with semi-structured interviews. Watts (1982) argues that there may be problems eliciting patients' explanations about their illness. The interviewer needs to spend time asking questions in a varied way, to elicit the range of models the individual may hold. People may initially present a single and simplistic explanation: the amount of probing may result in different levels of attribution. Questions may be leading or suggestive, and attempts to clarify questions or encourage further answers may lead to inconsistency between interviews. Subtle wording differences may result in different constructs being tapped. These problems are best controlled by piloting the questions to assess for bias, and by standardising the prompts used in interview. (As was done in the current study.)

2.5.1.2 Control beliefs

Whilst several control belief measures have been validated on adult chronic pain populations (e.g. the Beliefs about Pain Control Questionnaire [BPCQ], Skevington, 1990; the Multidimensional Locus of Pain Control [MLPC] questionnaire, ter Kuile, Linssen, and Spinhoven, 1993; the Pain Locus of Control [PLOC] scale, Toomey et al., 1995), no similar scales have been developed for use in paediatric chronic pain. Parcel and Meyer (1978) developed the Children's Health Locus of Control (CHLC) scale, but this has not been used in paediatric chronic pain research, and many of the items (e.g. regarding dental care) would be irrelevant in attempting to measure pain control beliefs. There are also problems with the validity and reliability of this measure (Stevenson, 1997). None of the above measures would be appropriate to measure parents' perceived control over their child's pain, or parents' perception of the child's own control.

Health control beliefs have been assessed directly in interviews. Measuring patients' perceived control over their breast cancer, Taylor et al. (1984) asked participants whether they had control over the course of their illness, using a Likert scale of 1 (no control) to 4 (a lot of control). They were also asked whether someone or something else had control over the illness, using the same scale.

Pain control beliefs have also been measured using direct questions and Likert scale responses. For example, Tennen et al. (1992) presented a series of statements relating to personal control over pain, and asked participants to rate how much they agreed or disagreed, using a Likert scale. The Coping Strategy Questionnaire (CSQ; Rosenstiel & Keefe, 1983) includes two pain control questions. Respondents are asked to indicate how much control they have over their pain, and how much they can decrease their pain by, using a scale from 0 (no control/can't decrease it) to 6 (complete control/can decrease it completely). These questions were the basis for measurement of control beliefs in the current study.

2.5.1.3 Coping strategies

The most frequently used pain coping questionnaire in adult chronic pain studies is the Coping Strategies Questionnaire. Gil and colleagues (Gil et al., 1991; Gil et al., 1993; Gil et al., 1997) have used the CSQ with children with sickle cell disease (SCD). Although they added subscales to assess strategies specifically relevant to SCD, it does not appear that they adapted the CSQ to make it more developmentally appropriate.

Several coping strategy measures have recently been designed for children. Both the Waldron/Varni Pediatric Pain Coping Inventory (Varni, Waldron, et al., 1996) and the Pain Coping Questionnaire (Reid et al., 1997) have been used in studies with paediatric chronic pain; however, neither of these measures were available for use in the current study. Walker et al. (1997) developed the Pain Response Inventory (PRI) to assess coping in children with recurrent abdominal pain. The scale was validated and found to be reasonably reliable (subscale alphas ranging from 0.68 - 0.89; coping factor alphas ranging from 0.71 - 0.78). The PRI is a multidimensional coping inventory assessing the strategies constituting each of the three general coping styles of Active Coping, Accommodative Coping, and Passive Coping. Active coping comprises problem-focused behavioural coping attempts. Accommodative coping comprises cognitive strategies that aim to allow the individual to adapt to unchangeable stressful conditions. Passive strategies involve withdrawing from or avoiding the stressful conditions.

Walker et al. (1997) argue that the PRI can be changed to examine the coping strategies used in other pain groups, by changing the stem question and replacing or rewording items

which are specific to abdominal pain. The PRI was adapted for use in the present study as described in section 2.5.4.1.

2.5.1.4 Functional Adjustment

School absence is the most commonly-used measure of functional adjustment to paediatric chronic pain (e.g. Dunn-Geier et al., 1986). Missed school provides an objective measure of the impact of the pain on the child's daily living tasks.

The Functional Disability Inventory (FDI; Walker & Greene, 1991) is a measure of the impact of illness on children's everyday physical and social functioning. The FDI has child and parent rated forms, and was developed from items on questionnaires for adults, but is suitably worded for use with a wide age-range. Walker and Greene validated the measure and found it to have good reliability (child form alpha 0.92; parent form alpha 0.95). Both child and parent questionnaires are brief and easy to administer. The measure centres on self-perception of problems, rather than actual functioning. Walker and Greene argue that a questionnaire based on perceived difficulty allows estimation of actual or anticipated difficulty in activities that may not have been performed recently.

Both school absence and the FDI were used to measure functional disability in the current study.

2.5.1.5 Psychological adjustment

Depression has been shown to relate to pain in adult studies (e.g. Jensen & Karoly, 1991) and scales focusing on depression or anxiety are frequently used to measure adult psychological adjustment. In paediatric chronic pain, measures such as the Child Depression Inventory (Kovacs, 1985) and the State-Trait Anxiety Inventory (Spielberger, 1973) have been used (e.g. Reid et al., 1997; Varni et al., 1996a). However, Crisson and Keefe (1988) call for the use of multidimensional or global indices for emotional adjustment in research with chronic pain patients. They argue that pain beliefs and coping strategies may affect psychological symptoms other than depression and anxiety. It is also appropriate to use multidimensional measures of adjustment in paediatric chronic pain, as the links between pain and psychological adjustment have not been thoroughly

investigated.

The Youth Self-Report (YSR; Achenbach, 1991b) was designed for use with children aged 11-18 years, to obtain descriptions of their own symptoms. It is the only widely used multidimensional self-report measure for children. The YSR includes a competence scale and a problem checklist. The checklist addresses a broad range of internalising and externalising psychological symptoms. Achenbach reports adequate reliability and validity for the measure (alphas for problem subscales and total scales range from 0.59 – 0.95).

The Child Behavior Checklist (CBCL/4-18; Achenbach, 1991a) was designed to measure the behavioural and emotional adjustment of children, based on parental report. The measure includes a competence scale and a problem checklist. The checklist addresses a broad range of internalising and externalising psychological symptoms for children aged 4-18 years. The CBCL has been used extensively in the paediatric illness adjustment literature (Perrin, Stein, and Drotar, 1991). Achenbach reports adequate reliability and validity for the measure (alphas for problem subscales and total scales range from 0.54 – 0.96). The CBCL and YSR are the only directly comparable parent and child assessments of emotional functioning, and so were used in the current study.

To summarise, Table 8 shows the measures that were selected for the study:

Table 8. Summary of measures selected

Variable	Child measure	Parent measure
Attributions	Interview	Interview
Control beliefs	Interview	Interview
Coping Strategies	Pain Response Inventory	-
Functional adjustment	Functional Disability Inventory; School absence	Functional Disability Inventory; School absence
Psychological adjustment	Youth Self-Report	Child Behavior Checklist

2.5.2 Child interview

The child interview schedule was designed to assess: the nature, frequency and severity of the pain; the child's perception of medical staff explanations for the pain; the child's perception of their parents' explanations for the pain; their own causal explanations for the

pain; and the child's beliefs about the controllability of the pain. (See Appendix 3a.) The interview began with questions about the nature of the pain.

2.5.2.1 Nature of the pain

The Pediatric Pain Questionnaire (PPQ; Varni, Thompson, and Hanson, 1987) was developed to promote comprehensive biopsychosocial assessment of children's chronic pain experiences. The measure includes assessment of the pain location, intensity, frequency, and quality (sensory and emotional). It was designed to be appropriate to cognitive-development, with separate forms for children and adolescents, and a parent form.

Based on questions from the PPQ, participants in the current study were asked: the location of the pain; when the pain problem had begun; the frequency of the pain; the duration of pain episodes; and the intensity of the pain. The sensory and affective qualities of pain, assessed by the PPQ, were not assessed in the current study. The pain intensity measures in the PPQ use visual analogue scales (VAS). Hain (1997) and Smith et al. (1989) recommend using visual analogue scales to assess the level of children's pain. In the current study children were asked to give ratings of: present pain, average daily pain over last three months, and worst pain in last week. They rated these using a VAS that is a plastic slide rule with the anchors "no pain " to "worst pain ever", with no numbers or marks on the participant's side of the slide. The interviewer's side is marked from 0 to 100 to allow for scoring.

Children were also asked how many days of school they had missed due to the pain in the last three months.

2.5.2.2 Attributions

Participants were asked whether they had received a diagnosis for the pain and, if so, whether they understood the diagnosis. They were then asked what medical staff had told them about the cause of the pain, and what their family had told them about the cause of the pain. This method of questioning not only opened the discussion of personal causal beliefs, but also allowed for exploration of where the children's causal beliefs originated.

Children were then asked what they thought caused the pain. A standard prompt was used: "Some people who have pain have hunches or theories about what causes it. Do you have any hunches or theories about what causes your pain?" Initial explanations were further queried in order to pursue underlying attributions (e.g. if a child supplied an attribution to muscle damage, s/he was then asked what caused the muscle damage). Participants were also encouraged to talk about beliefs or thoughts they may have had in the past, even if these had now been discounted. Finally, they were asked whether they could have changed anything in the past to avoid having the pain currently. This question was designed to encourage further discussion of the cause of the pain.

For each attribution children supplied, they were asked to rate how much they believed that was the cause of their pain, thereby identifying the most-strongly held causal beliefs. This was done using a sliderule VAS with the anchors 0% (Not at all) to 100% (Completely). Children could either indicate their strength of belief using the scale or by stating a percentage.

Attributions were coded as described in the Results section (see section 3.3.1). Coding categories were based on the content of the elicited attributions, and guided by previous research and the hypothesis being tested. Other researchers focusing on illness causal beliefs have either used post-hoc coding strategies (e.g. Affleck et al., 1985; Eiser et al., 1995) or conceptually driven coding systems (Jaber et al., 1991; Tennen et al., 1984).

2.5.2.3 Control beliefs

Children answered a series of questions regarding their control beliefs. They were first asked whether they believe that they can do things to reduce the pain. If the answer was yes, the child was asked to rate (using the same sliderule or percentage as above): (a) the strength of their *belief* that they can reduce their pain and (b) the extent to which they *can* decrease their pain. Participants were then asked the same questions regarding the parent that participated in the study, medical staff, and fate or chance.

These questions were designed to assess whether the children believed that their pain was controllable, either by themselves, by powerful others or by chance factors. The wording of the questions was adapted from the control belief questions included in the Coping

Strategies Questionnaire (CSQ: Rosenstiel & Keefe, 1983). The questions were designed to assess both control beliefs and coping efficacy beliefs.

The use of these questions allowed direct comparisons between children's beliefs and their parents'.

2.5.3 Parent interview

The parent interview schedule was designed to assess: parental perception of the nature, frequency and severity of the pain; parental perception of medics' explanations for the pain; their own explanations for the pain; the family pain history; the parent's attempts to help the child cope with the pain; and the parent's beliefs about the controllability of the pain. (See Appendix 4a.)

The parent's interview began by asking demographic information about the child (age, position in family) and the family (ethnicity, socio-economic status).

2.5.3.1 Nature of the pain

Parents were then asked about their perceptions of their child's pain problem (duration, frequency, intensity, and school absence), using the same questions as in the child interview (adapted from the parent form of the PPQ).

Parents were then asked about factors that make their child's pain worse, and about what things they can do to make their child feel better. Parents were also asked about the family's pain history and whether anyone close to the child experienced chronic pain (again, questions were adapted from the PPQ).

2.5.3.2 Attributions

Parents were asked whether their child had received a diagnosis and what the medical staff's explanations for the pain were; again to introduce questions about their own causal beliefs. They were then asked directly what they thought was the cause of the pain, again using the prompts regarding hunches/theories and past beliefs. Underlying attributions

were also pursued. Parents were also asked whether they or their child could have changed anything in the past to prevent the pain, in order to elicit any further attributions.

For each attribution parents supplied, they were asked to rate how much they believed that it was the cause of their child's pain, thereby identifying the most important attributions. This was done using the same sliderule VAS as above. Parents could either indicate their strength of belief using the scale or by stating a percentage.

Attributions were coded as described in the results section (3.3.1).

2.5.3.3 Control beliefs

Parents answered 10 questions regarding their pain control beliefs. Parents were asked whether they believe that they (or their child, or medical staff, or fate/chance) can reduce the pain. Again, if the answer was yes, the parent was asked to rate (using the same sliderule or stated percentage as above): (a) the strength of that belief and (b) the extent to which their child's pain is actually decreased. Parents were also asked whether they believe they can reduce their own pain (when they are experiencing pain) and again asked to rate (a) the strength of that belief and (b) the extent to which their own pain is decreased.

2.5.4 Questionnaires

2.5.4.1 Coping strategies

Children's coping strategies were assessed using the Pain Response Inventory (PRI; Walker et al., 1997). (See Appendix 3b.) The original PRI consists of 60 items, which load on to 13 subscales and 3 second-order factors: Active Coping (Problem-Solving; Seeking Social Support; Rest; Massage/Guard; Condition-Specific Strategies); Accommodative Coping (Acceptance; Minimizing Pain; Self-Encouragement; Distract/Ignore; Stoicism); and Passive Coping (Self-Isolation; Behavioral Disengagement; Catastrophizing). The questionnaire asks: "When you have a bad stomach-ache, how often do you..." followed by a statement describing a response to pain (e.g. "Try hard to do something about it?"). The response categories are: never (0), once in a while (1), sometimes (2), often (3), and always (4).

The PRI was designed for use with children with recurrent abdominal pain, and so the stem question and some of the items had to be changed to make it appropriate for children with other pain problems. The stem question used was "When you have a bad pain, how often do you...". Two items' wordings were changed, for example "Rub your stomach to try to make it feel better" became "Rub the sore part to try to make it better". Four items were dropped altogether, because they could not be adapted for non-stomach problems; for example "Try to go to the bathroom".

Scores for each of the 13 coping strategies are the mean score for the items that make up that strategy: a higher score indicating more frequent use of that strategy (scores range between 0 - 4). Scores for the general coping styles are the mean score for the strategies that load onto that style: again, a higher score indicates more frequent use of that type of coping.

2.5.4.2 Functional adjustment

Children and their parents completed the Functional Disability Inventory (Walker & Greene, 1991). (See Appendices 3c & 4b.) There are two forms of the questionnaire, one for children and one for parents. Both comprise the same 15 items; each rated on 5-point Likert scales. The original stem question "In the last few days, would you (your child) have had any physical trouble or difficulty doing these activities" was replaced with "How difficult is it for you (your child) to do these activities because of the pain?" This change was made after piloting, because with the original time frame, children who had not had a pain episode within the last few days would score zero, even though they reported being significantly disabled during pain episodes.

The 15 items are summed to give a total score of between 0 (well functioning) and 60 (poor functioning).

2.5.4.3 Psychological adjustment

Children completed the problem checklist of the Youth Self-Report (YSR; Achenbach 1991b), which comprises 102 problem items. (Copyright prohibits reproduction of the scale.) In this study, only the problem checklist was administered, both to reduce

administration time, and because the competence scale seems inappropriately worded for British children. For each problem item, the participant is asked to judge whether the statement is not true (0), somewhat or sometimes true (1), or very true or often true (2). The instructions state that the ratings given should be based on the last 6 months.

Parents completed the Child Behavior Checklist (CBCL/4-18; Achenbach 1991a). Again, only the problem checklist (118 items) was administered. (Copyright prohibits reproduction.) For each item, the parent is asked to judge whether the statement is not true (0), somewhat or sometimes true (1), or very true or often true (2) of their child. The instructions also state that the ratings given should be based on a 6-month period.

Scoring for both questionnaires is via a computer package (although the scorer must interpret several items on each questionnaire, and scoring rules between CBCL and YSR differ). Problem items are summed, to form a Total problem score: higher scores indicate more problems. Items form problem subscales (e.g. "withdrawn" or "thought problems"), which are then totalled into Internalising and Externalising problem scales. Both raw and T-scores for the subscales and Total problem scale are computed. T-scores represent the child's percentile score, as compared with a normative (gender and age matched) sample. However, different genders and age groups have different scale profiles: both with different problem subscales, and different items on same subscales. Therefore, Achenbach (1991a) recommends that in statistical analyses raw scores be used, because they reflect differences among individuals without truncation.

2.6 CHOICE OF STATISTICAL TESTS FOR ANALYSIS

Before any analysis was carried out, variables were examined to determine whether it was appropriate to use parametric statistics. Bryman and Cramer (1997) summarise the conditions under which it is appropriate to use parametric tests: the level of measurement is interval or ratio; the distribution of the population scores is normal; and the variances of variables are homogenous. Variables used in the analysis were examined to determine if they met these conditions.

Several of the variables (attributions, control beliefs and missed school) were considered to be nominal or ordinal level. Kolmogorov-Smirnov tests were used to assess whether the distribution of scores of variables differed significantly from normal distribution. The variables examined were: child's age and pain severity (child-rated average last three months); all child and parent pain control beliefs; the three coping factors; child and parent FDI; YSR and CBCL internal, external and total scales. The majority of these variables did not differ significantly from normal distribution. However, the majority of both child- and parent-rated control belief variables were found to significantly depart from normal distribution. Finally, Levene's tests were performed on the variables compared between attribution groups (see Hypothesis Three; section 3.5). These showed that the variances of several variables were significantly different. The size of the samples in the attribution groups were also unequal (see Bryman & Cramer). In conclusion, these preliminary tests revealed that the data departed from parametric requirements. Therefore, it was decided to use non-parametric statistical analyses.

The relationship between ordinal level data was examined using Kendall's tau-b (τ) correlation coefficients. This statistic was chosen due to its ability to deal with tied-ranks (i.e. more than one individual having the same ranked score). Kendall's tau-b varies between -1 and $+1$. Bryman and Cramer (1997) comment that there is little consensus regarding interpreting the size of correlations. Current interpretation is based on the guidelines they cite: ±0.20 to ±0.39 is low; ±0.40 to ±0.69 is modest; ±0.70 to ±0.89 is high; and ±0.90 to ±1 is very high (Cohen & Holliday, 1982, cited in Bryman & Cramer). Associations between nominal data (and data reduced to categorical) were examined using the Chi-square statistic. Group differences were examined using the Mann-Whitney U test. Significance values were set at $p<0.05$ throughout analysis and all analysis was performed using SPSS 8.0 for Windows.

3 RESULTS

Before testing the hypotheses, further information is presented regarding the participants' interview and questionnaire responses. The measures used are then examined for validity. After testing the hypotheses, the measures are examined for relationships with predicted moderating variables.

3.1 INTERVIEW AND QUESTIONNAIRE RESPONSES

See section 2.3.1 for information regarding participants' pain characteristics.

3.1.1 Control beliefs

Table 9 shows the means and standard deviations of children's and parents' ratings of pain control beliefs.

Table 9. Means and standard deviations (S.D.) of control beliefs

	Children		Parents	
Control beliefs (rated 0-100)	Mean	S.D.	Mean	S.D.
Strength of belief in child's ability to reduce pain	58.95	32.47	45.00	32.48
Rating of decrease in pain due to child's actions	44.87	30.05	27.52	24.34
Strength of belief in parent's ability to reduce pain	24.30	32.80	55.13	31.71
Rating of decrease in pain due to parent's actions	21.13	27.50	36.88	28.39
Strength of belief in medical staff's ability to reduce pain	54.75	38.18	45.75	35.76
Rating of decrease in pain due to medical staff's actions	33.38	33.71	30.65	31.03
Strength of belief in fate/chance's ability to reduce pain	16.05	20.44	9.9	19.02
Rating of decrease in pain due to fate/chance	15.05	23.04	10.15	24.08
Strength of belief in parent's ability to reduce their own pain	-	-	75.13	25.34
Rating of decrease in their own pain due to parent's actions	-	-	68.88	27.88

Children most strongly believed in their own ability to reduce pain, and rated decrease in the pain due to their own actions highest. They rated medical staff's ability to reduce pain and actual pain reduction as higher than parents', and rated fate/chance as having the least control over the pain.

Parents most strongly believed in their own ability to control their child's pain and rated their ability to actually decrease the pain higher than the others'. They rated medical staff's ability to reduce pain and actual pain reduction as higher than the child's, and rated fate/chance as having the least control over the pain.

3.1.2 Coping strategies

Table 10 shows the means and standard deviations of scores on the individual pain coping strategies and Table 11 shows the means and standard deviations of scores on the coping styles.

Table 10. Means and standard deviations of Pain Response Inventory subscales

PRI subscales (range 0-4)	Mean	S.D.
Problem solving	2.77	0.69
Seeking social support	1.91	0.81
Rest	2.50	0.74
Massage/guard	1.70	1.05
Self-isolation	1.65	1.12
Behavioural disengagement	1.00	0.83
Catastrophizing	1.55	0.70
Acceptance	1.96	0.83
Minimising pain	1.34	0.71
Self-encouragement	2.47	0.73
Distract/ignore	2.42	0.94
Stoicism	1.50	0.91
Condition specific strategies (medication use)	2.68	1.00

The most frequently used coping strategies were problem-solving, using medication, and resting. This is consistent with the findings reported by Walker et al. (1997).

Table 11. Means and standard deviations of PRI coping factors

Coping factors (range 0-4)	Mean	S.D.
Active coping	2.31	0.52
Accommodative coping	2.05	0.59
Passive coping	1.40	0.62

Active coping strategies were the most frequently used. Categorising children by their most strongly-rated coping style, 55% (22) were classified as active copers, 25% (10) as accommodative copers, 7.5% (3) as passive copers, and 12.5% (5) as mixed coping (equal scores on two or more factors).

3.1.3 Adjustment measures

Table 12 shows the frequency of school absence and Table 13 shows ranges, means and standard deviations for scores on the Functional Disability Inventory, Youth Self-Report and Child Behavior Checklist scales.

Table 12. Frequency of school absence

Number of missed school days (in last 3 months)	Child ratings	Parent ratings
None	30% (12)	27.5% (11)
1-2 weeks	37.5% (15)	35% (14)
2-4 weeks	15% (6)	15% (6)
More than 4 weeks	17.5% (7)	22.5% (9)

Table 13. Ranges, means and standard deviations of adjustment measures

Standardised measures	Child ratings			Parent ratings		
	Range	Mean	S.D.	Range	Mean	S.D.
FDI	2-45	17.45	10.93	0-52	21.73	14.91
YSR/CBCL internal score	4-47	17.78	8.09	0-37	12.33	7.57
YSR/CBCL external score	2-26	12.28	6.91	0-24	6.78	5.59
YSR/CBCL total score	17-101	48.38	19.92	2-77	27.13	16.41

The child-rated Functional Disability Inventory scores were similar to those reported by Walker and Greene (1991) for children with abdominal pain with no known organic origin. 22.5% (9) of the Youth Self-Report profiles indicated clinical levels of problems; 15% (6) of the Child Behavior Checklists also reached clinical cut-off.

3.2 INITIAL ANALYSES OF MEASURES

3.2.1 Control beliefs

To simplify presentation and discussion, the following labels are used to refer to children's and parents' control beliefs:

Table 14. Control beliefs – labels for analysis/discussion

Control beliefs	Label - Child	Label – Parent
Strength of belief in child's ability to reduce pain	Child Belief in Self	Belief in Child (parent)
Rating of decrease in pain due to child's actions	Child Self Pain Reduction	Child Pain Reduction (parent)
Strength of belief in parent's ability to reduce pain	Belief in Parent (child)	Parent Belief in Self
Rating of decrease in pain due to parent's actions	Parent Pain Reduction (child)	Parent Self Pain Reduction
Strength of belief in medical staff's ability to reduce pain	Belief in Medics (child)	Belief in Medics (parent)
Rating of decrease in pain due to medical staff's actions	Medics Pain Reduction (child)	Medics Pain Reduction (parent)
Strength of belief in fate/chance's ability to reduce pain	Belief in Fate/Chance (child)	Belief in Fate/Chance (parent)
Rating of decrease in pain due to fate/chance	Fate/Chance Pain Reduction (child)	Fate/Chance Pain Reduction (parent)
Strength of belief in parent's ability to reduce their own pain	-	Belief in Self – Own Pain (parent)
Rating of decrease in their own pain due to parent's actions	-	Self Pain Reduction – Own Pain (parent)

In order to examine the validity of the control questions, Kendall's tau-b (τ) correlations (two-tailed tests) were calculated between each of the control and efficacy questions for both the child and parent, as shown in Tables 15 and 16.

Table 15. Correlations between control and efficacy beliefs: child-rated

Child	tau-b
Belief in Self Self Pain Reduction	0.26*
Belief in Parent Parent Pain Reduction	0.81**
Belief in Medics Medics Pain Reduction	0.61**
Belief in Fate/Chance Fate/Chance Pain Reduction	0.73**

*p<0.05 **p<0.01

Correlations were low to strong and significant; lack of perfect correlation suggests that children were able to differentiate between the questions regarding strength of beliefs in pain control and actual pain decrease.

Table 16. Correlations between control and efficacy beliefs: parent-rated

Parent	tau-b
Belief in Self Self Pain Reduction	0.44**
Belief in Child Child Pain Reduction	0.43**
Belief in Medics Medics Pain Reduction	0.45**
Belief in Fate/Chance Fate/Chance Pain Reduction	0.73**
Belief in Self-Own Pain Own Pain Reduction	0.70**

**p<0.01

These correlations were moderate to strong and highly significant; again, lack of perfect correlation suggests that parents were able to differentiate between the questions regarding strength of beliefs in pain control and actual pain decrease.

Further correlations were calculated to explore relationships between control beliefs. For the children, there were significant correlations between strength of belief in parents' ability to reduce pain and strength of belief in medical staff's ability to reduce pain (τ=0.29, p<0.05). There were also relationships between ratings of actual pain decrease: ratings of actual decrease in pain due to the child correlated with decrease due to the parent (τ=0.40, p<0.01) and due to medical staff (τ=0.24, p<0.05). Actual decrease due to parents

and medics was also correlated (τ=0.37, p<0.01). This suggests that children who perceive one type of intervention (or intervention from a particular source) as efficacious are more likely to perceive another intervention as effective as well.

Similar results were found for the parents: parents' strength of belief in the child's ability to reduce their pain correlated with parents' belief in self (τ=0.34, p<0.01). Parents' control beliefs about their own pain correlated with their belief in medics' ability to control their child's pain (τ=0.26, p<0.05). Perceived decrease in pain due to their own actions correlated with perceived decrease due to the child (τ=0.57, p<0.01), and decrease due to medical staff (τ=0.36, p<0.01). Perceived decrease due to child's and medics' actions was also shown to correlate (τ=0.36, p<0.01).

3.2.2 Pain Response Inventory

As this measure had not been used with a mixed pain population previously and some items had been altered, the scale was examined for reliability. Cronbach's alpha for 12 of the 13 subscales was calculated (the Condition Specific Strategies–medication subscale had only one item and so was excluded from this analysis). Alphas ranged between 0.47 and 0.93; 8 of the 12 subscales had alphas that met recommended reliability (0.8; Bryman & Cramer, 1997). Cronbach's alpha was also calculated for the second-order scales: Active Coping (0.55), Accommodative Coping (0.73), and Passive Coping (0.46). These alphas were lower than those reported by Walker et al. (1997). The decision to use the measure in further analysis was supported by both the exploratory nature of the study; and the acceptability of lower alpha levels for scales which are new or in development (see Johnston, Wright, & Weinman, 1995). (See section 4.4.3 for further discussion.)

3.2.3 Functional Disability Inventory

The Functional Disability Inventory was also tested for reliability, as it had not been used with a similar chronic pain population. Cronbach's alpha for the Child form was 0.91 and for the Parent form was 0.94. This indicates that the scales are reliable for use with this population. Inter-rater reliability (child-parent correlation) is shown in the following section.

3.2.4 Relationships between adjustment measures

Kendall's tau-b (τ) correlations (two-tailed) were used to examine associations between the measures of adjustment: missed school; Functional Disability Inventory; and Youth Self-Report/Child Behavior Checklist.

Table 17. Child measures - Kendall's tau-b (τ) correlations

	Missed school	FDI	YSR total
Missed school	-	0.14	-0.02
FDI	-	-	0.07
YSR total	-	-	-

Table 18. Parent measures - Kendall's tau-b (τ) correlations

	Missed school	FDI	CBCL total
Missed school	-	0.34**	0.10
FDI	-	-	0.16
CBCL total	-	-	-

**p<0.01

The only significant correlation was that between parent-rated missed school and parent-rated FDI. In contrast, Walker and Green (1991) found child and parent FDI scores correlated moderately and significantly with school absence and the CBCL.

Children and parents were then compared on measures of child adjustment.

Table 19. Correlations between child and parent adjustment measures

Measure	*tau-b*
Missed school	0.85***
FDI	0.32**
CBCL/YSR totals	0.13
CBCL/YSR internal total	0.12
CBCL/YSR external total	0.35**

**p<0.01 ***p<0.001

The non-significant correlations between the Child Behavior Checklist and Youth Self-Report inventory total and internal scales are predicted from the literature (see Achenbach 1991b). The correlation between child and parent reported functional disability is similar to that reported by Walker and Green (1991).

For further analysis, parent-rated missed school was used (parents often appeared more certain of their estimate of absence than children). Child-rated functional disability and psychological adjustment were used as these measures are subjective and the child's perception of their own adjustment was the primary focus of investigation.

3.3 HYPOTHESIS ONE

There will be a significant association between children's pain beliefs and parents' pain beliefs.

Two main predictions were examined to test this hypothesis.

3.3.1 There will be a significant association between children's attributions about the cause of the pain and parents' attributions about the cause of the pain.

Before testing this prediction, it was necessary to code and categorise all attributional statements. Associations between children's and parents' most-strongly held attributions were then examined, before a series of specific predictions were tested using the Chi-square statistic.

Coding categories were generated from children's and parents' most-strongly held attributions (highest-rated percentage belief) about the cause of the pain. Attributions were assigned to categories by the researcher and two independent raters. Cohen's Kappa statistics were calculated to show agreement between raters: initial Kappa between the researcher and the independent raters were 0.74 (p<0.001) and 0.88 (p<0.001). Disagreements were resolved by negotiation and final inter-rater agreement was 100%.

The final coding categories are shown in Table 20.

Table 20. Attribution coding categories

Category	Description / Example
Don't know	the participant did not produce any attributions, or rated any elicited attributions as 0% believed, or attributed the pain to an unknown cause
Hereditary	the pain is attributed to genetically transmitted or inherited factors e.g. "there's knee pain in the family – it was waiting to happen"
Child's behaviour	the pain is attributed to the child's behaviour e.g. "probably too much running"
Physiology	the pain is caused by a problem with the functioning of the child's body, but not attributed to an organic process e.g. "the nerves in my head have gone wrong"; "his bowel doesn't work properly"
Organic illness/disease	the pain is caused by some pathology (undiscovered by doctors) e.g. "arthritis"; "there's something wrong in my head – it may be cancer"
Permanent damage	the pain is caused by permanent physical damage caused by an injury, illness or operation e.g. "meningitis damaged the lining of her brain"; "the doctors did something wrong (in the operation)"
Stress	the pain is caused by the child's emotional state and/or reactions to external stressors
Mixed	the participant held several attributions equally strongly, or indicated that they thought the pain was the result of a combination of several factors

Children's and parents' most-strongly held attributions were used to explore the frequency of attributing the cause of the pain to each of these categories, as shown in Table 21.

Table 21. Frequency of most-strongly held attributions

Attributions	Children	Parents
Don't know	2.5% (1)	2.5% (1)
Hereditary	7.5% (3)	7.5% (3)
Child's behaviour	15% (6)	0
Physiology	35% (14)	30% (12)
Organic illness/disease (Pathological)	12.5% (5)	10% (4)
Permanent damage	17.5% (7)	15% (6)
Stress	0	10% (4)
Mixed	10% (4)	25% (10)

Children generated between 1 and 11 attributions (mean 4.20, S.D. 2.56); the number of attributions which they believed to cause the pain (i.e. rated some percentage belief) ranged between 0 and 9 (mean 3.10, S.D. 2.06). The majority of children held more than one attribution (67.5%; 27). Parents also generated between 1 and 11 attributions (mean 4.88, S.D. 2.39); attributions believed to cause the pain (i.e. rated some percentage belief) ranged between 0 and 8 (mean 3.30, S.D. 1.96). The majority of parents held more than one attribution (85%; 34). Therefore, children and parents were generating an average of three attributions that they believed to some extent to be the cause of the pain.

The following analyses were not restricted to children's and parents' main attributions (most-strongly held) but examined any attributions to particular causes (believed to some extent to cause the pain; i.e. rated more than 0% believed).

Forty percent (16) of children held a self-blaming attribution (pain is caused by their own behaviour) and 32.5% (13) held a pathological attribution (attributing the pain to an undiscovered disease process). No parents made self-blaming attributions, 30% (12) held an attribution about the child's behaviour, and 30% (12) held a pathological attribution.

Most-strongly held attributions were used for the first test of the prediction:

3.3.1.1   There will be a significant association between children's and parents' most-strongly held attributions.

Initial analysis showed that 45% (18) of the child-parent dyads made the same category of attribution. The Lambda statistic was calculated for the child's main attribution dependent on the parent's attribution (Lambda=0.36, p<0.01). This shows that knowledge of the parent's attribution reduces error in predicting the child's by 36%.

The prediction (3.3.1) was then tested by dividing children and parents into groups based on their attributions as below. Chi-square analysis was used to examine associations:

3.3.1.2   There will be a significant association between children and parents making any attribution versus none.

It was not possible to test this prediction as all participants except one child and one parent made attributions.

3.3.1.3   There will be a significant association between children and parent making any attribution to the child's behaviour, or none.

Table 22. Chi-square analysis – any attribution to child's behaviour

Children making any attribution to their own behaviour?		Parents making any attribution to child's behaviour?		
		Yes	*No*	
	Yes	8	8	*16*
	No	4	20	*24*
		12	28	40

Chi-square 5.01, p<0.05

3.3.1.4 There will be a significant association between children and parents making any organic/pathological attribution or none.

Table 23. Chi-square analysis – any pathological attribution

Children making any pathological attribution?	Parents making any pathological attribution?		
		Yes	No	
	Yes	8	5	13
	No	4	23	27
		12	28	40

Chi-square 9.12, p<0.01

In summary, the findings indicate that there is a relationship between children's and parents' most-strongly held attributions. Specifically, significant associations were found between children and parents making any pathological attributions about the cause of the pain, and between children and parents making any attributions to the child's behaviour.

3.3.2 There will be a significant association between children's pain control beliefs and parents' pain control beliefs.

This was tested by examining Kendall's tau-b (τ) correlations (one-tailed tests) between children's and parents' control beliefs (see Table 14 for labels). A series of specific predictions were tested.

3.3.2.1 Children with strong beliefs in their own ability to control and decrease their pain will have parents with strong beliefs in their child's ability to control and decrease their pain.

Child Belief in Self correlated significantly with Belief in Child (parent) ($\tau=0.21$, $p<0.05$) and Child Self Pain Reduction correlated significantly with Child Pain Reduction (parent) ($\tau=0.29$, $p<0.05$).

3.3.2.2 Children with strong beliefs in their own ability to control and decrease their pain will have parents with strong beliefs in their ability to control and decrease their own pain.

Child Belief in Self did not correlate with Belief in Self–Own Pain (parent) nor did Child Self Pain Reduction correlate with Self Pain Reduction-Own Pain (parent).

3.3.2.3 Children with strong beliefs in their parents' ability to control and decrease their pain will have parents with strong beliefs in their own ability to control and decrease their child's pain.

Belief in Parent (child) correlated with Parent Belief in Self (τ=0.26, p<0.05) and Parent Pain Reduction (child) correlated with Parent Self Pain Reduction (τ=0.33, p<0.01).

3.3.2.4 Children with strong beliefs in medical staff's ability to control and decrease their pain will have parents with strong beliefs in medical staff's ability to control and decrease their child's pain.

Belief in Medics (child) correlated with Belief in Medics (parent) (τ=0.33, p<0.01) and Medics Pain Reduction (child) correlated with Medics Pain Reduction (parent) (τ=0.34, p<0.01).

3.3.2.5 Children with strong beliefs in fate/chance's ability to control and decrease their pain will have parents with strong beliefs in fate/chance's ability to control and decrease their child's pain.

Belief in Fate/Chance (child) did not correlate with Belief in Fate/Chance (parent) nor did Fate/Chance Pain Reduction (child) correlate with Fate/Chance Pain Reduction (parent).

In summary, three predicted relationships between children's and parents' control beliefs were found to be weak to moderate and statistically significant. However, no relationship was found between parents' beliefs about controlling their own pain and children's control beliefs about their pain. Neither was a significant relationship shown between children's

beliefs in the role of fate/chance in controlling their pain, and their parents' beliefs about fate/chance.

3.4 HYPOTHESIS TWO

Children's use of coping strategies will be significantly associated with their adjustment

This hypothesis was tested by examining Kendall's tau-b (τ) correlations (two-tailed tests) between scores on each of the 13 specific coping strategies and the Active, Accommodative and Passive coping styles with scores on missed school (parent-rated), functional disability (child-rated) and psychological adjustment (child-rated). This examination allowed several predictions to be tested at once:

The use of Active Coping strategies will be significantly associated with less missed school, lower functional disability and fewer psychological difficulties.

The use of Accommodative Coping strategies will be significantly associated with less missed school, lower functional disability and fewer psychological difficulties.

The use of Passive Coping strategies will be significantly associated with more missed school, higher functional disability, and more psychological difficulties.

Missed school correlated with the coping strategy Rest (τ=0.29, p<0.05). Functional disability (FDI scores) correlated with Self-isolation (τ=0.25, p<0.05). Youth Self-Report scores were positively correlated with Behavioural Disengagement (τ=0.31, p<0.01) and Acceptance (τ=0.31, p<0.01); and negatively correlated with medication use (τ=-0.28, p<0.05).

Missed school did not correlate significantly with any of the general coping styles. FDI scores did not correlate significantly with any of the coping styles, but did have a weak positive relationship with Passive Coping that approached significance (τ=0.20, p<0.1). YSR total scores had a negative correlation with Active Coping (τ=-0.23, p<0.05) and a positive correlation with Accommodative Coping which approached significance (τ=0.20, p<0.1).

In summary, the data indicate some predicted associations between individual coping strategies and coping styles and the adjustment measures. However, specific correlations were all found to be low, which suggests that other variables may also be important in predicting adjustment to paediatric chronic pain.

3.5 HYPOTHESIS THREE

Children's and parents' attributions about the cause of the pain will be significantly associated with control beliefs, coping strategies and adjustment to the pain.

This hypothesis was tested by examining a series of specific predictions using Mann-Whitney U tests, as below. (See Table 14 for clarification regarding labels for child and parent control beliefs.)

3.5.1 Children who make any attributions will:

    (a) have lower fate/chance control beliefs,

    (b) use less passive and more active and accommodative coping strategies

    (c) have better functional and psychological adjustment

  than those who make no attributions.

Only one child made no attributions about the cause of the pain (i.e. "don't know"). This meant that this prediction was not testable.

3.5.2 Parents who make any attributions will:

    (a) have lower fate/chance control beliefs; and have children who:

    (b) have lower fate/chance control beliefs

    (c) use less passive and more active and accommodative coping strategies

    (d) have better functional and psychological adjustment

  than those who make no attributions.

Only one parent made no attributions about the cause of the pain (i.e. "don't know"). This meant that this prediction was also not testable.

3.5.3 Children who attribute their pain to their own behaviour will:

  (a) have higher self control beliefs,

  (b) use less passive and more active and accommodative coping strategies

  (c) have better functional and psychological adjustment

than those who make other or no attributions.

This prediction was explored using Mann-Whitney *U* tests (one-tailed) in two ways.

3.5.3.1 (i) Main attribution to own behaviour versus other attributions

First, children were categorised by their most-strongly held attributions into either "own behaviour" or "not". Six children comprised the first group and 34 the second. These two groups were compared on their scores of: Child Self Pain Control Beliefs; coping styles; missed school (parent-rated); functional disability (child-rated); and psychological adjustment (child-rated).

See Figure 3, which shows the percentage mean scores of the two groups on the range of measures. The mean score for each group was divided by the total possible score of the measure and multiplied by 100 to calculate percentage means. This enabled all measures to be represented on the same scaling. As can be seen in the graph, all differences between the two groups were in the predicted direction, however, none met statistical significance levels (p<0.05).

Figure 3. Main attribution to own behaviour (child)
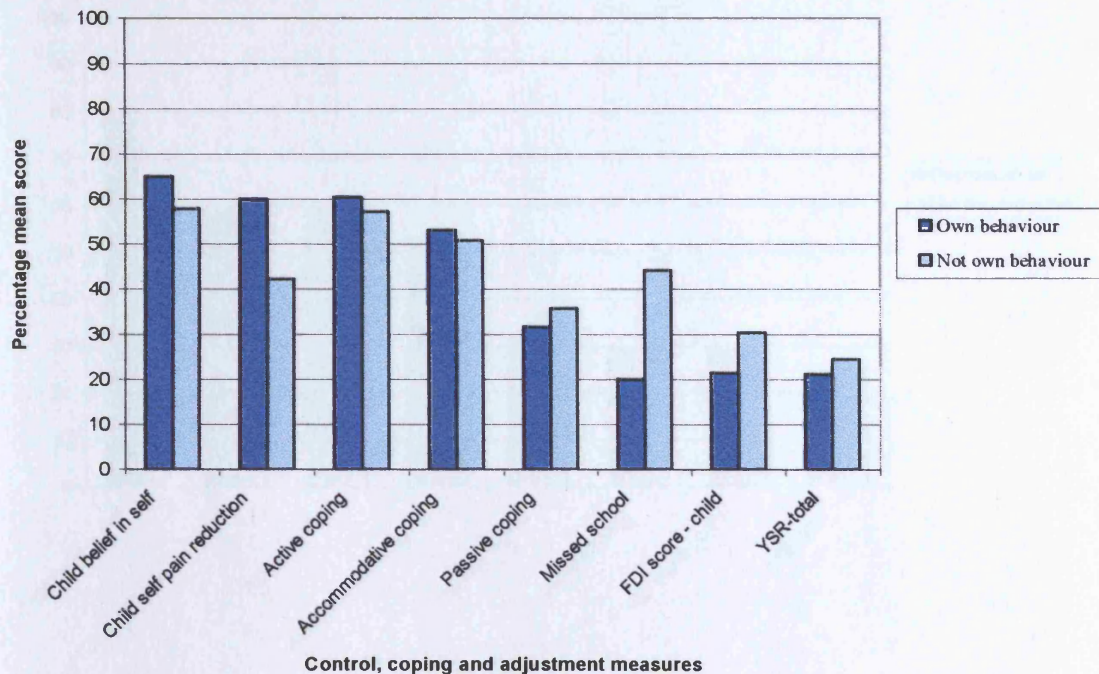
3.5.3.2 *(ii)* Any attribution to own behaviour versus none

Children were categorised by whether they made any attributions to their own behaviour into either "any own behaviour" or "none". Sixteen children comprised the first group and 24 the second. These two groups were compared on their scores of: Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 4, which shows the percentage mean scores of the two groups on the range of measures. As the graph shows, differences between the two groups were again in the predicted direction, with the exception of FDI scores. The differences in Child Belief in Self (U=75.50, p<0.001) and Child Self Pain Reduction met high significance levels (U=110.00, p<0.01). The difference between the groups in missed school approached significance (U=139.50, p<0.10).

Figure 4. Any attribution to own behaviour (child)
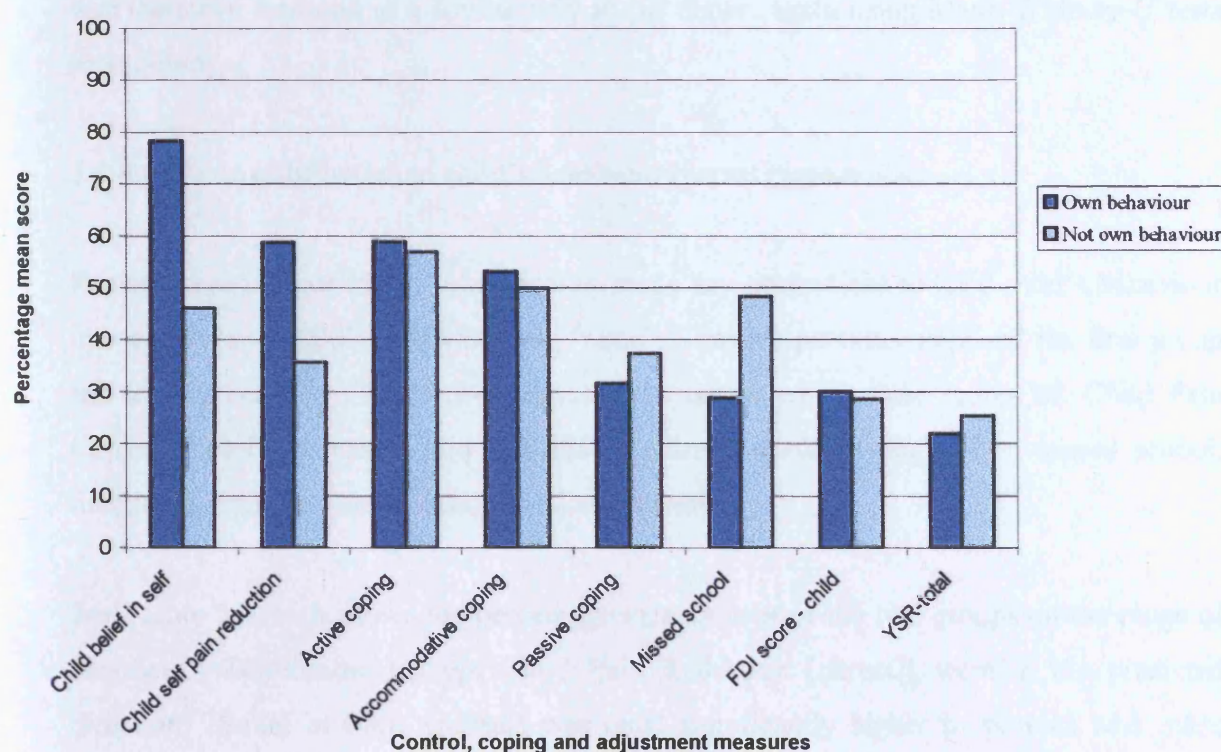
In summary, the trends in the data were in the predicted direction: children who made attributions to their own behaviour tended to be better copers and more well-adjusted than those who did not. However, analyses of specific measures of control, coping and adjustment showed that the differences between the two groups of children were mostly non-significant. Children who made any attribution to their own behaviour had significantly higher beliefs in their ability to control the pain than children who either did not mention their own behaviour as a cause of their pain, or who did not believe to any extent that their own behaviour had caused their pain.

3.5.4 Parents who attribute the pain to their child's behaviour will:

     (a) have higher child control beliefs, and have children who

     (b) have higher self control beliefs

     (c) use less passive and more active and accommodative coping strategies

     (d) have better functional and psychological adjustment

*than those who make other or no attributions.*

No parents rated child's behaviour attributions as their most-strongly held. This prediction was therefore explored in a similar way to *(ii)* above, again using Mann-Whitney U tests (one-tailed).

3.5.4.1 *(i)* Any attribution to child's behaviour (parent) versus none

Parents were categorised by whether they made any attributions to their child's behaviour into either "any child's behaviour" or "none". Twelve parents comprised the first group and 28 the second. These two groups were compared on their scores of: Child Pain Control Beliefs (parent); Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 5, which shows the percentage mean scores of the two groups on the range of measures. Differences (except Child Pain Reduction [parent]) were in the predicted direction. Belief in Child (parent) was rated significantly higher by parents who made attributions to their child's behaviour (U=105.00, p<0.05). Children of parents making attributions to child's behaviour used significantly less Passive Coping (U=112.00, p<0.05) and had significantly lower YSR scores (U=89.00, p<0.01). These children also had higher Child Belief in Self and Child Self Pain Reduction, which approach significance (U=119.00, p<0.10; U=116.00, p<0.10) and used more Active Coping, also approaching significance (U=120.00, p<0.10).

Figure 5. Any attribution to child's behaviour (parent)
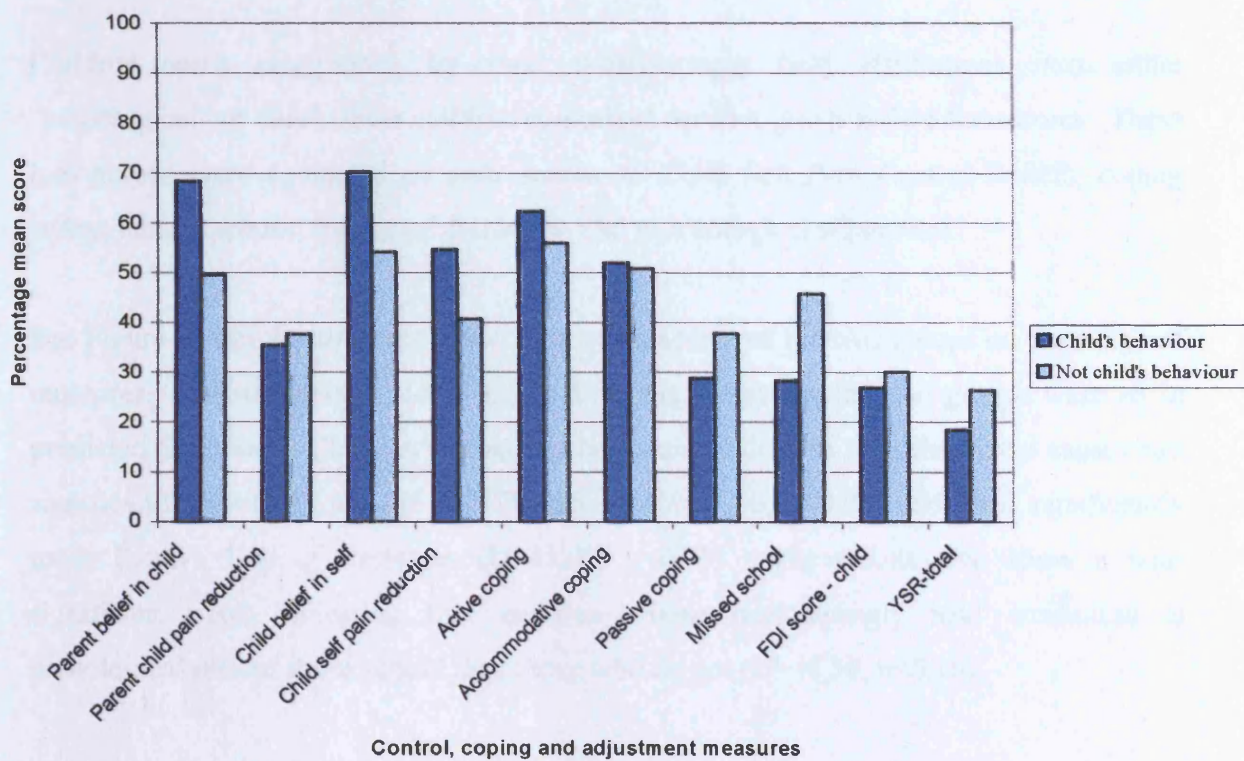
In summary, parents who made any attributions to their child's behaviour had significantly stronger beliefs in their child's ability to reduce the pain. They also had children who used significantly less Passive Coping and had significantly lower self-rated psychological problems.

3.5.5 Children who attribute their pain to a pathological cause will:

  (a) have lower self control beliefs,

  (b) use more passive and less active and accommodative coping strategies

  (c) have poorer functional and psychological adjustment

 than those who make other or no attributions.

This prediction was explored using Mann-Whitney *U* tests (one-tailed) in two ways.

3.5.5.1 (i) Main attribution to pathological cause versus other attributions

Children were categorised by their most-strongly held attributions into either "pathological" or "not". Five children comprised the first group and 35 the second. These two groups were compared on their scores of: Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 6, which shows the percentage mean scores of the two groups on the range of measures. As can be seen in the graph, differences between the two groups were all in predicted directions. Children who made their main attribution to pathological causes had significantly lower Child Self Pain Reduction (U=47.00, $p<0.05$) and used significantly more Passive Coping strategies (U=43.00, $p<0.05$). The results also show a non-significant trend indicating that children whose most-strongly held attribution is pathological missed more school than those who do not (U=48.50, $p<0.10$).

Figure 6. Main attribution to pathological cause (child)
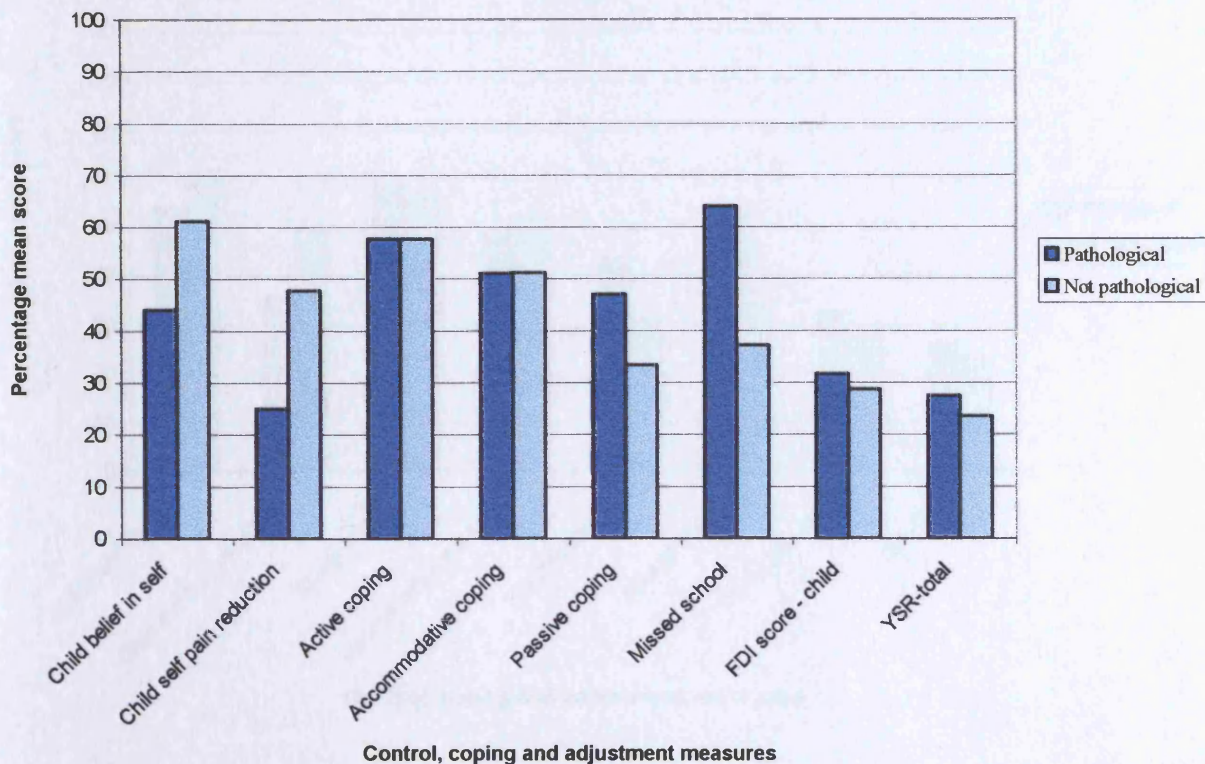
3.5.5.2 (ii) Any attribution to pathological cause versus none

Children were categorised by whether they made any attributions to pathology into either "any pathological" or "none". Thirteen children comprised the first group and 27 the second. These two groups were compared on their scores of: Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 7, which shows the percentage mean scores of the two groups on the range of measures. Differences were in the predicted direction (except Active Coping). Children making any pathological attributions had significantly lower beliefs in Child Self Pain Reduction (U=119.50, $p<0.05$) and used significantly more Passive Coping (U=103.00, $p<0.05$). Children making any pathological attributions had higher FDI scores, a difference that approached significance (U=128.00, $p<0.10$).

Figure 7. Any attribution to pathological cause (child)
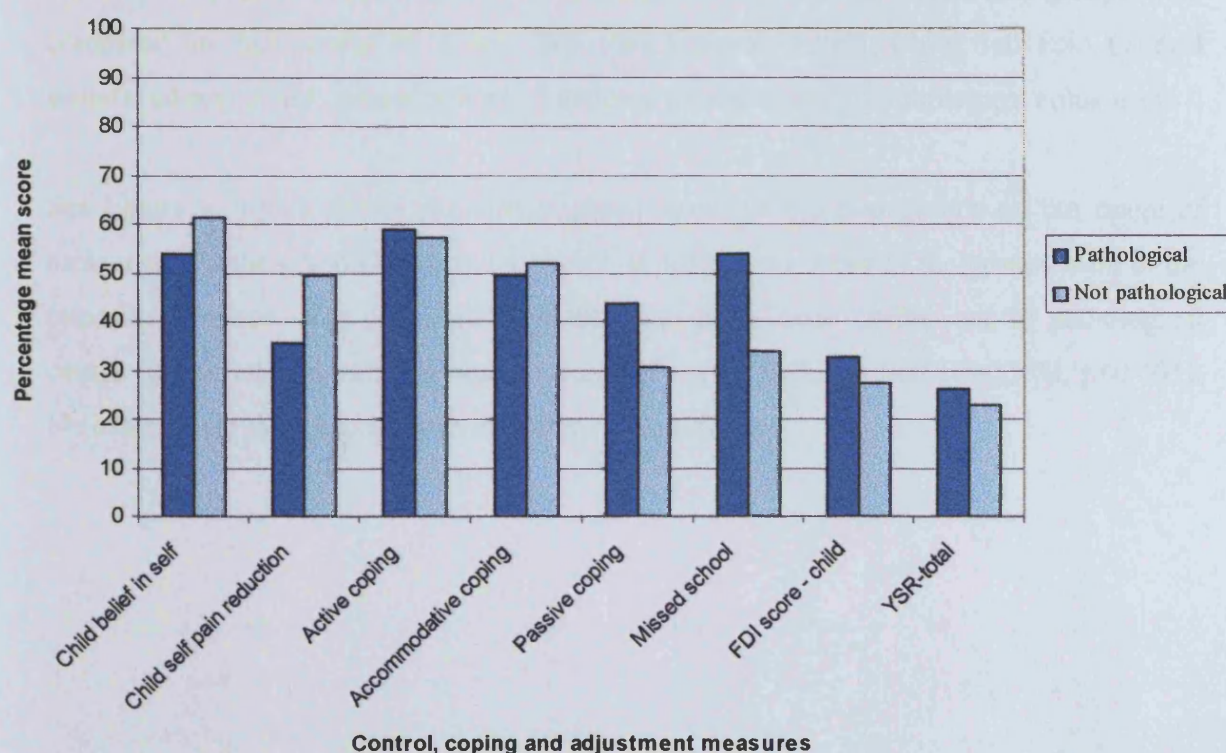
Control, coping and adjustment measures

In summary, children who made attributions to a pathological cause believed significantly less in their ability to reduce their own pain and used significantly more Passive Coping strategies.

3.5.6 Parents who attribute their child's pain to a pathological cause will:

    (a) have lower self control beliefs, and have children who

    (b) have lower self control beliefs

    (c) use more passive and less active and accommodative coping strategies

    (d) have poorer functional and psychological adjustment

  than those who make other or no attributions.

This prediction was also explored using Mann-Whitney U tests (one-tailed) in two ways.

3.5.6.1 (i) Main attribution to pathological cause (parent) versus other attributions

Parents were categorised by whether their main attributions into either "pathological" or "not". Four parents comprised the first group and 36 the second. These two groups were compared on their scores of: Parent Self Pain Control Beliefs; Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 8, which shows percentage mean scores of the two groups on the range of measures. As the graph shows, the majority of differences between the groups were in the opposite direction from predicted. Parents who made main attributions to pathological causes had strongly significant higher ratings of Parent Belief in Self (U=15.00, p<0.005). No other group differences reach or approach significance.

Figure 8. Main attribution to pathological cause (parent)
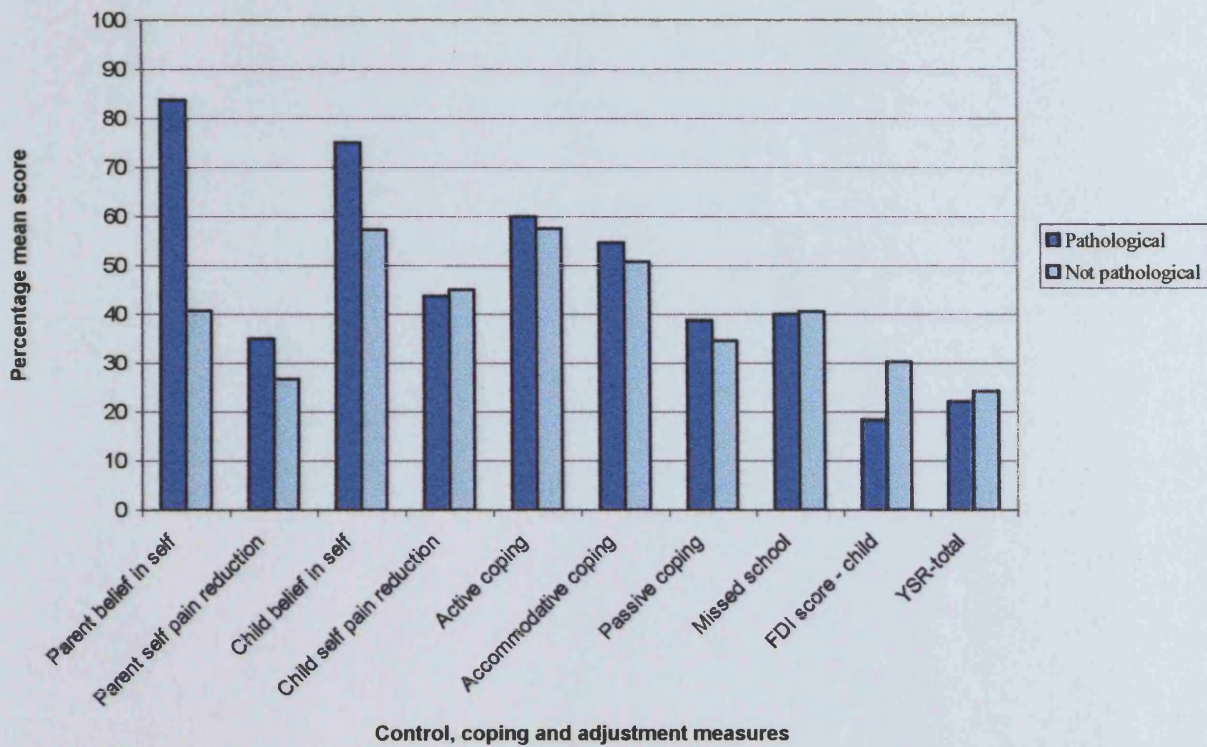
3.5.6.2 (ii) Any attribution to pathological cause (parent) versus none

Parents were categorised by whether they made any attributions to pathology into either "any pathological" or "none". Twelve parents comprised the first group and 28 the second. These two groups were compared on their scores of: Parent Self Pain Control Beliefs; Child Self Pain Control Beliefs; coping styles; missed school; functional disability; and psychological adjustment.

See Figure 9, which shows percentage mean scores of the two groups on the range of measures. As the graph shows, the majority of the differences between the groups were in the opposite direction from that predicted, although differences were generally small. However, as predicted, children whose parents made any pathological attributions missed significantly more school (U=107.50, p<0.05).

Figure 9. Any attribution to pathological cause (parent)
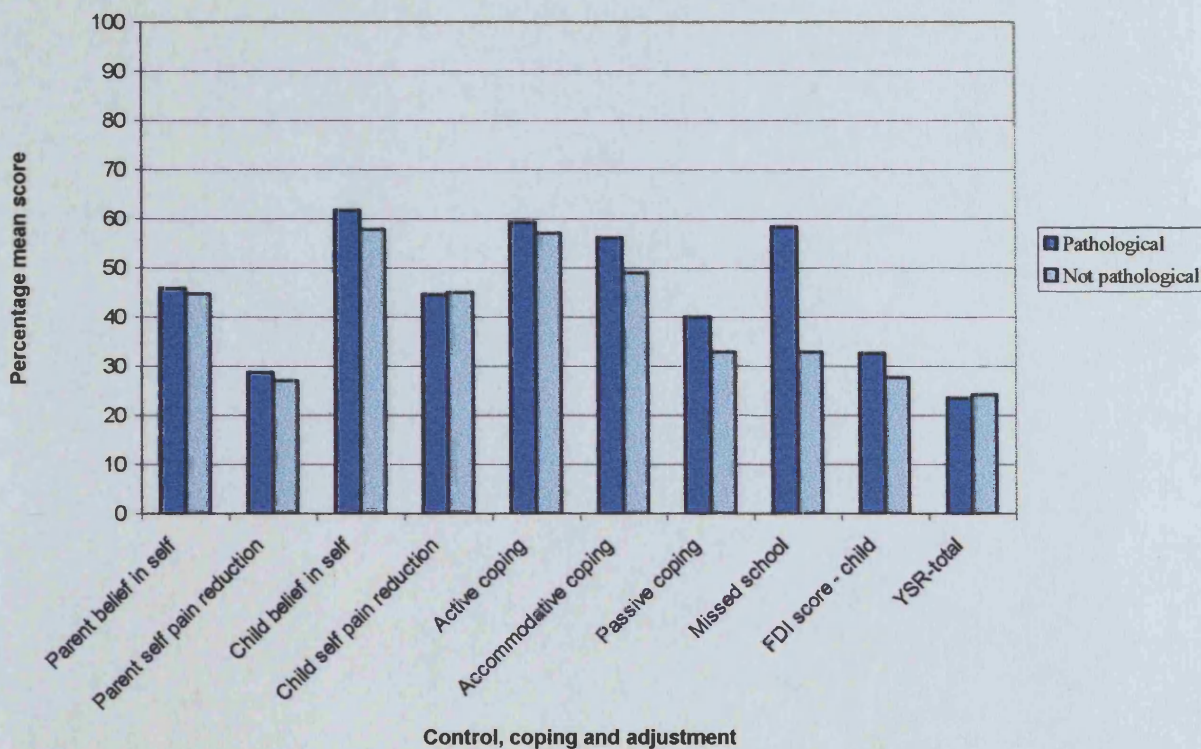
In summary, parents who mainly attribute their child's pain to a pathological cause have higher beliefs in their own ability to control their child's pain, and parents who have any pathological attributions have children who miss significantly more school. However, the influence of parents' pathological attributions on control, coping and adjustment measures appears complex, as not many group differences were in the predicted direction. Parental attributions to pathology had inconsistent relationships with coping and adjustment measures.

3.6 EXAMINATION OF MODERATING VARIABLES

After the hypotheses were tested, the measures used in the analyses were explored for relationships with other, possibly confounding variables. It has been suggested that children's age and gender, and the chronicity and severity of the pain they are experiencing will influence their beliefs about pain, their coping strategies and their adjustment (e.g.

McGrath & Hillier, 1996). The influence of type of pain disorder (i.e. location) on these variables was also considered, as previous research had not used mixed pain samples.

A combination of Mann-Whitney U tests, Chi-square statistics and Kendall's tau-b (τ) correlations (all two-tailed tests) were used to look for significant associations between the above variables and the variables used in analysis of the hypotheses. Ordinal and interval data was reduced to nominal for Chi-square analysis on the basis of median splits.

3.6.1 Age

Age was not found to correlate significantly with any of the pain attribution categories (as explored in Hypothesis Three), nor the coping measures. Age had a significant negative correlation with Belief in Fate/Chance (child) ($\tau=-0.21$, $p<0.05$). Of the adjustment measures, age was found to be positively correlated with child-rated FDI ($\tau=0.25$, $p<0.05$).

3.6.2 Gender

There were no significant associations between gender and attributional beliefs (as used in the analysis of Hypothesis Three). There were no significant differences between girls and boys on the pain control belief, coping or adjustment variables.

3.6.3 Pain duration

Length of time of pain problem was not associated with attributional beliefs (as above). There were no associations between chronicity of pain and control, belief and adjustment measures. However, length of time of problem was found to have a highly statistically significant positive association with Passive Coping ($\tau=0.32$, $p<0.001$).

3.6.4 Pain severity

Pain severity (child-rated average pain last three months) and did not correlate significantly with any of the attributions, coping or adjustment measures, but was related to some of the pain control beliefs. Pain severity was negatively correlated with Child Belief in Self

(τ=-0.21, p<0.05) and Child Self Pain Reduction (τ=-0.26, p<0.05) and positively correlated with both Belief in Fate/Chance (child) (τ=0.28, p<0.01) and Fate/Chance Pain Reduction (child) (τ=0.29, p<0.01).

3.6.5 Pain location

There were no significant associations between the type of pain disorder (as defined by primary pain site) and attributions, control beliefs, coping or adjustment.

A summary of the results from the current study is presented at the beginning of the next section.

4 DISCUSSION

A summary of the results, hypothesis by hypothesis, is first presented. The results are then interpreted with reference to the existing literature, before clinical implications of the research are discussed. Then, suggestions for future research are presented before the study's conclusions are discussed.

4.1 SUMMARY OF RESULTS

4.1.1 Interview and questionnaire responses/initial analysis

4.1.1.1 Attributions

The majority of children and parents made more than one attribution (which they believed to some extent). Only one child and one parent made no attributions. Eight categories of attributions were generated from the children's and parents' most-strongly held attributions. Both children and parents most frequently attributed the pain to physiological processes. The majority of both children's and parents' attributions were to physical causes (physiology, pathology or permanent physical damage). Approximately one-third of parents and children held pathological attributions (i.e. attributing the pain to an undiscovered disease process). No parents most-strongly attributed the pain to the child's behaviour, whereas 15% of children did. Approximately one-third of parents and children made some attribution to the child's behaviour. No children and very few parents made an attribution of characterological blame (i.e. attributing the pain to global-stable personality characteristics).

4.1.1.2 Control beliefs

Both children and parents most strongly believed in their own ability to reduce the pain and rated largest decrease in pain due to their own actions. However, children's belief in their parents' control over their pain was low; they rated medical staff as having much more control over their pain. Similarly, parents rated beliefs in children's control as lower than beliefs in medical staff's control.

The correlations found between children's control beliefs support the validity of the measures. The control and efficacy beliefs for each agent (self, parents, medical staff, and fate/chance) were correlated, and relationships were found between control and efficacy beliefs regarding different agents. Similar results from the parents' measures support the validity of these questions in assessing beliefs about control over someone else's (the child's) pain.

4.1.1.3 Coping strategies

The pattern of coping strategy use was very similar to that found by Walker et al. (1997) in the recurrent abdominal pain samples they studied. Active Coping strategies were most frequently used and the majority of the children could be classified as "active copers". The current sample reported using more rest, medication, and self-isolation strategies than the Walker et al. sample. This may reflect the high proportion of participants with chronic headaches (45%) in the current sample, as these coping strategies are often recommended to headache sufferers.

4.1.1.4 Adjustment measures

Whilst the majority of the sample (62.5%) had not missed school or missed less than two weeks in the past three months, a considerable proportion (22.5%) had missed more than four weeks of school in the same period. This suggests that chronic pain has a considerable impact on some children's educational and social development. Substantial school absence, and corresponding loss of peer contact, may have serious implications for social development in adolescence (Schulz & Masek, 1996).

Child-rated functional disability was similar to that found by Walker and Greene (1991) in a sample of children with recurrent abdominal pain. However, parent-rated functional disability was considerably higher than that found by both Walker and Greene, and Walker et al. (1993). In the current sample, parents' ratings of disability were higher than children's.

In contrast, parents' ratings of psychological problems were lower than children's. Children's mean problem score was nearly twice that of the parent-reported problems, and

22.5% of children scored within the clinical range. This rate of clinical problems is as predicted by Holden et al. (1997) and Wallander and Varni (1998) for children with chronic physical disorders.

Correlations between child- and parent-rated adjustment measures were similar to those found in previous studies (see Achenbach, 1991b; Walker & Green, 1991). However, the lack of correlation between child-rated measures was surprising (cf. Walker & Greene), particularly the finding that missed school did not correlate with perceived disability. This indicates that children who miss more school do not necessarily view themselves as more disabled by the pain. Parent-rated functional disability did correlate with missed school; this may reflect the probability that parents have control over school attendance, and they are more likely to give their child permission to miss school if they perceive the child to be disabled by the pain. Lack of correlation between perceived functional disability and psychological problems is interesting, as it suggests that the factors that influence these adjustment outcomes may differ.

In summary, the majority of children and parents make attributions and the majority of attributions are to physical causes. Both children and parents most strongly believe in their own ability to decrease the pain. Active Coping strategies were used most frequently by children. Finally, the level of adjustment problems were as predicted by the literature, but the current study found little correlation between measures of adjustment in comparison with other research.

4.1.2 Hypothesis One: There will be a significant association between children's pain beliefs and parents' pain beliefs

4.1.2.1 Prediction 1: There will be a significant association between children's attributions about the cause of the pain and parents' attributions about the cause of the pain

Results from the current study provide support for this prediction. A large proportion (45%) of the child-parent dyads made main attributions of the same category and the Lambda statistic shows that knowledge of the parent's main attribution reduces 36% of the error in predicting the child's main attributional category. Significant associations were

found in the Chi-square analyses of children and parents making attributions to the child's behaviour and to pathological causes.

4.1.2.2 Prediction 2: There will be a significant association between children's pain control beliefs and parents' pain control beliefs

Current results provided some support for this prediction: three of the five predicted correlations between child and parent pain control beliefs were statistically significant. Children's beliefs about their own control over the pain correlated with parents' beliefs about their child's control over the pain. Similarly, parents' beliefs about their control over the pain correlated with children's beliefs in parents' control. There was also an association between children's and parents' beliefs in medical staff's control over the pain. Although these correlations were statistically significant, correlations were low, indicating that the association between children's and parents' beliefs is weak.

There was no significant association between parents' beliefs about their own pain and children's beliefs about theirs. This is probably due to the chronic nature of the child's pain. The parents were generally rating their ability to control their own acute pain episodes, rather than a pain similar to the child's. It is possible that children and parents have similar beliefs about the controllability of acute pain episodes, and that they differentiate between the controllability of different pains. Lack of correlation between children's and parents' beliefs about fate or chance's control over the pain suggests that children's beliefs about these issues are influenced by other factors (see section 4.1.5).

The current findings indicate that there are associations between children's and parents' attributional and control beliefs. These relationships are statistically significant but not very strong, indicating that other factors may influence children's pain beliefs (see section 4.2.3).

4.1.3 Hypothesis Two: Children's use of coping strategies will be significantly associated with their adjustment

Several current findings provide support for this hypothesis. The lack of correlation between measures of adjustment appears to be reflected in their relationships to different

specific coping strategies and coping factors. Coping appears to have most impact on psychological adjustment.

Examination of relationships between missed school and each of the specific coping strategies and general coping styles revealed only one significant association: with the coping strategy Rest. This finding indicates that children who use resting to manage their pain have higher rates of school absence.

Correlations between FDI scores and specific coping strategies and styles revealed that using Self-isolation as a coping strategy was associated with higher perceived functional disability. Results also suggested that there may be a positive relationship between the use of Passive Coping and functional disability, but the correlation was not statistically significant.

Youth Self-Report scores were significantly associated with several coping strategies. Children who used Behavioural Disengagement as a strategy had higher levels of self-reported psychological problems. Children who used the cognitive strategy of Acceptance also reported more problems. Children who manage their pain with medication indicated lower levels of psychological problems. The use of Active Coping was also associated with fewer problems. There may be a positive relationship between YSR scores and Accommodative Coping, indicating that children who use strategies aimed at adapting to the pain have more problems; however, this correlation did not reach statistical significance.

In summary, measures of adjustment had several specific associations with coping. Relationships between coping strategies and adjustment were as predicted, except for the positive correlation found between Acceptance and psychological problems. All correlations found were low, suggesting that the relationships between coping and adjustment, although significant, are weak. Correlations were of a similar size to those reported by Walker et al. (1997).

4.1.4 Hypothesis Three: Children's and parents' attributions about the cause of the pain will be significantly associated with control beliefs, coping strategies and adjustment

The study's results provide some support for this hypothesis. The majority of group differences were in predicted directions and several reached, or approached, statistical significance. Only one of the differences not in the predicted direction reached, or approached, statistical significance.

Child pain control beliefs were significantly associated with children's attributions to their own behaviour and to pathological causes. Children who made any attributions to their own behaviour had higher beliefs in their ability to reduce the pain, and rated decrease in pain due to their own actions higher than children who made no attributions to their own behaviour. Children who made main or any attributions to pathology rated decrease in pain due to their own actions significantly lower than children who made no attributions to pathological causes. Child control beliefs may also have an association with parents' attributions to child's behaviour: children whose parents made attributions to their behaviour had higher control beliefs, a difference that approached significance.

Parent pain control beliefs were significantly associated with parents' attributions. Parents whose main attribution was to pathology had significantly higher ratings of decrease in pain due to their (parents') actions. This relationship is in the opposite direction from that predicted. Parents who made any attribution to the child's behaviour had significantly higher beliefs in their child's ability to reduce the pain.

Passive Coping was significantly associated with both child and parent attributions. Children who made main or any pathological attributions had higher Passive Coping scores. Parents who made any attributions to their child's behaviour had children who used significantly less Passive Coping. Active Coping may have a relationship with parents' attributions to child's behaviour: children whose parents made attributions to child's behaviour used more Active Coping, a difference that approached significance.

Missed school was significantly associated with parents' attributions to pathology. Parents who made any attributions to pathology had children who missed significantly more

school. Children whose main attribution was to pathology also missed more school: a trend that approached significance. There was also a non-significant trend indicating a relationship between children's attributions to their own behaviour and missed school: children making any attribution to their own behaviour missed less school.

Functional disability did not have significant associations with any child or parent attributions. One group difference approached significance, suggesting that children who make any pathological attributions had higher perceived functional disability.

Psychological adjustment was significantly associated with parents' attributions to child's behaviour. Children whose parents made any attributions to the child's behaviour had significantly lower self-rated psychological problems.

The results show that whether children and parents held any attributions to a particular cause was often more predictive of control, coping and adjustment measures than their most-strongly held attributions. The results also show more associations between parental attributions, coping and adjustment measures, than between child attributions, coping and adjustment.

4.1.5 Moderating variables

Analysis of the association between type of pain (as determined by location) and attributions, control beliefs, coping and adjustment found no significant relationships. This supports the validity of using a mixed pain sample in the current study. Examination of the impact of the child's age and gender, and the chronicity and severity of their pain on the variables examined in hypothesis-testing produced several interesting results.

There were no significant associations between attributions and the above variables. No significant relationships between parents' pain control beliefs and the confounding variables were found. However, children's age had a negative correlation with their belief in fate or chance's ability to control their pain. Younger children rated fate or chance as having higher control over their pain. This may explain why children's and parents' beliefs about fate or chance were not associated, as these beliefs appear to be related to cognitive development (see section 1.6.4).

Perceived pain severity was also associated with beliefs in fate or chance. Children who perceived their pain as more severe had higher beliefs in the ability of fate or chance to reduce their pain, and also rated actual decrease in pain due to fate or chance more highly. Pain severity was negatively correlated with children's self control beliefs: children reporting more severe pain had lower beliefs in their own ability to reduce the pain and rated decrease in pain due to their own actions as lower. These associations between pain severity and control beliefs support findings in the adult pain literature (see section 1.6.3.1).

There was one significant finding regarding pain coping strategies: Passive Coping was highly significantly associated with chronicity of the pain problem. Children whose pain had been a problem for longer were more likely to use passive strategies.

Of the adjustment measures, only functional disability had a significant relationship with any of the confounding variables. FDI scores were positively correlated with the child's age: older children reported higher levels of perceived disability. Walker et al. (1993) also found levels of perceived disability increased with age. This relationship may explain the lack of significant association between other variables (pain beliefs and coping strategies) and functional disability.

4.1.6 Summary

Table 24 presents the significant associations between children's attributions, control beliefs and coping strategies; and child and parent beliefs and moderating variables. Table 25 shows the attributional beliefs, coping strategies and moderating variables significantly associated with adjustment measures.

Table 24. Variables found to be significantly associated with children's attributions, control beliefs and coping strategies

Children's attributions	Children's control beliefs	Children's coping strategies
Parents' attributions	Children's attributions: any own behaviour; main or any pathological	Children's attributions: main or any pathological
	Parents' control beliefs	Parents' attributions: any child's behaviour
	Pain severity	Chronicity of pain problem
	Age	

Table 25. Variables found to be significantly associated with adjustment measures

Missed school	FDI	YSR
Parents' attributions: any pathological	Self-isolation	Parents' attributions: any child's behaviour
Rest	Age	Behavioural Disengagement
		Acceptance
		Medication use
		Active Coping

Some evidence supporting the hypotheses was found. The findings support the assertion that paediatric pain patients and their parents form attributions about the cause of the pain. The study's findings indicate significant associations between child and parent pain beliefs. Findings also support several specific relationships between coping strategies and adjustment; all except one of these was in the predicted direction.

The results indicate that parents' attributions to their child's behaviour have stronger associations with the coping and adjustment measures than do children's attributions to their own behaviour. Children's attributions to their own behaviour appear to influence coping and adjustment as predicted, but these associations were not statistically significant. However, children's attributions to their own behaviour did have significant predicted

associations with their pain control beliefs. Children's attributions to pathology had several associations with control, coping and adjustment measures as predicted. However, parents' attributions to pathology did not influence the other variables as predicted, apart from the association with school absence. Parental attributions to pathology were not found to have a clear relationship with children's coping and adjustment: many group differences were in the opposite direction from predicted, although differences between parents making any pathological attributions and those making none were very small.

The results show that making any attributions to a particular cause was often more predictive of control, coping and adjustment measures than making a main attribution to the cause. The study found that parental attributions had more associations with coping and adjustment measures than children's attributions.

Older children were found to have lower beliefs in fate or chance's control over their pain than younger children. Older children also perceived themselves to be more disabled by their pain. Pain severity had several relationships with children's control beliefs. Children with stronger beliefs in fate and children with lower beliefs in their own ability to control the pain perceived their pain as more severe. Finally, the study showed that children who had experienced pain for a longer time used more Passive Coping strategies.

4.2 INTERPRETATION OF FINDINGS

4.2.1 Paediatric chronic pain: coping and adjustment

Children report using more active coping strategies than accommodative or passive. This finding has been replicated in studies of both children with other pain disorders (Gil et al., 1991; Gil et al., 1997) and adults with chronic pain (Williams & Keefe, 1991). The majority of this sample had received no pain management input; however, children were using active coping techniques and had high perceived control and efficacy. The high levels of perceived personal control over pain and the use of active strategies contrasts with the popular medical conception of chronic pain patients as dependent and passive (see Reading, 1982). The majority of the sample also had good psychological and functional adjustment.

A common finding in the related literature is the association between pain coping strategies and perceived pain severity (e.g. Schanberg et al., 1997). This relationship was not found in the current study. However, there was a relationship between coping strategies and the duration of the pain problem. Children who had experienced pain for longer were more likely to use Passive Coping. Schulz and Masek (1996) suggest that a long process of investigations and attempted interventions will lead chronic pain patients to become passive, relying on medical staff for pain relief and failing to take responsibility for managing the pain. Jensen et al. (1991) argue that the impact of coping strategies on adjustment is moderated by the duration of the pain problem. Pain coping strategies appear to have most impact on psychological and functional adjustment in patients with relatively short pain duration. This may explain the lack of association between Passive Coping and adjustment.

Jensen and Karoly (1991) and Jensen, Turner, Romano, and Lawler (1994) found that pain severity moderated the relationship between pain beliefs, coping strategies and adjustment. In the current study, there were no direct relationships between either pain severity or pain chronicity and adjustment. This supports the argument that pain itself (i.e. pain variables) does not lead to adjustment problems: it is the child's and family's response to the pain that predicts adjustment (O'Dougherty & Brown, 1990). This finding therefore supports the cognitive-behavioural conception of pain (see Turk et al., 1983).

In the current study, coping strategies were found to have specific relationships with adjustment measures, which reflects findings from other research (Jensen & Karoly, 1991; Walker et al., 1997). This supports Gilbert's (1995) finding that children classified as well-adjusted (in terms of several dimensions) use a greater number and wider range of coping strategies than children classified as poorly-adjusted. This has important clinical implications (see section 4.3). Given that there were no relationships between the child-rated adjustment measures, it is not surprising that different coping strategies affected different elements of adjustment. Coping strategies were found to have most impact on psychological adjustment.

As predicted, Active Coping was associated with good adjustment. Children who use disengagement strategies (i.e. giving up trying to deal with the pain) had poorer adjustment; but so did children using Acceptance strategies. Acceptance and other

Accommodative Coping strategies had been hypothesised to relate to good adjustment, but results showed a non-significant trend between accommodative strategies and poor psychological adjustment. Accommodative Coping comprises cognitive strategies that enable the individual to adapt to unchangeable stressful situations. This way of coping, therefore, may indicate an appraisal of the pain problem as unchangeable and chronic, which has a negative impact on adjustment. As discussed in section 4.2.4, expectations about the future are likely to have considerable impact on adjustment to chronic pain.

4.2.2 Chronic pain attributions

The study shows that both children and parents form attributions about the cause of chronic pain. It was not possible to test the hypothesis that making any attributions is predictive of good adjustment, because so many children and parents made attributions. This finding supports the suggestion in the literature (e.g. McGrath, 1993; Reading, 1982) that the experience of pain (in this case, one's own or one's child's) will prompt a search for the cause of the pain in order to find the treatment for it. This is an appropriate and protective reaction to acute pain, which often signifies tissue damage that requires treatment. However, the link between cause and cure is not straightforward in chronic pain disorders. Ongoing pain may represent a significant, even life-threatening, organic problem and so the search for the cause may be perceived as essential. However, in the current sample, organic causes for the pain had largely been ruled out; children were experiencing chronic pain that has complicated multifactorial and uncertain causes. This type of chronic pain challenges the prevalent biomedical model of illness (that disease is directly linked to pathogenic processes; and that biological, psychological and social processes are independent) and requires a biopsychosocial understanding.

The biomedical model implies that knowing the cause of the problem will lead to the cure for it; treatment decisions in medicine are often justified with reference to causal explanations. Medical response to pain is predominately influenced by the biomedical model: the pain may be extensively investigated in the search for a pathological cause. In this study, approximately one-third of children and parents made an attribution to a pathological cause, despite the lack of medical evidence to support their belief. An ongoing and extensive search for the cause of the pain can actually entrench patients' and their families' fears about an undiscovered pathological cause (Hotopf et al., 1998; Schulz

& Masek, 1996) rather than provide reassurance. Gilbert (1995) found that the families of poorly-adjusted children with chronic pain often refused to discontinue their search for the aetiology and cure for the pain. However, some families accept reassurance that the appropriate tests have been carried out and have shown no pathology. It is probable that negative test results will be easier to accept if the doctor provides the family with a plausible explanation regarding the pain, using a biopsychosocial perspective.

Despite the wide acceptance of the gate-control theory of pain (Melzack & Wall, 1965) doctors do not always share this with patients and may fail to explain chronic pain in biopsychosocial terms. Doctors often explain pain in purely physical terms: which relates to the finding that the predominant attributions held by children and parents were to physiological causes. The majority of both children and parents held a main attribution that focused on physical causes of the pain (physiology, disease, or permanent damage attributions).

The biomedical model of illness is predominant in Western culture. Patients who experience illness that has indefinite, multifactorial causes are likely to experience, or fear, challenges regarding the legitimacy of their illness. Despite the common perception of a wider acceptance of psychological factors in medicine (and acceptance of more holistic treatment approaches), many doctors continue to view health problems as either organic or functional (see Watts, 1982). Some medical practitioners continue to stigmatise health problems that are perceived as functional. This may explain why few parents and no children made main attributions to stress (the only psychological attribution found). In a culture that tends to stigmatise patients with illnesses that have psychologically-based explanatory models, there are many incentives for the patient to seek a physically-based explanation. This could result in a conflict for the child and parents, between a desire to find a pathological cause to prove that the pain is "real" and a fear that the child has some fatal or chronic condition.

Despite the factors discussed above, the study found that nearly as many parents made "mixed" attributions as made physiological attributions. The majority of these attributions contained both psychological and physical elements and represented a biopsychosocial understanding of pain. Few children made these kinds of attributions. This may be interpreted with reference to cognitive-developmental levels. As discussed in section 1.5,

biopsychosocial explanations of illness represent formal-operational thinking: it is probable that not all children in the sample had reached this stage of cognitive development.

The study's findings indicate that parents more frequently hold attributions about their child's illness than do partners and friends of adult patients (see Taylor et al., 1984). Parents may be more likely to make attributions because of their responsibility to find suitable treatment for their child's disorder. Many more children and parents in the current sample held attributions, in comparison with studies of other childhood disorders (e.g. Affleck et al., 1985; Bearison et al., 1993; Eiser et al., 1995). It is possible that the need to find an explanation for chronic pain is stronger than the need to find a cause for an illness that has a clear treatment protocol. (See section 4.2.6 for further discussion.)

Some of the research literature (e.g. Bearison et al., 1993) implies that people hold one "ultimate" attribution. In fact, many people appear to hold a range of attributions. The current study showed that pain patients and their parents usually hold more than one attribution. Parents in the present study made a greater number of attributions than did parents of children with diabetes (Affleck et al., 1985). In many cases these attributional beliefs were contradictory: holding several competing attributions can be seen as an attempt to reduce the uncertainty regarding the aetiology of the pain. However, holding a range of attributions may not be specific to pain beliefs. Bugental et al. (1998) comment that parents' attributions regarding their child's behaviour typically include multiple, and often contradictory, causal factors.

4.2.3 The relationship between child and parent pain beliefs

Attributional content is believed to be related to knowledge (about illness) and social and cultural factors (see Taylor et al., 1984). However, *how* individuals develop attributions has not been explored in the literature. The mechanism by which children are influenced by their parents' attributions is not clear. It is possible that parents directly tell the child what they think causes the pain. Alternatively, children may learn their parents' beliefs indirectly, for example, during medical consultations when the parent is talking with the doctor. It is also possible that another variable, such as information from a third party, could influence both the child's and parent's beliefs. The relationship between child and

parent attributional beliefs may be bi-directional. Whilst children learn some of their attributions from their parents, children's beliefs about their pain could also influence their parents' beliefs (via the same mechanisms).

The strength of concordance between children's and parents' most-strongly held attributions might be negatively influenced by several factors. For example: parents may not share their attributions with children, or parents and children could hold the same attributions but vary in their strength of belief. Children's beliefs may be based on their parents' but have been subject to interpretation (which will be determined by cognitive developmental level) and/or children's beliefs may be more influenced by their peers' beliefs (a factor that is increasingly important in adolescence). Concordance between child and parent pain beliefs will also be influenced by family relationships and characteristics (such as communication and trust).

The relationship between child and parent control beliefs is probably influenced by additional factors. Some of these control and efficacy beliefs may be shared directly, but the strongest influence of the parent's beliefs is likely to be via the parent's reactions to the child's pain and coping attempts. For example, a parent who believes that their child has considerable control over their pain will encourage the child's use of effective coping strategies, which will increase the child's sense of control. As the current findings show, parents who make attributions to their child's behaviour have higher beliefs in their child's ability to control pain and have children who use less passive coping strategies. Non-significant results also indicated that these parents have children with higher beliefs in their own ability to control the pain and who use more active coping strategies.

The relationship between child and parent control beliefs is likely to be influenced by the child's age: both children and parents probably ascribe more control to older children, but children are likely to ascribe increased control at an earlier age than parents do. Similarly, whilst younger children may perceive their parents as having considerable control over their pain, the age group in the current sample perceived their parents' control as quite low. In contrast, parents' perceived their control over the pain as quite high: it may be that parents do not relinquish their perception of control until their child is fully-grown.

Children's control beliefs were influenced by the severity of their pain: parents control beliefs were not found to be associated with the child's perceived pain severity. It may be that children's and parents' control beliefs are each influenced by their own perceived severity of the pain. If the child and parent perceive the pain severity very differently, this may lead to them having different beliefs about the controllability of the pain.

Finally, consideration of the influence of parents' pain beliefs on children's should not ignore wider literature regarding child development (e.g. Herbert, 1991). As discussed above, both family issues and children's developmental level will influence the relationship between parents' and children's beliefs.

4.2.4 The impact of children's attributions

The study found that children's attributions affected their control and efficacy beliefs as predicted. Behavioural self-blame was found to correlate with an increased sense of control and higher efficacy regarding the management of chronic pain. However, behavioural self-blame was not found to influence the child's psychological or functional adjustment. The absence of a link between self-blame and adjustment challenges the theory that behavioural self-blame will have a positive effect on adjustment in certain illnesses, because it offers a perception of control (see sections 1.4.2 & 1.5.2). In the current sample, the frequency of attributing the pain to "own behaviour" may have confounded this relationship. In this sample, 40% of children made behavioural self-blaming attributions; whereas in a sample of adult chronic pain patients, Williams and Keefe (1991) found only 8% accepted any level of behavioural blame for the cause or maintenance of their pain. The frequency of attributing to own behaviour is affected by cognitive development; children are more likely than adults to believe that they are somehow responsible for their illness (see section 1.5). This may confound relationships between attribution and adjustment.

Current findings showed that children's attributions to pathological causes also had predicted relationships with control beliefs, but no significant relationships with adjustment measures. Attributions to pathological causes were, however, related to use of Passive Coping. The influence of pathological beliefs on adjustment measures may be moderated by the implications for the future that these beliefs engender. Children who

hold pathological beliefs are likely to have conflicting beliefs about the future: they may have fears that the pain will continue forever, or that they will die from the undiscovered disease. Alternatively, they could have hopes that the doctors will find the cause of their pain and they will be cured. Beliefs about chronicity of the pain have been shown to relate to coping (Williams & Keefe, 1991; Williams & Thorn, 1989) and fears about death have a negative impact on adjustment (Schulz & Masek, 1996). The concept of hope has not been considered in this literature but it may be protective with regard to psychological functioning. Lewis and Kliewer (1996) found that hope was negatively associated with anxiety in children with sickle cell disease (this relationship was mediated by coping strategies).

The study found predicted, but weak (non-significant), relationships between children's attributions and adjustment; this may be explained with reference to other beliefs about pain. As suggested above, beliefs about the future implications of the pain will affect adjustment. In support of this, Williams and Thorn (1989) found that adult pain patients who strongly believed their pain would persist showed poor self-management behaviour. As discussed above, pathological attributions may lead to conflicting beliefs about the future. Other attributions will also have implications for beliefs about the future. For example, attributions to "permanent damage" may lead to beliefs that the pain will never be resolved, but also that it is unlikely to become any worse over time.

It would, therefore, be useful to consider children's pain beliefs more broadly, rather than focusing purely on attributions. Leventhal et al. (1997) propose that five types of beliefs about illness are important in predicting adjustment: illness identity (symptoms and label); time-line (perceived chronicity of illness); consequences (expected future implications); attributions (about the cause); and perceived control over the course of the illness. Leventhal et al. argue that these beliefs are not independent: rather, they occur in sets and have combined influence on coping with illness. Research has provided support for this cognitive model of adjustment to illness: Moss-Morris et al. (1996) found that beliefs about illness identity, causality, controllability and consequences all influenced adjustment in adults with chronic fatigue syndrome. As Leventhal et al. predicted, these illness representations were also significantly related to each other.

4.2.5 The impact of parental attributions

The study showed that parental attributions influenced their control and efficacy beliefs, but there were fewer associations between parents' pain beliefs than between children's. It seems that attributions regarding other people's illness do not have as strong an impact on control beliefs as attributions about one's own illness. For example, Affleck et al. (1985) failed to find any relationship between parents' attributional content (about their child's diabetes) and their beliefs about controlling the illness.

Parental attributions were found to be significantly related to children's coping strategies and two of the three adjustment measures: parental attributions had more associations with coping and adjustment than did children's. It may be that parents' attributions have more impact on coping and adjustment than children's because of the stability of those attributions. As children's attributions are related to cognitive-developmental level, they are unlikely to be as stable as their parents' attributions; therefore they may have less influence on coping and adjustment. Parental attributions are hypothesised to influence children's coping and adjustment via several mechanisms. The first proposed mechanism is that parental attributions influence children's attributions, which influence adjustment. However, the results show that while child and parent attributions are related, children's and parents' attributions have different relationships with outcomes.

Given the above finding, the second proposed mechanism might be more influential. This theory is based on an operant learning model: parental attributions affect parents' responses to the child's pain behaviours and coping attempts, which influence adjustment. Parents' reinforcement of children's coping strategies will have a significant impact on children's adaptation to the pain problem (Bursch et al., 1998). For example, parents who make attributions to their child's behaviour have higher beliefs in the child's ability to reduce the pain, and so encourage the child to use effective coping strategies and keep up activities, which positively influences the child's psychological adjustment.

The above hypothesis is also supported by Dunn-Geier et al. (1986) who compared groups of poorly-adjusted and well-adjusted children with chronic pain. They found that the mothers of the poorly-adjusted children more frequently discouraged appropriate coping behaviours. However, Dunn-Geier et al. also found a non-significant trend for mothers of

poorly-adjusted children to more frequently *encourage* coping behaviour as well. They conclude that these mothers are over-involved with their children's attempts to cope, which leads to adjustment problems for the child. This over-involvement may lead to the child becoming very dependent. Gilbert (1995) found that children who were poorly-adjusted to chronic pain appeared highly dependent on specific family members (usually their mother) to help them cope with the pain.

The third proposed mechanism regarding the impact of parental attributions also has support from other studies. Parents' attributions about their child's pain may affect how well the parents themselves cope, which will influence children's coping and adjustment. For example, parents who do not attribute the pain to their child's behaviour may feel more anxious about the pain problem; this anxiety may directly influence the child's psychological well-being. Several studies support this: Affleck et al. (1985) found a relationship between mothers' attributions and staff ratings of the mothers' adaptation to their child's diabetes. Sharpe, Brown, Thompson, and Eckman (1994) found that mothers' coping strategies were predictive of both the mother's and child's adjustment in children with sickle cell disease. Similarly, maternal anxiety ratings have been shown to account for a significant proportion of psychological adjustment in children with sickle cell disease (Thompson et al., 1993).

Finally, parents' attributions could have direct impact on the child's adjustment, as illustrated by the relationship between parental attributions to pathology and school absence. Parents who believe that their child is seriously ill are less likely to insist on school attendance when the child feels unwell. Parents who do not have this fear may be more influenced by concerns regarding the child's educational and social development, and insist on school attendance even when the child reports pain.

4.2.6 Attributions and adjustment to illness

The current findings contribute to the debate regarding the psychological relevance of attributional beliefs (see Turnquist et al., 1988). Taylor et al. (1984) argue that attributions provide meaning to illness, and that it is the search for meaning that is important in adapting to illness. Alternatively, Wong and Weiner (1981) posit that attributions are important to psychological adjustment because of their impact on control beliefs. Neither

of these explanations account for the current findings: attributions are made by the vast majority of patients and parents, but there are variations in psychological and functional adaptation; and children's self-blaming attributions are related to control beliefs, but not to their adaptation.

These findings suggest that the main mechanism by which attributions influence adaptation to illness is by determining the course of action (e.g. help seeking, continuation of activities, types of treatment sought) taken in response to the symptoms (in this case, pain). As discussed in section 4.2.2, parents' responsibility to seek explanation and treatment for their child's pain may explain the relatively high numbers of attributions they make. For child (even adolescent) chronic pain patients, parents take the majority of decisions regarding the management of the pain; therefore, it is the parents' attributions that influence the child's adjustment. This may explain why children's attributions affect their control beliefs, but not their adjustment: despite the child's level of perceived control, their parent is likely to be making the major treatment decisions on their behalf. For adult patients, perceived control is likely to be associated with actual control, whereas for paediatric patients this may not be so. The above explanation may also explain an unexpected finding of the current study: that parents who most strongly believe that the cause of the pain is pathological have high beliefs in their own ability to control their child's pain. This relationship is difficult to interpret. However, it may be that parents who firmly believe that their child's pain has a pathological cause are determined to carry on the search for the cause and cure. Their determination and pursuit of treatment may increase their perceived control over the child's pain.

Finally, as discussed in section 4.2.4, attributions may affect adjustment via other beliefs about the illness, for example beliefs about future implications. As proposed by Leventhal (e.g. Leventhal et al., 1997) attributional beliefs are one of a set of illness beliefs that influence an individual's adjustment to illness.

4.3 CLINICAL IMPLICATIONS

Ideally, medical and psychological interventions should proceed together in a multidisciplinary model of pain management (as discussed by Segal-Andrews et al., 1995).

A simultaneous physical and psychological treatment approach may prevent the "pain journey" described below, and the possible entrenchment of families' physical understanding of pain. Current medical practice often uses psychology as the treatment of last resort. Schulz and Masek (1996) describe a "pain journey" of repeated medical investigations and referral from one specialist to another. When no pathological cause is found, the family are referred to psychology, possibly because doctors believe that if there is no discernible physical cause the pain must be caused by a psychological problem. At the point of referral to psychology, therefore, the family feels under pressure to prove that the pain is "real" and that psychological input is not warranted. Gilbert (1995) found that poorly-adjusted paediatric chronic pain patients had families who were "doctor shopping" and who were determined to continue their search for the cause and cure of the pain. A good therapeutic relationship and successful intervention may stop the family from continuing their search for a physical cause of the pain (Schulz & Masek, 1996).

Watts (1982) suggests fitting treatment to the patient's (or family's) attributions. Given the preponderance of physical attributions regarding pain, this may mean initial work with the family within a biomedical framework. Engaging the family may be the most challenging part of treatment: if their understanding of pain is purely physical, they may be angry and resentful at referral for psychological input. Initial assessment that focuses on the physical elements of the pain (location, sensation, severity etc.) may be helpful in engaging families with a purely physical understanding of pain. Initial acceptance of the family's framework for understanding the pain, and an emphasis on managing the pain rather than curing it, may enable a therapeutic relationship to be built. An emphasis on the physiological elements of the pain experience, such as a focus on techniques that can be understood from a physiological framework (e.g. relaxation), could help engage the family in treatment.

Intervention should include education about pain processes, using the gate-control theory (Melzack & Wall, 1965). The physical elements of the model can be emphasised initially, before introducing psychological constructs and demonstrating how physiological and psychological processes are related. Explanations of the gate-control theory need to be developmentally appropriate, but should not patronise children or their families. Even young children can appreciate the links between pain sensation and psychological factors (see McGrath & Hillier, 1996).

The focus of working with the family's attributions about the pain will be to encourage them to see how a wide range of (biopsychosocial) factors may interact to cause the pain, *not* to teach the family that their beliefs are "wrong". A treatment approach that disregards or challenges the family's belief system is unlikely to be effective (Shutty et al., 1990). Intervention should encourage the family to see the full range of possible aetiologies of the pain, and the complex interaction of physiological and psychological factors.

Watts (1982) discusses the problems of challenging attributions directly; patients may react by strengthening their position and assert their beliefs more strongly. Attributions to pathological causes need to be addressed openly; fears need to be elicited and taken seriously. Medical evidence that contradicts the attribution should be discussed, but the family's fears should not be dismissed because of lack of evidence (there is always a possibility that test results are incorrect). Instead of focusing on disproving the family's beliefs, intervention should focus on encouraging other, more adaptive, beliefs. Despite the current finding that attributing to the child's behaviour was associated with good adjustment, intervention should not encourage families to blame the child for their pain, for ethical and clinical reasons. However, families should be encouraged to attribute responsibility for managing the pain to the child (with family support). Intervention based on education regarding the nature of pain and its complex aetiology should emphasise the importance of both the child's and the family's contribution to treatment and should encourage their active involvement.

The study's findings provide support for the type of intervention that several authors (e.g. McGrath & Hillier, 1996) have recommended: family based, cognitive-behavioural intervention focused on increasing the child's effective use of coping strategies within a supportive environment. Gil et al. (1993; 1997) argue that children's patterns of coping are less stable than adults and therefore should be more responsive to interventions. The current study showed that individual coping strategies had relationships with different areas of adjustment. Taken with the findings of other research (e.g. Gilbert, 1995) this indicates that children who have a broad range of effective strategies will adapt to their pain more successfully. Intervention should focus, therefore, on encouraging children to use coping strategies they already have more effectively, and on teaching new strategies where necessary. Psychological intervention may be easier for families to accept, and possibly more effective, if there is an emphasis on "harnessing" pre-existing adaptive

coping strategies. Any intervention should be based on a thorough assessment of the child's coping and what they find effective and adaptive. Examining *how* children use their reported coping strategies is necessary, as Gilbert found that children who were poorly adapted to chronic pain used the same strategies as those who were well-adjusted, but used them in a chaotic and ineffective way.

The current study found a trend that indicated accommodative strategies were related to poorer psychological adaptation. Acceptance of the pain was associated with poorer adjustment, therefore these strategies, which are aimed at coming to terms with the pain, should not be encouraged. The study's findings showed that active strategies were related to positive psychological adjustment. Active strategies are problem-focused, behavioural strategies that are aimed directly at reducing the pain. Therefore, it seems that the most psychologically protective strategies are those which are focused directly on pain management. Previous research has shown that children rarely use cognitive techniques for pain management unless they are taught to do so (see McGrath, 1993). It is likely that intervention aimed at increasing children's use of active strategies and teaching them new strategies such as imagery (Fernadez & Turk, 1989) will be effective in reducing psychological problems.

Interventions focused on increasing active coping have been successful in reducing both children's and adults' pain and disability (Keefe et al., 1990; Sanders et al., 1994). However, interventions focused purely on coping strategies may be unsuccessful if the beliefs that influence the choice and use of those strategies are not elicited and addressed. It is probable that interventions aimed at improving children's coping that do not include working with their parents will be unsuccessful. The child's capacity to use coping strategies effectively is influenced by the family environment and parental reactions to coping efforts. As the current research shows, parents may have beliefs about the pain which prevent them supporting the child's use of active coping: these beliefs need to be addressed. Specifically, the parents' attributions and other illness representations regarding the child's pain need to be elicited and, if necessary, made the focus of intervention. This element of treatment has been included in a successful cognitive-behavioural intervention for paediatric chronic pain (Sanders et al., 1994).

Finally, the present study used an interview format that was successful in eliciting causal beliefs and attributions from both children and parents. Discussion of medical staff's and other family members' explanations regarding the pain and discussion of beliefs held in the past were useful in eliciting attributions. This is especially important given the current finding that main attributions were not necessarily the best predictors of adjustment; therefore it is important to elicit the full range of children's and parent's attributions. Lastly, separate child and parent interviews appeared to facilitate response from children, which indicates that there would be clinical utility in separate assessment interviews.

4.4 CRITIQUE AND LIMITATIONS OF STUDY

4.4.1 Design

The fundamental difficulty with cross-sectional, correlational research methodology is that relationships between variables may be identified, but the causal direction of relationships cannot be determined. For example, children with good psychological adjustment may be more likely to use Active Coping strategies; or the use of Active Coping strategies may result in better psychological adjustment. The hypothetical model (see Figure 2) that guided the study was designed to be a starting point for exploration of the variables within it: those relationships are likely to be much more complex and dynamic than the model implies. Relationships between beliefs, coping, and adjustment are likely to be interactional. Longitudinal research and/or experimental research would help theoretical understanding of relationships within the model and indicate the most useful points for clinical intervention.

4.4.2 Sample

The most significant problem with identifying potential participants was the lack of consensus on definitions of pain disorders (as discussed in section 1.1.6.1). Authors differ on definitions of chronic (versus acute) pain; and on whether cause or frequency and duration of the pain are the defining factors. The current focus on "pain associated with no well-defined disease or disorder" (Varni et al., 1995) was based on a supposition that beliefs about pain will have more impact on adjustment if there is no known aetiology of

the pain. The decision to include both chronic and recurrent pain types was pragmatic (to increase sample size), and based on an assumption that whether pain is chronic or recurrent will not have a significant impact on adjustment. However, this assumption is largely untested and ideally the study would have focused on either chronic recurrent pain, or chronic intractable benign pain (Turk et al., 1983).

Recruitment of children with chronic pain "associated with no well defined disease or disorder" was difficult due to consultants interpreting this differently. Several doctors challenged this definition, arguing that it was too subjective, or that it was emphasising an organic versus functional understanding of pain. Differences in doctors' interpretation of the definition led to different patterns of referral to the study. However, the researcher's close involvement with the selection of potential participants prevented inappropriate referrals and facilitated appropriate ones.

Given that Eiser et al. (1995) found different patterns of attributing in mothers and fathers, it may have been advantageous to include only mothers in the study, or to include both mother and father of each child to allow for comparison. However, only one parent could be included due to the length of the interview process; and selection of the participating parent was based on the family's decision as to who was best placed to talk about the child's pain.

A narrower age-range might have mitigated the influence of children's age on their control beliefs and perceived disability, and the potential impact of cognitive development on the main variables. Alternatively, some measure of cognitive development would have allowed for analysis of its impact. However, the age-range had to be wide to ensure sample size was sufficient, and measuring cognitive developmental level would have been time consuming (in an already long interview process).

A larger sample size would have shown whether current non-significant trends indicate significant associations. A larger sample may also have mitigated the problem of using post-hoc comparison groups (see section 4.4.5). Furthermore, a larger sample with higher ethnic minority representation (Asian children were under-represented in the sample) would have allowed for cultural comparisons. Bates and Rankin-Hill (1994) found that

pain control beliefs were associated with cultural background, and Bates (1987) argues that ethnicity affects many elements of the pain experience, including attributions.

4.4.3 Measures

There is infrequent recognition in the attribution literature of the difficulty of eliciting attributions (see Munton, Silvester, Stratton, & Hanks, 1999; Watts, 1982). Participants do not only suggest causal attributions but also offer explanations, reasons, labels, and triggers in response to questions regarding the cause of the pain. Some of the research literature also implies that participants will access and provide their attributional beliefs on demand. In fact, much of the interview in the current study was a "warm up" to eliciting personal causal beliefs. The questions about medical staff's explanations about the pain and prompts about past beliefs seemed very useful, and the majority of participants in this study did not appear to find it difficult to access their attributions.

An assumption of quantitative research is that the researcher does not influence the data, however, it was felt that the relationship with the interviewee did determine how many questions were asked and how far distal causes were pursued. If it appeared that the participant was uncomfortable or "fed-up" with answering questions, it was likely that fewer follow-up questions would be asked. Therefore, it cannot be assumed that pursuit of distal causes was completely consistent.

It was not possible to provide evidence of the test-retest reliability of the control belief measures. Although the questions were quite difficult, the majority of participants appeared to understand the difference between the control and efficacy questions. Interestingly, children appeared to understand the aims of the questions more quickly, and were more confident in providing answers than parents.

The most significant problem with the use of the Pain Response Inventory was the low reliability of the second order coping factors (as discussed in section 3.2.2). Cronbach's alphas for the individual coping strategies were acceptable, however, for the coping factors they were lower than recommended. The Pain Response Inventory was validated on three large samples (688, 158, 175; Walker et al., 1997). Given the scope of the current study, the findings do not provide sufficient evidence to dispute the validity of the PRI. Problems

with reliability may reflect Walker et al.'s finding that individual coping strategies load onto more than one factor; they argue that the function of a coping attempt will depend on the context. Current reliability may also have been low due to the large number of items and subscales on the measure and the study's small sample size. The low reliability of the scale decreases the likelihood of significant findings between it and other variables. This may explain some of the non-significant findings regarding relationships between coping and adjustment.

There are some methodological problems with the PRI and other measures of coping. Jensen et al. (1991) suggest that the self-report format of these measures may lead to over-reporting of active strategies and under-reporting of passive strategies, due to social desirability effects. They also comment that many of these measures include items that do not measure "coping" as originally defined (see Lazarus & Folkman, 1984). As Jensen et al. suggest, some of the items on the PRI do not appear to represent purposeful efforts to deal with a problem (e.g. Item 16: "Feel like you can't stand it any more"). Some items appear to represent beliefs about the pain, or negative thoughts regarding it, rather than coping attempts. Finally, it may have been useful to complement the PRI with some objective, observational, measure of children's coping efforts in order to assuage the above difficulties.

Missed school may have been more accurately measured by accessing the child's attendance record, however, this would have meant involving schools in the research and would have been time-consuming. It may also have been useful to include a measure of health services utilisation as an adjustment measure (see Jenson et al., 1991).

Finally, the use of child-rated adjustment, and a multidimensional measure, was appropriate (see Lavigne & Faier-Routman, 1992). However, there are some difficulties in using the Youth Self-Report scale with this sample. The inclusion of a somatic scale has lead to criticisms regarding its use in paediatric adjustment to illness research (see Perrin et al., 1991). Whilst physical symptoms may reflect psychological problems, they may also reflect problems directly due to the child's disorder: children with physical difficulties may therefore receive elevated problem scores. Another criticism is that both the YSR and CBCL were originally designed to detect psychopathology in children, not to identify or compare children with mild difficulties within the normal range of functioning.

4.4.4 Procedure

It may have been useful to conduct all interviews in the hospital setting to provide a similar environment for all. Several of the interviews carried out in participants' homes were disrupted by other children, visitors, animals etc. However, choice of location was offered to participants to make it easier for them to take part and to ensure their comfort during participation (also, it was not possible to reimburse participants for their journey to, and parking at, the hospital). It may have been preferable to interview all parents and children separately as joint interviews may have influenced responses from both; however, children had to be offered the option of a joint interview so that they felt comfortable with the interview situation.

4.4.5 Analysis

There are difficulties in using post-hoc groups in tests of difference. In this study, the groups being compared were often of very different sizes (e.g. comparing 4 parents who made main attributions to pathological causes with 36 who did not). Discrepancy between group sizes may explain why some predicted relationships were not found to be statistically significant. The discrepancy between group sizes may limit the conclusions that can be drawn regarding the differences between "main" attributions and "none" to the different causes. However, examination of group differences between "any" attributions and "none" to causes, generally supported findings regarding main attributions (i.e. differences were usually in the same direction). Ideally, for these kinds of analyses, equal size groups would be used (e.g. recruit equal numbers of children who made attributions to their own behaviour and those who did not). However, this would have serious implications for research resources.

A possible problem with the current analysis may have been the number of analyses performed within each hypothesis: a large number of comparisons may increase risk of a Type I error. The large number of analyses, testing individual relationships, resulted because multivariate statistics were not used in the study. Choice of statistical tests was limited by the main independent variable being a nominal level measure, and the decision to use non-parametric statistics. This meant that it was not possible to use multivariate statistics to examine effects of interactions between variables (e.g. attribution and

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chronicity) or incremental effects, nor to control for possible confounding variables (e.g. socio-economic status).

4.5 SUGGESTIONS FOR FUTURE RESEARCH

4.5.1 Outcome research

The current findings suggest that the most appropriate treatment for children with chronic pain is a family-based intervention focused on teaching effective coping within a facilitative family environment. As part of encouraging the child's use of and parents' support of effective coping, attributional beliefs should be elicited and addressed (see section 4.3). Sanders et al. (1994) have provided one study which evaluates this type of intervention, and have shown that it was very successful. Replication of their study within a British health-care system would be desirable (as the "standard paediatric care" they compared with the cognitive-behavioural intervention, may differ from treatment here). Furthermore, a future study should evaluate changes in attributional thinking as a predictor of adjustment. Bursch et al. (1998) argue that it is necessary for families to move from medical conceptualisations of pain to biopsychosocial in order to improve coping; only an intervention study could confirm this assertion.

4.5.2 How do attributions affect adjustment?

As discussed in section 4.2.6, attributions about the cause of the pain will determine the decisions made about managing the pain, such as health service utilisation. Because parents make these decisions for their children, their attributions are more closely related to adjustment than the child's. This hypothesised mechanism should be examined by studying adult pain patients' attributions, pain management and adjustment. The current study found that in children, attributions were related to control and efficacy beliefs and coping strategies, but not to adjustment (probably because of the parents' more direct influence). In adults, it is hypothesised that attributions relate to control and efficacy beliefs, coping, management and adjustment.

4.5.3 Where do attributions come from?

As attributions appear important in predicting psychological and functional adjustment to illness, it may be useful to explore where attributions come from, or how they are acquired. Garrison and McQuinston (1989) claim that children receive the vast majority of their information from parents, who have interpreted the information from medical staff. It would be possible to use data from the current study to explore whether children's attributions are more related to their perception of their parents' explanations, or their perception of the doctors' explanations. Further analysis could reveal whether children's perception of their parents' attributions are accurate (i.e. the same as the attributions their parents actually supplied).

Given the high percentage of children with pain "role models" (see section 2.3.2), future research could examine whether the children's attributions reflect their role-models' explanations of their pain.

One further area for study could be the effect of holding different attributions from parents and medical staff on adjustment to the pain. For example, acceptance of medical staff's explanations for the pain may result in good psychological and functional adjustment, as their treatment advice is more likely to be followed. Holding different attributions may lead to conflict over treatment and management decisions, which may negatively affect adjustment.

4.5.4 Explaining adjustment to paediatric chronic pain

This research has been guided by a conceptual model designed by Varni et al. (1996b) to explain variance in adjustment to paediatric chronic pain (see Figure 1). The present study contributes to understanding predictors of adjustment, by focusing on the elements of Cognitive appraisal and Coping strategies. Varni et al. did not specify whether Cognitive appraisal referred to children's or parents' beliefs; the current study indicates that parents' appraisals of the pain are more predictive of outcome measures than children's. The current findings suggest that it may be useful to use Leventhal's illness representations (Leventhal et al., 1997) as a method to understand and study what Varni et al. call "cognitive appraisal". (See section 4.2.4.) Further analysis of the current data would allow

for exploration of the direct relationships between child and parent control beliefs and the adjustment variables. Future research should focus on whether beliefs about the chronicity and "curability" of the pain affect adjustment.

The current research focused on a small part of Varni et al.'s model and further research needs to be carried out to evaluate other elements. In particular, future research could focus on functional disability and more comprehensively explore factors that may be related to this.

4.5.5 Replication

Finally, as with all research, replication of the current findings would be desirable. The study could be repeated with a different population of paediatric chronic pain patients, or with a different age group. Some of the limitations of the current study could be addressed, in particular, the sizes of the groups being compared. A larger sample would indicate whether the non-significant trends found in the current study represent significant associations. Research with a larger sample and/or more equal group sizes could confirm (or repudiate) current findings regarding "main" attributions to causes. Ideally, further research could use multivariate statistics to explore the effects of interactions between variables and to control for possibly confounding relationships (see section 4.4.5).

4.6 CONCLUSIONS

The current study explored adjustment to paediatric chronic pain with reference to child and parent pain beliefs and child coping strategies. Whilst it was recognised that there are many influences on adjustment to paediatric pain (see Figure 1) it was predicted that pain beliefs and coping strategies would be significantly associated with adjustment measures (see Figure 2). This research was guided by the theoretical and research literature regarding both attributional beliefs and adaptation to pain.

As predicted by the literature, a wide variation in adjustment to paediatric chronic pain was found. The majority of children had good functional and psychological adjustment; however, a notable minority exhibited functional or psychological difficulties. The current

results showed specific relationships between child and parent attributions, control beliefs, coping and adjustment. The majority of these associations were found to be weak, indicating the importance of other influences on children's adjustment (see Figure 1).

The complex relationships found by this study are represented in Figure 10. The use of bi-directional arrows indicates that causality cannot be inferred from the findings (except in the case of the influence of the child's age). Solid lines represent relationships found between the main variables (see Figure 2 for predicted relationships). Dashed lines represent relationships between the main variables and the moderating variables.

Figure 10. Diagrammatic representation of the study's findings.
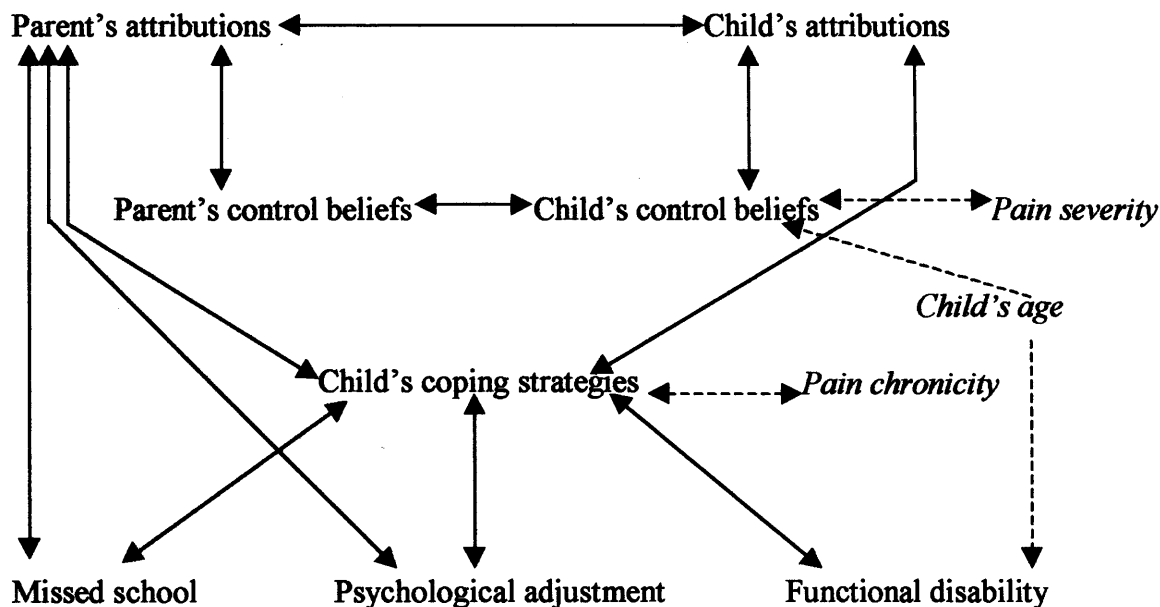
In conclusion, children's use of coping strategies related to their adjustment as predicted, although this relationship was limited to specific correlations. Both children and parents were found to make attributions about the cause of the pain; the majority of participants held more than one. The study indicates that any strength of belief in a particular cause may be predictive of adjustment. Findings from the study indicated that parental attributions have more influence on adjustment to paediatric chronic pain than do children's. Despite associations between child and parent pain beliefs, their beliefs have different relationships with coping and adjustment. The findings indicate that the mechanism by which parents' attributions affect children's adjustment is by influencing

decisions made in response to the pain, such as treatment decisions. Finally, the findings emphasise the clinical importance of involving parents in treatment of paediatric chronic pain and support the clinical utility of cognitive-behavioural treatments designed to increase the child's use of active coping.

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APPENDIX 1

    1a Child Study Information Leaflet

    1b Parent Study Information Leaflet

All information leaflets were printed on Trust headed paper for the purpose of the study.

PATIENT INFORMATION SHEET

Paediatric chronic pain: child and parent pain beliefs and adjustment.

We are doing a project about pain in children and young people. This project will be done as part of a Doctoral degree in Clinical Psychology. We are particularly interested in what young people think about their own pain and how they cope with it.

We are really interested to hear from people like you, who are aged between 11 and 16 and who have been having pain for some time.

Results from this project will be used to help children and young people like yourself in the future.

If you and your parents would like to take part, someone will come and talk to you about your experience of pain. The person would like to talk to you on your own, but if you want someone else with you, this is fine. This talk will probably take about 1 hour. The same person will also want to talk to one of your parents, separately, for about 1/2 hour.

What you say to us about your pain experience is anonymous and confidential. The person who comes to talk with you will explain fully what this means.

Although we would like to talk to you, you do not have to take part in this project. You can say no, or even agree but change your mind later; this will not affect your treatment.

If you have any questions at any stage, you or your parents can contact us at the phone number above. Thank you for your help.

....

N.T. Barlow   Ciara Masterson
Consultant Paediatric Psychologist   Clinical Psychologist in Training

PARENT INFORMATION SHEET

Paediatric chronic pain: child and parent pain beliefs and adjustment.

We are currently involved in a research project that is examining pain beliefs and coping strategies in children and young people with chronic pain. This study is being performed as a partial fulfilment of the requirements for the Doctorate in Clinical Psychology at Leicester University.

Your and your child's participation in this study will provide useful information about this topic. The research project will provide knowledge that will be useful in the clinical management of children with pain disorders.

Your child qualifies for participation in this study if they are aged between 11 and 16 and have a pain problem that started 3 months ago or more (16-19 year olds will also be included, providing they still live at home and are in full-time education). Participation will entail an interview of approximately 60 minutes with your child and an interview of about 30 minutes with yourself (one parent only). As part of the interview, both you and your child will be asked to fill in some questionnaires. You and your child will be interviewed separately. The time and place of these interviews will be arranged to suit you both.

All data from this project are confidential and will be used for research purposes only. Any data you or your child provide will be made anonymous and will not be traceable to you. We will explain this further when we meet with you.

Participation in this study is strictly voluntary. You and your child may withdraw from the study at any point without penalty. Your decision to participate or not will not affect your child's current or future treatment.

Please do not hesitate to contact us should you require further information (either before or after your participation). Thank you for your assistance.

....
N.T. Barlow   Ciara Masterson
Consultant Paediatric Psychologist   Clinical Psychologist in Training

APPENDIX 2

2a Child consent form: 11-15 years; Leicester

2b Parent consent form: 11-15 years; Leicester

2c Child consent form: 16-18 years; Leicester

2d Parent consent form: 16-18 years; Leicester

2e Child consent form: 11-15 years; Derby

2f Parent consent form: 11-15 years; Derby

2g Child consent form: 16-18 years; Derby

2h Parent consent form: 16-18 years; Derby

All consent forms were printed on Trust headed paper for the purpose of the study.

PATIENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

This form should be read in conjunction with the Information Sheet.

I agree to take part in the above study as described in the Information Sheet.

I understand that I may withdraw from the study at any time.

I understand the reason for the study.

I understand what will be required if I take part in the study.

I have read the Information Sheet on the above study and have had the opportunity to discuss the details with the investigator and ask any questions.

Signature of patient...Date.................................

Name (Block letters)..

Name of parent (Block letters)..

I confirm I have explained the nature of the study, as detailed in the Information
Sheet, in terms which in my judgement are suited to the understanding of the patient.

Signature of
Investigator...Date.................................

Name (Block letters)..

PARENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

This form should be read in conjunction with the Information Sheet.

I agree to take part in the above study as described in the Information Sheet.

I understand that I may withdraw from the study at any time without justifying my decision and without affecting my child's care and medical management.

I understand research is covered for mishaps in the same way as for patients undergoing treatment in the NHS, i.e. compensation is only available if negligence occurs.

I have read the Information Sheet on the above study and have had the opportunity to discuss the details with the investigator and ask any questions. The nature and purpose of the study have been explained to me and I understand what will be required if I take part in the study.

Signature of parent...Date.................................

Name (Block letters)..

Name of child (Block letters)...

I confirm I have explained the nature of the study, as detailed in the Information Sheet, in terms which in my judgement are suited to the understanding of the parent.

Signature of Investigator...Date.................................

Name (Block letters)...

PATIENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

This form should be read in conjunction with the Information Sheet.

I agree to take part in the above study as described in the Information Sheet.

I understand that I may withdraw from the study at any time without justifying my decision and without affecting my care and medical management.

I understand that members of the research team may wish to view relevant sections of my medical records, but that all information will be treated as confidential.

I understand research is covered for mishaps in the same way as for patients undergoing treatment in the NHS, i.e. compensation is only available if negligence occurs.

I have read the Information Sheet on the above study and have had the opportunity to discuss the details with the investigator and ask any questions. The nature and purpose of the study have been explained to me and I understand what will be required if I take part in the study.

Signature of patient...Date..............................

Name (Block letters)..

Name of parent (Block letters)..

I confirm I have explained the nature of the study, as detailed in the Information Sheet, in terms which in my judgement are suited to the understanding of the patient.

Signature of Investigator...Date..............................

Name (Block letters)..

PARENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

This form should be read in conjunction with the Information Sheet.

I agree on behalf of my child and myself to take part in the above study as described in the Information Sheet.

I understand that I may withdraw from the study at any time without justifying my decision and without affecting my child's care and medical management.

I understand that members of the research team may wish to view relevant sections of my child's medical records, but that all information will be treated as confidential.

I understand research is covered for mishaps in the same way as for patients undergoing treatment in the NHS, i.e. compensation is only available if negligence occurs.

I have read the Information Sheet on the above study and have had the opportunity to discuss the details with the investigator and ask any questions. The nature and purpose of the study has been explained to me and I understand what will be required of myself and my child if we take part in the study.

Signature of parent...Date................................

Name (Block letters)...

Name of child (Block letters)..

I confirm I have explained the nature of the study, as detailed in the Information Sheet, in terms which in my judgement are suited to the understanding of the parent.

Signature of Investigator...Date................................

Name (Block letters)...

PATIENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

Principle investigator: Ciara Masterson, Clinical Psychologist in training

This form should be read in conjunction with the information sheet

----

I have had the nature of this research explained to me. I agree to participate in this study. I understand that:

1. The time taken for my participation in the study is about 60 minutes.

2. I may withdraw from the study at any time.

3. All information I give will be anonymous and confidential.

Signature of patient...Date.....................

Name (Block letters)..

Name of parent (Block letters)..

If you have any further questions (before or after your participation) the researcher can be contacted at the above address/phone number.

PARENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

Principle investigator: Ciara Masterson, Clinical Psychologist in training

This form should be read in conjunction with the information sheet

----

I have had the nature of this research explained to me. I agree on behalf of my child and myself to participate in this study. I understand that:

1. The time taken for participation in the study is about 90 minutes (that is, a 60 minute interview with my child and a 30 minute interview with myself).

2. Participation in the study is entirely voluntary. I may withdraw from the study at any time, without justifying my decision, and without affecting my child's medical management.

3. All information provided by my child and myself will be anonymous. All such information will be confidential and used for this investigation only.

Signature of parent...Date.....................

Name (Block letters)...

Name of child (Block letters)...

If you have any further questions (before or after your participation) the researcher can be contacted at the above address/phone number.

PATIENT CONSENT FORM

<u>Paediatric chronic pain: child and parent pain beliefs and adjustment</u>

Principle investigator: Ciara Masterson, Clinical Psychologist in training

This form should be read in conjunction with the information sheet

----

I have had the nature of this research explained to me. I agree to participate in this study. I understand that:

1. The time taken for participation in the study is my about 60 minutes.

2. Participation in the study is entirely voluntary. I may withdraw from the study at any time, without justifying my decision, and without affecting my medical management.

3. All information I provide will be anonymous. All such information will be confidential and used for this investigation only.

Signature of patient...Date......................

Name (Block letters)..

Name of parent (Block letters)...

If you have any further questions (before or after your participation) the researcher can be contacted at the above address/phone number.

PARENT CONSENT FORM

Paediatric chronic pain: child and parent pain beliefs and adjustment

Principle investigator: Ciara Masterson, Clinical Psychologist in training

This form should be read in conjunction with the information sheet

----

I have had the nature of this research explained to me. I agree to participate in this study. I understand that:

1. The time taken for my participation in the study is about 30 minutes.

2. Participation in the study is entirely voluntary. I may withdraw from the study at any time, without justifying my decision, and without affecting my child's medical management.

3. All information I provide will be anonymous. All such information will be confidential and used for this investigation only.

Signature of parent..Date......................

Name (Block letters)..

Name of child (Block letters)...

If you have any further questions (before or after your participation) the researcher can be contacted at the above address/phone number.

APPENDIX 3

3a Child interview schedule

3b Pain Response Inventory

3c Functional Disability Inventory – Child form

PATIENT INTERVIEW

1. Where is your pain? (e.g. headache, limb pain, tummy pain)

2. When did this pain problem begin?

2a. Has your pain been constant since then, or have you had weeks or months without pain?

3. How many days per week do you have pain? (in last 3 months)
(if not applicable: How many days per month (i.e. 4 weeks) do you have pain?)

3a. How many hours a day do you have pain? (in last 3 months)

1_____<1 hour
2_____1-6 hours
3_____6 + hours
4_____constant/24 hours

4. During the past three months of the school year, how often did your pain stop you from going to school?

0_____None
1_____1-5 days (school days)
2_____more than one week (> 5 days)
3_____more than 2 weeks (> 10 days)
4_____more than 3 weeks (> 15 days)
5_____more than 4 weeks (> 20 days)

5. Please rate how much pain you are having <u>today</u> by placing a mark somewhere on the line.

Not hurting   **Hurting a lot**
No pain _____ **Severe pain**

Or 3-D VAS score_____

6. Thinking about the last 3 months, please rate how much pain you have <u>on average each day</u>, by placing a mark somewhere on the line.

Not hurting   **Hurting a lot**
No pain _____ **Severe pain**

Or 3-D VAS score_____

7. Please rate how severe the <u>worst pain you had in the past week</u> (7 days) by placing a mark somewhere on the line.

Not hurting   **Hurting a lot**
No pain _____ **Severe pain**

Or 3-D VAS score_____

8. What does the word pain mean? What words would you use to describe pain? (prompt) If you met someone who had never had any pain, how would you explain it to them?

9a. Have the doctors given you a diagnosis? What of?

9b. What does (*supplied diagnosis*) mean? (prompt) Can you explain (*supplied diagnosis*) to me?

10a. What have you been told by medical staff about the cause of your pain?

How much do you believe each explanation is correct?
0% = Not at all, through to, 100% = Completely (3D scale)

10b. What have you been told by your family about the cause of your pain?

How much do you believe each explanation is correct?
0% = Not at all, through to, 100% = Completely (3D scale)

11. What do *you* think are the causes of your pain?
{If child supplies original cause e.g. accident then ask: What things are responsible for you *still* having the pain?}

(Note number of prompts: (Q))

How much do you believe each explanation is correct?
0% = Not at all, through to, 100% = Completely (3D scale)

12. If you could go back in time, is there anything you could do to avoid having the pain?

13a. Do you believe that you can do things which reduce your pain? (both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

13b. How much can you actually decrease your pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

14a. Do you believe that your parent (who is being interviewed) can do things which reduce your pain? (both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

14b. How much can your parent actually decrease your pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

15a. Do you believe that the medical staff can do things which reduce your pain? (both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

15b. How much can the medical staff actually decrease your pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

16a. Do you believe that fate can reduce your pain? (both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

16b. How much can fate actually decrease your pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

Pain Response Inventory

When you have a bad pain, how often do you:

	Never	Once in a while	Some-times	Often	Always
1. try hard to do something about it?	0	1	2	3	4
2. keep your feelings to yourself?	0	1	2	3	4
3. tell yourself that you can't deal with it, and quit trying?	0	1	2	3	4
4. try to get used to it?	0	1	2	3	4
5. get as far away from other people as you can?	0	1	2	3	4
6. lie down to try to feel better?	0	1	2	3	4
7. try to do something to make it go away?	0	1	2	3	4
8. tell yourself that it doesn't matter that much to you?	0	1	2	3	4
9. do something you enjoy so you won't think about it?	0	1	2	3	4
10. think to yourself that it's never going to stop?	0	1	2	3	4
11. not let other people see what you're going through?	0	1	2	3	4
12. give up trying to feel better?	0	1	2	3	4
13. try to accept it?	0	1	2	3	4
14. go off by yourself?	0	1	2	3	4
15. try not to move around too much?	0	1	2	3	4
16. feel like you can't stand it anymore?	0	1	2	3	4

When you have a bad pain, how often do you:

	Never	Once in a while	Some-times	Often	Always
17. try to think of a way that you could make it better?	0	1	2	3	4
18. tell yourself that it isn't that big a deal?	0	1	2	3	4
19. rub the sore part to try to make it better?	0	1	2	3	4
20. not tell anyone how you're feeling?	0	1	2	3	4
21. think to yourself that there's nothing you can do, so you don't even try?	0	1	2	3	4
22. try to learn to live with it?	0	1	2	3	4
23. stay away from people?	0	1	2	3	4
24. try to rest?	0	1	2	3	4
25. talk to someone to find out what to do?	0	1	2	3	4
26. bend over or curl up to try to feel better?	0	1	2	3	4
27. think to yourself that it's going to get worse?	0	1	2	3	4
28. tell yourself you can get over the pain?	0	1	2	3	4
29. try to figure out what to do about it?	0	1	2	3	4
30. tell yourself that it's not that bad?	0	1	2	3	4
31. try to think of something pleasant to take your mind off the pain?	0	1	2	3	4
32. give up since nothing helps?	0	1	2	3	4

When you have a bad pain, how often do you:

	Never	Once in a while	Some- times	Often	Always
33. tell yourself that's just the way it goes?	0	1	2	3	4
34. try to be alone?	0	1	2	3	4
35. try to keep still?	0	1	2	3	4
36. keep others from knowing how much it hurts?	0	1	2	3	4
37. hold the sore part to try to make it better?	0	1	2	3	4
38. think to yourself that you might be really sick?	0	1	2	3	4
39. tell yourself to keep going even though it hurts?	0	1	2	3	4
40. try not to think about it?	0	1	2	3	4
41. ask someone for help?	0	1	2	3	4
42. talk to someone who will understand how you feel?	0	1	2	3	4
43. think hard about what to do?	0	1	2	3	4
44. think of things to keep your mind off the pain?	0	1	2	3	4
45. stay close to someone who cares about you?	0	1	2	3	4
46. keep quiet about it?	0	1	2	3	4
47. ask someone for ideas about what you can do?	0	1	2	3	4
48. not even try to do anything about it because it won't help?	0	1	2	3	4

When you have a bad pain, how often do you:

	Never	Once in a while	Some-times	Often	Always
49. tell yourself, "That's life."?	0	1	2	3	4
50. try to get away from everyone?	0	1	2	3	4
51. stop what you're doing to see if it will help?	0	1	2	3	4
52. take some medicine?	0	1	2	3	4
53. think to yourself that something might be really wrong with you?	0	1	2	3	4
54. talk to someone so that you'll feel better?	0	1	2	3	4
55. tell yourself you can deal with the pain?	0	1	2	3	4
56. try to forget about it?	0	1	2	3	4

Questionnaire adapted from:
Walker, L.S., Smith, C.A., Garber, J., & Van Slyke, D.A. (1997). Development and validation of the Pain Response Inventory for children. *Psychological Assessment, 9*, 392-405.

FUNCTIONAL DISABILITY INVENTORY – CHILD FORM

When people are sick or not feeling well it is sometimes difficult for them to do their regular activities. How difficult is it for you to do these activities because of the pain?

1.	Walking to the bathroom	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
2.	Walking up stairs	No trouble	A little trouble	Some troublet	A lot of rouble	Impossible
3.	Doing something with a friend (for example, playing a game)	No trouble	A little trouble	Some troublet	A lot of rouble	Impossible
4.	Doing chores at home	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
5.	Eating regular meals	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
6.	Being up all day without a nap or rest	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
7.	Riding the school bus or travelling in the car	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible

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
9.	Doing the activities in gym class (or playing sports)	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
10.	Reading or doing homework	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
11.	Watching TV	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
12.	Walking the length of a football field	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
13.	Running the length of a football field	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
14.	Going shopping	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
15.	Getting to sleep at night and staying asleep	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible

Questionnaire adapted from:
Walker, L.S., & Greene, J.W. (1991). The Functional Disability: measuring a neglected dimension of child health status. *Journal of Pediatric Psychology, 16*, 39-58.

APPENDIX 4

BACKGROUND INFORMATION

*Sample number*_____

Child's age   _____

Child's year at school   _____

Ethnicity   _____

Parents' ages   _____

Parents' occupations   _____

_____

Parent interviewed: Mother   Father   Step-mother   Step-father   Other

                      Main carer?   Yes/ No

List all family members who live with the child and ages of siblings

_____

_____

_____

_____

_____

_____

PARENT INTERVIEW

*Sample number*_____

1. **Where is your child's pain? (e.g. headache, limb pain, tummy pain)**

2. **When did your child's <u>current</u> pain problem begin?**

2a. **Has the pain been constant since then, or have there been weeks or months without pain?**

3. **How many days per week does your child have pain? (in last 3 months)**
(if not applicable : How many days per month (i.e. 4 weeks) does your child have pain?)

3a. **How many hours per day does your child have pain? (in last 3 months)**

1_____<1 hour
2_____1- 6 hours
3_____6 +
4_____constant/24 hours

4. **During the past three months of the school year, how often did your child's pain keep him/her from going to school?**

0_____None
1_____1-5 days (school days)
2_____more than one week (> 5 days)
3_____more than 2 weeks (> 10 days)
4_____more than 3 weeks (> 15 days)
5_____more than 4 weeks (> 20 days)

5. Please rate how much pain you think your child is having today by placing a mark somewhere on the line.

Not hurting   Hurting a lot
No pain   _____   Severe pain

Or 3-D VAS score_____

6. Thinking of the last 3 months, please rate how much pain you think your child has on average each day, by placing a mark somewhere on the line.

Not hurting   Hurting a lot
No pain   _____   Severe pain

Or 3-D VAS score_____

7. Please rate how severe the worst pain your child had in the past week (7 days), by placing a mark somewhere on the line.

Not hurting   Hurting a lot
No pain   _____   Severe pain

Or 3-D VAS score_____

8. Has your child received a diagnosis? What of?

3

8a. Do you think that diagnosis is correct?

8b. What have you been told by medical staff about the cause(s) of your child's pain?

How much do you believe each explanation is correct?
0% = Not at all, through to, 100% = Completely (3D scale)

9. What do you think are the causes of your child's pain?
{If parent supplies original cause e.g. accident then ask: What factors are responsible for your child continuing to have the pain?}

(note number of prompts: (Q))

How much do you believe each explanation is correct?
0% = Not at all, through to, 100% = Completely (3D scale)

9a. If you could go back in time is there anything you or your child could do to avoid your child having the pain problem?

10. Has anyone else in the family experienced severe or chronic pain problems? What was the outcome? (what did they do about it/ how are they now)
{If yes, was/is this family member close to the child?}

11. What makes your child's pain worse? (e.g. stress, tiredness, exertion, noise, boredom, light)

12. What do you currently do to ease or relieve your child's pain?
{if answer is medication : What do you do apart from medicate to relieve your child's pain?}

13a. Do you believe that you can do things which reduce your child's pain? (Both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

13b. How much can you actually decrease your child's pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

14a. Do you believe that your child can do things which reduce their pain? (Both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

14b. How much can your child actually decrease their pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

15a. Do you believe the medical staff can do things which reduce your child's pain? (Both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

15b. How much can the medical staff actually decrease your child's pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

16a. Do you believe that fate reduces your child's pain? (Both relief and prevention)

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

16b. How much can fate actually decrease your child's pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

**17a. If you are in pain, do you believe that you can do things which reduce that pain?
(Both relief and prevention)**

Please rate your belief on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

17b. How much can you actually decrease your own pain?

Please rate on the scale.
0% = Not at all, through to, 100% = Completely

3D scale_____

FUNCTIONAL DISABILITY INVENTORY – PARENT FORM

When people are sick or not feeling well it is sometimes difficult for them to do their regular activities. How difficult is it for your child to do these activities because of the pain?

1.	Walking to the bathroom	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
2.	Walking up stairs	No trouble	A little trouble	Some troublet	A lot of rouble	Impossible
3.	Doing something with a friend (for example, playing a game)	No trouble	A little trouble	Some troublet	A lot of rouble	Impossible
4.	Doing chores at home	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
5.	Eating regular meals	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
6.	Being up all day without a nap or rest	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
7.	Riding the school bus or travelling in the car	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible

Remember, you are being asked about difficulty due to your child's physical health

8.	Being at school all day	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
9.	Doing the activities in gym class (or playing sports)	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
10.	Reading or doing homework	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
11.	Watching TV	No trouble	A little trouble	Some trouble	A lot of trouble	Impossible
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