

**The Influence of Gender on Appraisal of Pain  
and  
Pain Coping Strategies**

**by**

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for the degree of  
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## ABSTRACT

This study was a cross-sectional community telephone survey examining the relationships between gender, specific characteristics of pain, the threat or challenge appraisal of a troublesome pain, and the impact of appraisal on coping strategies. The sampling frame consisted of 1,430 households, randomly selected from the Halifax-Dartmouth-Bedford community. Of the 390 respondents who reported a pain in the two weeks preceding the interview, 309 respondents (157 women, 152 men) agreed to participate in the study (79% response rate). Fifty-three percent of respondents had pain at the time of the interview.

For women and men, the most important impact on whether pain was appraised as a threat was the extent to which pain interfered with activities and responsibilities, and how upset the respondent was about the pain. These two aspects of pain accounted for 48% of the variance in threat appraisal for women, and 37% of the variance for men. For women, threat appraisal increased significantly more quickly as the overall interference of the pain increased. There was no gender difference in emotional upset due to pain, or on the impact of emotional upset on threat appraisal.

Threat appraisal had a stronger impact than did challenge appraisal on the way respondents coped with their pain. Threat appraisal was associated with information-seeking, seeking social support, problem-solving about the pain, as well as more emotive coping behaviours considered as externalizing (e.g. swearing, arguing, yelling), internalizing/catastrophizing (e.g. thinking pain would never stop), and indirect help-seeking (e.g. crying, groaning, asking for help). Challenge appraisals of pain were low. Respondents who reported higher challenge appraisals used more behavioural and cognitive distraction strategies, and more positive self-statements. Women were more likely than men to seek health care in response to increasing threat appraisals of pain. However, threat appraisal and gender of the respondent predicted only a small proportion of visits to a health professional for pain.

Although women tend to receive more attention for emotional aspects of their pain experiences, this study demonstrated that overall interference of pain on daily life was a more important factor in the threat appraisal of pain for women and men. Greater attention should be given in health care practice to the impact of overall interference of pain on the roles and responsibilities of daily life and its relationship to the threat appraisal of pain. Appraisal of pain may be an important determinant of overall psychological adjustment for women and men who experience persistent pains in their lives.

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An interdisciplinary doctoral program is administratively somewhat different from other doctoral programs in that the candidate has the responsibility of seeking out faculty who are willing to supervise the thesis, co-ordinate the program, and provide consultation, often in addition to the responsibilities which they already hold within their own respective schools/departments.

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## CHAPTER 1. INTRODUCTION

### Background to the Problem

#### Overview

There is a substantial body of epidemiological research to demonstrate gender differences in the prevalence, the severity and the treatment of pain. In addition, there is experimental and epidemiological evidence of important gender variations in pain response particularly coping strategies. Many of these differences are consistent with gender variations noted in stress and coping research.

There have been few attempts to account for these gender variations. Biological factors are likely to be implicated in women's and men's risks for pain. However, psychosocial factors may also influence reporting of pain and coping behaviours used to control and manage pain.

Investigators who have been concerned with the management of illness and long term adjustment to health problems have argued that greater attention should be given to the meaning attached to symptoms. Examination of cognitive appraisal to construct a meaning of pain may be essential to understand how gender influences coping behaviour and strategies. For example, appraisal of pain as a threat or challenge may be central to decisions to seek health care for acute pain events and may have important implication for management of chronic pain.

In chapter one, I review the evidence for gender variation in pain prevalence and coping strategies, and then examine a model of appraisal from the stress and coping research of Lazarus and Folkman (1984). This discussion is followed by a review of current appraisal research with particular attention to evidence of the relationship between appraisal and coping, and gender effects. In the second chapter, I give a conceptual framework of the relationship between appraisal and coping as applied to pain. This framework will emphasize the contribution of the characteristics of pain on appraisal. The purpose of this study was to



examine the effect of gender on a threat or challenge appraisal of pain, and the impact of appraisal on coping behaviour.

### The Distinction Between Gender and Sex

The most common approach to questions about variations in pain research outcomes between females and males is to speak about sex differences. Sex typically refers to the biological, hormonal, and anatomical differences between women and men as well as other physiological differences that may affect brain chemistry and body metabolism. In contrast, gender denotes a broader more complex psychological, sociological, and political framework which shapes attitudes, perceptions or beliefs that tell people how to think, feel, and act as women or men in a particular society on the basis of their sex (Phillips, 1995). The importance of a gender perspective is its explicit recognition that the meaningfulness of any differences between women and men in their thoughts, emotions or behaviours, cannot be fully understood without considering biological, psychological, sociological, political, and cultural mechanisms.

The distinction between gender and sex has particular significance in pain research since pain is a subjective event with biological and psychological components (discussed in more detail in Chapter 2). A debate often ensues about the biological or psychological nature of differences between women and men in pain research. However, biology and psychology are likely to be interactive due to the inclusion of sex within gender and the subjective nature of all pain events. For these reasons, sex differences in pain experience cannot be fully understood without consideration of gender.

### What is Known about Gender Variation in Pain Experience?

Health statistics routinely demonstrate that women have a higher morbidity from acute and nonfatal chronic diseases (Dawson & Adams, 1987; Verbrugge, 1985). The differences are largest among young adults aged 17 to 44 years, even when reproductive and other gender-specific conditions are excluded. In contrast, men have 50% to 60% more injuries at ages 17 to 44 years with a higher prevalence of life-threatening chronic diseases. These differences

suggest that women and men may also have somewhat different pain experiences.

Indeed, in most epidemiological pain research, women are more likely than men to report a variety of temporary and persistent pains such as tension headaches, migraines, musculoskeletal pain, facial/oral pain and abdominal pain (e.g. Crook, Rideout, & Browne, 1984; Magni, Calderion, Rigatti-Luchini, & Merskey, 1990; Rasmussen, Jensen, Schroll, & Olesen, 1991; Taylor & Curran, 1985; Von Korff, Dworkin, Le Resche, & Kruger, 1988). In addition, women may have moderate or severe pains from menstruation, pregnancy, and childbirth (Taylor & Curran, 1985; Melzack, 1993; Melzack, Taenzer, Feldman, & Kinch, 1981). Women report more severe pain, more frequent pain and pain of longer duration than do men (Andersson, Ejlertsson, Leden, & Rosenberg, 1993; Attanasio & Andrasik, 1987; Hasvold & Johnsen, 1993; Henry et al., 1992; Honkasalo, Kapiro, Heikkilä, Sillanpää, & Koskenvuo, 1993; Pietri et al., 1992; Reisbord & Greenland, 1985; Stewart, Linet, Celentano, Van Natta, & Ziegler, 1991; Taylor & Curran, 1985). Even under more extreme circumstances such as homelessness, in which one might anticipate that women and men would have a similar prevalence of pain, women continue to report more headaches, musculoskeletal pain and abdominal pain than men (Ritchey, La Gory, & Mullis, 1991). Although there are variations in the magnitude of the prevalence rates in this body of population-based research, partially due to differences in measurement criteria, gender variations for prevalence of recurrent pains are strikingly consistent from country to country. For example, higher prevalence of headaches and migraines for women than men has been reported in studies from the United States (Lipton & Stewart, 1993), Norway (Hasvold & Johnsen 1993), England (Newland, Illis, Robinson, Batchelor, & Waters, 1978), France (Henry et al., 1992), Finland (Honkassalo, Kapiro, Heikkilä, Sillanpää, & Koskenvuo 1993), Zimbabwe (Levy, 1983), Switzerland (Merikangas, Angst, & Isler, 1990), Denmark (Rasmussen, Jensen, Schroll, & Olesen, 1991), Ecuador (Sachs et al., 1985), and New Zealand (Thomson, White, & West, 1993).

Some gender differences in recurrent pain prevalence begin to emerge in adolescence (Balagué, Dutoit, & Waldburger, 1988; Beiter, Ingersoll, Ganser, & Orr, 1991; Kristjánsdóttir & Wahlberg, 1993; Larsson, 1991; Mortimer, Kay, & Jaron, 1992; Munoz et al., 1993; Pilley, Mohlin, Shaw, & Kingdom, 1992; Salminen, Pentti, & Terho, 1992; Von Korff, Dworkin, Le Resche, & Kruger, 1988) and then continue into young adulthood (Lester, Lefebvre, & Keefe, 1994). Although pain is often considered a problem of old age, many common pains may be more prominent in young adult years. For example, Taylor and Curran (1985) found that pain was inversely related to age, that is, young adults were more likely to report pain particularly headaches, back pain, muscle pains, stomach pains, premenstrual and menstrual pains and dental pains, than middle-aged or elderly respondents. In fact, in a survey of undergraduate students, 65% of students reported pain at the time of the survey (Lester et al., 1994). In addition, 65% reported a moderate to severe pain intensity for pain in the previous month. Women and men were similar in their report of pain intensity for current pain, and report of highest and lowest pain in the past month. However, women reported significantly more headache, pelvic pain, and low back pain than did men; they also reported significantly more pain sites.

Although back pain has been associated with young adults (Lester et al., 1994; Taylor & Curran, 1985), in other surveys back pain has been more prevalent among older respondents (Heliövaara et al., 1989; Lee, Helewa, Smythe, Bombardier, & Goldsmith, 1985). In a review of epidemiological research concerning back pain, de Girolamo (1991) concluded that back pain may be more strongly associated with occupation than either age or gender.

Gender variations in health risks and pain prevalence may predispose women and men over time to acquire different coping strategies for their health needs. In health and illness research, women typically report more short-term disability, medication use and health care visits as well as more long-term disability in occupational roles associated with employment (Dawson & Adams, 1987; Verbrugge, 1985). However, women may pay more attention to

symptoms and they may respond more aggressively to symptoms of ill health through health-related activities (Muller, 1994; Verbrugge, 1979, 1980, 1985). That is, women and men appear to cope somewhat differently with symptoms of ill health. Women are frequently found to develop a greater repertoire of coping strategies that includes active behavioural and cognitive coping, avoidance, emotion-focused coping, seeking social support, relaxation, and distraction, whereas men rely on direct action, problem-focused coping, talking problems down, looking at the bright side of life and tension-reducing activities such as alcohol consumption, smoking and drug abuse (Astor-Dubin & Hammen, 1984; Stone & Neale, 1984; Verbrugge, 1985; Vingerhoets & Van Heck, 1990). While seeking social support and expression of emotion are more strongly associated with women, men are more likely to use denial (Brems & Johnson, 1989; Holm et al., 1986).

In epidemiological pain research, gender variation in response to pain is similar to outcomes from other health and illness research. Overall, women are at greater risk for short-term, pain-related disability than men (Alexanderson, Leijon, Åkerlind, Hillevi, & Bjurulf, 1994; Chevalier, Luce, Blanc, & Goldberg, 1987; Crook, 1993; Johnson, 1991; Lipton & Stewart, 1993; Taylor & Curran, 1985; Westerling & Jonsson, 1980). Women may be more likely to use medication for pain (Lipton & Stewart, 1993; Hertzberg, 1985; Lee et al., 1985). Women are more likely to access health care resources for some but not all types of pain (Adelman & Koch, 1991; Agerberg & Carlsson, 1972; Celentano, Linet, & Stewart, 1990; Rasmussen et al., 1992; Taylor & Curran, 1985; Walsh, Cruddas, & Coggon, 1992). Differences in health care utilization may emerge in childhood and adolescence (Fairbank, Pynsent, Van Poortvliet, & Phillips, 1984; Hertzberg, 1985; Lewis & Lewis, 1982; Olsen et al., 1992; Rudolf, Tomanovich, Greenberg, Friend, & Alario, 1992). Women seek more social support for pain, and report higher internalizing/catastrophizing and indirect help-seeking than do men (Reid, Gilbert, & McGrath, 1994). Among children of school age, girls have higher levels of indirect help-seeking than

boys; boys report more behavioural- and cognitive-distraction, and more problem-solving than girls (Reid et al., 1994).

Gender variations in coping strategies may also occur in samples of individuals with chronic pain problems. However, prolonged pain may affect the nature of gender variations. To illustrate, Buckelew et al. (1990) found that while women with chronic benign pain problems reported significantly more use of cognitive restructuring and information-seeking than men, women and men were similar in their use of emotional expression, self-blame, threat minimization, and wish-fulfilling fantasies. In a sample of individuals with rheumatoid arthritis, Keefe et al. (1991) did not find gender differences in coping strategies. Women and men were similar in their coping strategies and in their perception of the effectiveness of their coping skills.

Nevertheless, two other studies have demonstrated that the relationship between gender and coping with chronic pain is complex and may be influenced by the type of pain. Strong, Ashton, and Stewart (1994) found that women and men were equally likely to be depressed and disabled by chronic low back pain, but differed significantly in their perceptions of being in control of pain, use of active coping strategies and denial of life stressors. In this study, outcomes on measures of pain intensity, depression, disability, illness behaviour, pain attitudes and coping strategies were used to identify three clusters of patient groups. These groups included: "in control patients", "depressed and disabled patients", and "active coping patients with high denial". There was a significant gender difference in group classifications. "In control" patients reported low pain intensity and a strong belief in their ability to control pain. Sixty percent of male patients but only 36% of women were classified in this cluster. "Active copers" had the highest pain intensity but low scores on disability, depression and irritability. They used a variety of coping strategies with a high degree of denial. Forty-two percent of the women and 16% of the men were classified as active copers. From a clinical perspective, the most worrisome group might be the cluster labelled as "depressed and disabled". These patients had average ratings of pain intensity with low scores on reinterpretation of pain, pain

control attitudes and denial with high ratings of depression, disability, helplessness and irritability. Women and men were similar in their distribution within this group (women 22%, men 24%). The outcome of this study would suggest that severe chronic pain may be more frequent for women than men, but women and men may be similar in their ability to cope with such pain. They may also be similar in their risk for long-term disability and depression associated with chronic pain.

However, Jensen, Nygren, Gamberale, Goldie, and Westerholm (1994) in a sample of patients with intractable pain in the neck, shoulder or back area, found that women used more catastrophizing, and reported more distress and general interference of pain in everyday life due to the pain than did men. They maintained that women demonstrated a more complex pattern of adjustment to chronic pain than did men.

These differences in outcomes may be a function of differences in measures used within the studies. They also suggest that gender differences, when they occur, may be small and possibly interactive with other factors such as type of pain and severity of pain. The effect of gender on coping may also be influenced by the respondent's age, in part, because prevalence of various pains is affected by age. As women and men age, they may become increasingly more concerned about pain as a symptom of possible underlying progressive or terminal disease. Studies examining age effects on stress and coping have suggested that elderly individuals may be less likely to attribute controllability of stressful events to themselves and may perceive events as less changeable (Aldwin, 1991; Blanchard-Fields & Robinson, 1987; Folkman, Lazarus, Pimley, & Novacek, 1987). The interaction of age with gender on coping is not known.

The nature of the pain, its severity, frequency, duration and interference with function are all likely to influence reported coping strategies. However, there are several perplexing questions : "Is higher frequency of common pains and pain severity for women sufficient to

explain gender variation in coping behaviour?" "Are there any other factors which may explain gender effects?"

#### How Can We Account for Gender Variations?

Biological differences in pain mechanisms may predispose women to have more pain (Berkley, 1993, 1995) and may affect recovery from pain such as post-operative pain (Burns et al., 1989; Puntillo & Weiss, 1994; Savedra, Holzemer, Tesler, & Wilkie, 1993), but psychological and socio-cultural factors interact with these mechanisms to influence thoughts, emotions and behaviours in response to pain.

Sociological studies of health-related behaviour have shown that gender variation can be partially accounted for by role obligations, psychological distress, employment status, ease of going to the doctor, perceived efficacy of medical care, degree of personal happiness, contact with young children, extent and advice of the social support network (Berkanovic, Telesky, & Reeder, 1981; Davis, 1981; Heloe & Heloe, 1975; Klonoff & Landrine, 1992; Verbrugge, 1985; Weir, Browne, Tunks, Gafni, & Roberts, 1992) as well as personality characteristics such as Type A behaviour (Leikin, Firestone, & McGrath, 1988; Matthews, Siegel, Kuller, Thompson, & Varat, 1983). Any of these factors may be further influenced by culture or ethnicity (Fuller, Edwards, Semsri, & Vorakitphokatorn, 1993).

Collectively, these factors suggest that the meaning given to an event is an important consideration in determining a woman's or a man's response to the event. Meaning can be defined as an individual's perception of the potential significance of an event (Fife, 1994). Meaning generation is a process of inquiry, that seeks to answer: "What does it mean?" "In what way does it affect me?" "Should I be concerned?" "Is any action required on my part?" (Kreitler & Kreitler, 1976). Cognitive appraisal is the conceptual framework most commonly used to understand how meaning is derived from an event and then used to determine coping behaviours and strategies in response to appraisal of the event.

## Definition and Measurement of Appraisal Mechanisms

Appraisal has been considered central to coping research for some time. However a conceptual framework giving a broad outline of the relationship between stress, appraisal, and coping did not appear until 1984 (Lazarus & Folkman, 1984). Using this framework, appraisal was conceptualized as a cognitive process in which the person and the situation contributed to the perception of a stressful event as a challenging, harmful, or threatening experience (Lazarus & Folkman, 1984).

### Person Factors

Person factors are characteristics of the individual that may influence her or his appraisal of a stressful event. Lazarus and Folkman (1984) argued that the most important person factors for cognitive appraisal were a person's beliefs and her or his commitments/responsibilities. Beliefs may be partially influenced by knowledge about prevalence, risk factors and anticipated outcomes. In experimental research, knowledge about a stressor presented in advance of delivery of the stressor has been shown to reduce or increase the perceived threat depending on what information was presented (Croyle, 1992). Past experiences may heighten or diminish appraisals of a current event as threatening or challenging (Croyle, 1992).

Commitments refer to what is important to the person, particularly in relation to one's choices, values, and/or goals; commitments may also affect proximity of an individual to a situation that has the potential for threat or harm (Lazarus & Folkman, 1984). Although not explicitly detailed in this model, influential commitments might also include commitment to employment and relationships, as well as particular role obligations and responsibilities. Multiple commitments through roles and responsibilities may increase the perceived stress of an event and may limit one's ability to recover from the event.

Beliefs and commitments may be related to various sociodemographic factors including gender, age, marital status, occupation, and cultural or ethnic affiliation. These characteristics



have not received extensive attention in appraisal research. Since they are characteristics specifically of persons, they would also be considered person factors.

### Situation Factors

Situation factors refer to the properties of events that make them stressful (Lazarus & Folkman, 1984). A variety of situation specific factors can contribute to the appraisal process including novelty, predictability or event uncertainty, temporal uncertainty, imminence of the event, and its duration (Lazarus & Folkman, 1984). Novelty refers to the individual's previous experience with the event. Lazarus and Folkman argued that a threat appraisal will occur only if the event or some aspect of the event has previously caused harm. Predictability is the degree to which there is a warning of the stressful event. Lazarus and Folkman (1984) also proposed that alternatively one might speak of "event uncertainty" as the probability of the occurrence of an event and suggested that high uncertainty was extremely stressful. On the other hand temporal uncertainty refers to knowing that an event is inevitable but not knowing when it will occur (Lazarus & Folkman, 1984). Imminence refers to the time interval preceding the event. If an event is less imminent there may be greater opportunity for a threat appraisal (Lazarus & Folkman, 1984). Duration is thought to be implicated in appraisal by providing an opportunity for habituation if a stressful event persists over time.

Although any of these person and situation factors may contribute to appraisal, they have received varying degrees of attention in research. Of these factors, perceived predictability is identified as a particularly important situation factor in stress research (eg. Hammen & Mayol, 1982; Holm et al., 1986; Ehde & Holm, 1992).

### Stressful Appraisals

Person and situation factors have interactive features and effects that together produce summative primary appraisals of an event. Lazarus and Folkman (1984) argued that three categories of appraisals could be distinguished: irrelevant, benign-positive and stressful. Nothing has been lost or gained in an event that is appraised as irrelevant. A benign-positive

appraisal occurs if the outcome of an event is construed as positive.

Stressful appraisals include harm/loss, threat and challenge. Harm/loss refers to the physical and/or psychological damage that has occurred to the person whereas threat concerns anticipated harm/loss (Lazarus & Folkman, 1984; Folkman & Lazarus, 1985). Challenge refers to the potential for growth, mastery, or gain. Lazarus and Folkman (1984) argued that threat appraisals were associated with negative emotions such as fear, anxiety and anger whereas challenge appraisals were accompanied by pleasurable emotions of eagerness, excitement or exhilaration. In addition, threat and challenge are not necessarily mutually exclusive; they may both be present during a stressful event. Stressful appraisals are of interest because they necessitate mobilization of coping responses (Lazarus & Folkman, 1984). In appraisal research, threat and challenge receive greater attention than benign-positive or harm/loss appraisals. Threat and challenge may have the greatest implication for health research since they may be related to health care utilization.

A stressful appraisal will have a direct influence on coping strategies (Lazarus & Folkman, 1984; Fife, 1994) but appraisal and coping also have interactive features. Outcomes of coping strategies affect reappraisals of the stressful event. For example, seeking social support may change initial appraisals and lead to alternative or additional coping strategies (Croyle, 1992). Reappraisals are thought to be specifically directed towards determining the extent to which the event is perceived as controllable (Lazarus & Folkman, 1984). For this reason, "reappraisal" or "secondary appraisal" is often measured as perceived controllability. Like perceived predictability, perceived controllability is considered a key factor in stress appraisal. Both factors have had a long research history having had a central role in the learned helplessness model of Seligman (1975).

#### Measurement Issues

Some efforts have been made to capture key person and situation factors inherent in appraisal in various instruments such as the Attribution Questionnaire (Hammen & Mayol, 1982)

and the Cognitive Appraisal Inventory used by Holm et al. (1986). Both measures are based on three factors: perceived control, perceived impact, and perceived predictability. Unfortunately, there is limited information concerning the reliability and validity of these measures.

In most stress research, select person or situation factors have been measured through instruments developed specifically for the stressor under investigation. Unfortunately, this specificity of instruments for a given stressor has reduced the comparability of outcomes among studies. Nevertheless, while the person and situation factors outlined by Lazarus and Folkman (1984) can be applied conceptually to most, if not all, stressors, measures may be needed for specific stressors to ensure clarity of the instrument and the responses. In addition, these measures may be needed to capture key characteristics of the stressor in order to understand the specific appraisal process.

Although the appraisal process is considered central to coping and possibly overall psychological health in the face of chronic illness (Smith & Wallston, 1992), measurement of appraisal is poorly developed (Lazarus & Folkman, 1987). Measurement development has reflected tension between the need for macro-level global instruments that facilitate comparison of outcomes across stressors, and descriptively richer, context-specific micro-measures (Dewe, 1991; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Although the former would be more consistent with the appraisal model of Lazarus and Folkman (1984), the latter may be more feasible. Maintaining the face validity and the content validity of measures may be very difficult for generic questions.

The most common approach to measurement of threat and challenge is a set of one or more defining statements that require a rating on a Likert scale of the extent to which a respondent agrees with these statements. The measurement used by Ptacek, Smith, and Zanas (1992) may conceptually be the most consistent with threat and challenge as defined by Lazarus and Folkman (1984). In this study, "threat" was defined as belief that an event could have negative or undesirable consequences and "challenge" as a belief that an event might

have positive or desirable consequences. Some investigators have also defined "threat" as perceived seriousness of the stressor (Mendola, Tennen, Affleck, McCann, & Fitzgerald, 1990).

Typically, threat and challenge are defined specifically for the stressor under investigation and reflect specific concerns inherent in the nature of the stressor with threat having a negative focus and challenge having a positive direction. To illustrate, Stanton, Tennen, Affleck, and Mendola (1991) assessed threat as a rating of the extent to which infertility harmed self-esteem, important life goals, financial security and health. Challenge was measured as potential for personal growth and strengthening of a relationship through the experience of infertility. Arathuzik (1991a, 1994) defined threat as fear that cancer pain might become worse or that one would become a burden to others. Challenge was measured as belief that one could overcome the pain, determination to get well, and belief that life goals could be achieved despite pain.

In other research, threat-challenge distinctions have been equated with emotional responses such as fear, anxiety and worry as threat appraisals, and confidence, hopefulness, and eagerness as challenge appraisals (Armer, 1993; Folkman & Lazarus, 1985). Although emotions may be closely associated with cognitive appraisals, it is not conceptually or empirically clear that emotions are the same as cognitive appraisals.

A more unusual alternative to measurement is the construction of threat and challenge as opposite points along a continuum. For example, Tomaka, Blascovich, Kelsey and Leitten (1993) defined threat as a ratio of high perceived stressfulness (on a 7-point scale) to low perceived coping ability. Challenge was constructed as a ratio of high perceived coping ability to low perceived stressfulness.

In other research, threat appraisal is constructed as a summative measure of a variety of independent variables. For example, Ditto, Jemmott, and Darley (1988) measured threat as a composite index of the perceived seriousness of a positive outcome on an experimental

health test combined with other research factors. This approach was highly specific to the demands of the research setting.

While the stress-appraisal-coping model of Lazarus and Folkman (1984) is widely used in stress research, not all investigators have used this model of appraisal, particularly in health research. To illustrate, Lipowski (1970) developed eight categories to capture various meanings of chronic illness, again to link meaning with coping. The meaning categories have some similarity with the concepts of threat and challenge (Lazarus & Folkman, 1984). They included: challenge, enemy, punishment, weakness, relief, strategy, irreparable loss, and value. These categories were used in a qualitative study of the pain of patients in hospital (Copp, 1974). They were also used by Barkwell (1991) to examine ascribed meaning of cancer pain.

Other investigators utilized some aspects of the stress-appraisal-coping model of Lazarus and Folkman (1984) but did not use harm, threat or challenge concepts (e.g. Holm et al., 1986; Neundorfer, 1991; Smith & Wallston, 1992; Klonoff, Landrine, & Brown, 1993). For example, Holm et al. (1986) measured appraisal using a cognitive appraisal inventory. This inventory is concerned with perceived control, perceived impact and perceived predictability, concepts that are closely related to situation factors in the stress-appraisal-coping model of Lazarus and Folkman (1984). Harm/loss, threat and challenge do not appear in the inventory.

Smith and Wallston (1992) were concerned about pain and illness appraisal by patients with chronic rheumatoid arthritis. Appraisals of helplessness using the Arthritis Helplessness Index (Stein, Wallston, & Nicassio, 1988) rather than threat or challenge appraisal were used to predict reliance on active or passive coping strategies.

Another variation to appraisal, in this case applied to hypothetical acute pains varied according to type and location of pain, is appraisal of pain as serious and life-threatening. This approach was used by Klonoff et al. (1993) drawing on the initial work of Leventhal, Meyer, and Nerenz (1980). Appraisal was measured using three questions: "How sick are you?" "How likely are you to die?" "How much of an emergency is it?"

All of these appraisal measures have limited data concerning reliability and validity. In addition, they are usually useful only for the specific stressor or population for which they were intended. This specificity of measurement limits the usefulness of these measures for examination of pain appraisal since some or all of the specific items may not be meaningful when used in a different context.

Recently, a Meaning of Illness Questionnaire (MIQ) (McAdams, Byrne, & Browne, 1989) based on the appraisal model of Lazarus and Folkman (1984), was developed to examine the degree to which a mixture of appraisals may be applied to the meaning of a chronic illness (Weir, Browne, Roberts, Tunks, & Gafni, 1994). The MIQ addresses a variety of concurrent but divergent meanings given to chronic illness including: impact on life; amount and type of stress (harm, loss, threat, challenge); functional context (disability, disfiguring, deteriorating); view of illness; degree of stress; and, secondary appraisal of coping resources (Browne et al., 1988). The MIQ was recently used in a study of cognitions and adjustment among patients with chronic pain (Weir et al., 1994). Five factors of the meaning of illness were supported: burdened, manageable, adverse impact, meaningful and vulnerable. This measure has good evidence of reliability, content validity and initial concurrent validity (Weir et al., 1994). Nevertheless many of the items may not be meaningful to examine pain appraisal in the general population, and the threat and challenge distinctions are not the primary focus of the MIQ.

Cognitive appraisal may have central importance in explaining psychosocial adjustment to a variety of stressors including bereavement (Gass & Chang, 1989), relocation of elders to a residential setting (Armer, 1993), infertility (Stanton et al., 1991), chronic illness (Browne et al., 1988) and chronic pain (Barkwell, 1991; Weir et al., 1994). In some cases, appraisal may have a stronger explanatory role than coping behaviours in adjustment of the individual to illness (Browne et al., 1988; Felton, Revenson, & Hinrichsen, 1984).

Although appraisal research is not extensive, various alternatives to the measurement of appraisal have been developed. At present, there is no existing measure that is suitable for

the measurement of pain appraisal in a community population. Cognitive appraisal may be a key aspect of an individual's emotional and behavioural responses to a stressful event (Lazarus & Folkman, 1984). Indeed personal meanings may be the most important aspects of stressful events and they have an important impact on how an individual attempts to cope with a stressful experience (Kleinman, 1988; Lazarus, 1993).

#### Definition and Measurement of Coping

Coping is defined as one's efforts to manage stressful demands regardless of whether the outcome is perceived as successful or unsuccessful (Lazarus & Folkman, 1984). Coping efforts are used to master, tolerate, reduce or minimize stress, that is, an event which taxes or exceeds an individual's resources (Cohen & Lazarus, 1979, Cohen, 1987). The emphasis in this definition is on "effort" and not the specific outcome. These efforts are thought to serve two primary functions: problem-solving and regulation of emotion (Lazarus, 1975; Lazarus & Folkman, 1984). Problem-solving efforts are directed at managing internal or environmental factors which cause stress or contribute to the stressful event, whereas emotion-focused coping is an effort to control the emotional response to stress. Cohen (1987) suggested that problem-solving strategies are intended to manage the internal or environmental aspects that create threat whereas emotion regulation strategies are directed at modifying the distress associated with threat. In practice, the distinction between these two functions is not always self-evident and may be highly dependent on the context in which the coping strategies are used (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Cohen and Lazarus (1979, 1983) further identified five broad categories of coping strategies: information-seeking, direct action, inhibition of action, intrapsychic processes, and seeking social support. Information-seeking refers to learning more about the problem and its possible resolutions. Direct actions are concrete behavioural acts such as taking medication. In contrast, inhibition of action would include avoidance of movement or limiting activities. Intrapsychic processes include minimization or

denial of the stressor. Seeking social support refers to seeking out others for emotional and instrumental support during a stressful event.

Whether or not a coping strategy is useful, ineffective or even destructive, is highly dependent on the individual, the type of stress, and the short- and long-term outcome (Lazarus, 1993). For example, denial or minimization of a stressor such as pain may be useful in coping with chronic pain but may have significant health risks if the pain is a symptom of an impending heart attack. For this reason, coping is typically conceptualized as a transactional process between the individual and the environment rather than as a specific behavioural trait (Lazarus & Folkman, 1987; Lazarus, 1993). Tunks and Bellissimo (1988) also argued that coping was a constantly changing process. Nevertheless, over time, individuals may develop a repertoire of preferred coping strategies (Billingsley, Waehler, & Hardin, 1993; Fondacaro & Moos, 1989).

Stability in coping strategies may be a function of personality traits such as optimism (Billingley et al., 1993), but stability in coping may also be a response to familiar and similar stressors such as recurring pain events.

In research, coping is typically measured by self-report. Coping measures have varied considerably due to differences in the underlying conceptual framework and purpose of the instrument. For example, perhaps the most widely known coping measure is the Ways of Coping Checklist (Folkman & Lazarus, 1988). This instrument was developed as a global measure of coping that could be applied to a variety of stressors. Coping strategies were grouped according to their proposed problem-focused or emotion-focused function. The distinction between these two forms of coping was derived from a body of coping research using different samples and a variety of stressors (e.g. Folkman & Lazarus, 1980; Mechanic, 1962). As noted earlier, problem-focused coping is aimed at managing the stressor whereas emotion-focused coping is directed at regulating emotional response to the stressor (Lazarus & Folkman, 1984). Other coping measures have been concerned with differences in active and passive coping strategies or prosocial versus antisocial coping behaviours (e.g. Hobfoll,



Dunahoo, Ben-Porath, & Monnier, 1994), cognitive versus behavioural dimensions of coping (e.g. Billingley, Waehler, & Hardin, 1993), or distinctions between information/support seeking, problem-solving, and emotional discharge (e.g. Billings & Moos, 1982; Fondacaro & Moos, 1989).

Several coping measures have been designed specifically for assessment of coping with pain. These instruments have considerable variability in their structure depending on the conceptual framework used to generate items and scales. They have been designed typically to examine intervention strategies for patients with chronic pain. For example, items and scales of the Coping Strategies Questionnaire (CSQ) (Rosenstiel & Keefe, 1983) were constructed on the basis of their cognitive or behavioural dimensions. The Coping Strategies Questionnaire is currently the most widely used coping measure for pain in adults and thus offers more extensive reliability and validity data than other measures. The Vanderbilt Pain Management Inventory (Brown & Nicassio, 1987) makes a distinction between active coping (e.g. staying busy, ignoring pain) and passive coping (e.g. going to bed, restricting social activities). Neither of these measures is based on a problem-focused or emotion-focused distinction of coping behaviours. The advantage of a problem-focused/emotion-focused structure to a measure of coping is that this framework was developed in conjunction with the model of stress, appraisal and coping (eg. Lazarus & Folkman, 1984). For this reason, a problem-focused/emotion-focused coping measure of pain may be more useful to examine the relationship between appraisal of pain and coping with pain. A second limitation of these instruments is that they were intended for patients experiencing chronic pain.

A more recent measure of pain coping strategies, the Pain Coping Questionnaire (Reid et al., 1994) is based on the Lazarus and Folkman (1984) stress-appraisal-coping model. It was designed to measure how children, adolescents, and young adults cope with pain. The questionnaire does not make a distinction between acute and chronic pain. Factor analyses demonstrated eight scales loaded on three higher-order factors (approach, problem-focused

avoidance, and emotion-focused avoidance).

Coping strategies are an important response to a stressful event but they cannot be adequately understood without examination of appraisal and its influence on coping. There is a small body of research that has been concerned with the relationship between appraisal and coping.

#### What is the Evidence that a Relationship Between Appraisal and Coping Exists?

Not all appraisal research has been concerned with the relationship between appraisal and coping. Indeed the majority of this research has focused on identifying group differences (patients with varying characteristics and/or controls) in appraisal and various outcomes such as global or personal distress, symptom severity, or compliance to treatment regimes (eg. Ehde & Holm, 1992; Holm et al., 1986; Mendola et al., 1990; Stanton et al., 1991; Stein et al., 1988). Other research has been concerned with instrument development giving limited or no information about the impact of appraisal on coping (eg. Arathuzik, 1991a, b, 1994; Weir et al., 1994). However, a variety of correlational studies, prospective cohort studies and experimental research have demonstrated that there is a relationship between appraisal and coping response.

The majority of appraisal-coping research has relied on retrospective cross-sectional correlational designs. For example, Gass and Chang (1989) examined appraisal of bereavement through home interviews of widows and widowers. A high threat appraisal of bereavement was associated with greater use of both problem- and emotion-focused coping strategies.

Other investigators have used a case-control method in which cases and controls have been compared by retrospective report of appraisal mechanisms and coping strategies to various stressors. To illustrate, Holm et al. (1986), and Ehde and Holm (1992) recruited college students with tension headaches and compared their appraisals and coping behaviours to a

control group matched on age and sex. All participants reported appraisal and coping behaviours for an event that had most changed or interrupted their usual activities in the previous year. Headache subjects were more likely than their controls to appraise the life event as undesirable and stressful. They also used more wishful thinking and social withdrawal in response to stressful events.

Relationships between appraisal and coping have also been observed in pain research. For example, in a sample of women experiencing pain due to breast cancer, Arathuzik (1991a) reported that threat and harm appraisals were associated with increased withdrawal (such as remaining still and avoiding movement) as a coping strategy whereas a challenge appraisal resulted in greater use of activity (such as walking). Barkwell (1991) found that the strongest impact on advanced cancer pain, depression and coping was made by the meaning given to the pain. Meaning of pain had a stronger effect than did medication or access to support from a hospital palliative care unit. The most frequently ascribed meanings were challenge, punishment, and enemy using Lipowski's (1970) categories of meaning of illness.

Klonoff et al. (1993) avoided some of the difficulty of recall bias by directing participants to consider a series of hypothetical pains varied by their location (head, stomach, genitals, mouth and chest). Appraisal of pain as serious and life-threatening, and willingness to see a physician, stay home, treat oneself, or seek social support were related to location of the pain. Chest pain and genital pain were more likely to be appraised as serious and life-threatening than other pains. However, although respondents appraised chest pain as more life-threatening than genital pain, they reported that they would be more worried about genital pain, and they would be more likely to see a physician. This study noted the importance of pain location (or type of pain) on appraisal but the reliability and validity of the appraisal and coping measures were unknown. In addition, people do not always respond to the real life event in the manner in which they have indicated when the question concerned a hypothetical problem.

Correlational designs, such as the preceding, avoid the expense of time and resources

needed for prospective studies and they are less demanding of participants, but these designs are limited in their capacity to demonstrate causal relationships (Mausner & Kramer, 1985). Appraisal and coping may be related to each other but they may also be more strongly related to other factors. Furthermore, the retrospective nature of the provided information may be subject to recall bias particularly for events that are some distance in the past (Mausner & Kramer, 1985). The usefulness of retrospective studies when restricted to short recall periods is in providing initial data about relationships that may be further explored in prospective research.

Prospective studies of stress, appraisal, and coping are particularly useful for showing how shifts in appraisal cause changes in coping. For example, Folkman and Lazarus (1985) examined appraisal and coping of undergraduate students before a midterm examination, and again before and after grades were announced. In this study, 94% of students reported some degree of threat or challenge appraisals. The intensity of these appraisals decreased significantly after the grades were announced.

Other prospective studies have also been applied to appraisal and coping research. Ptacek et al. (1992) used a daily diary reporting of appraisal and coping for the most stressful event of the day in a 21 day prospective study among undergraduate students. The stressors pertained to family and social relationships, school, health and body, job or work, or financial difficulties. Challenge appraisals resulted in more problem-focused coping than did threat appraisals.

Smith and Wallston (1992) also used a longitudinal design to examine pain due to rheumatoid arthritis, appraisals of helplessness, and active versus passive coping strategies. In this case, participants were followed from the age of 18 years for a period of four years. The measures of concern were administered on an annual basis. The recall period varied from one measure to another. For example, pain intensity was measured as severity of pain in the previous month whereas psychosocial impairment reflected interference during the previous six months. Subjects were directed to assess typical use of coping strategies for arthritis related

pain. The time interval was not specified. Path analysis revealed that helplessness appraisals of the pain due to rheumatoid arthritis led to passive rather than active coping. The relationship between helplessness appraisals and passive coping was significant at all but the last time interval. Passive coping increased psychosocial impairment (interference in family relationships, hobbies and sports, sexual activities, sleeping, social activities, working, comforting and helping others). Psychosocial impairment reduced perceived competence and increased depression. It also had direct contribution to increases in helplessness appraisals.

Prospective studies reduce recall bias and they can be used to show changes in appraisal and coping over time. However, these studies are still correlational in nature and do not establish causal relationships (Contrada & Krantz, 1987). It is still possible that some other factors are related to the variables under consideration.

Experimental research is a third alternative to examine the relationship between appraisal and coping. Experimental research in this area has the capacity to manipulate influential factors of stress, appraisal and coping. The disadvantage is that the laboratory context may itself be a powerful influential factor on appraisal and coping. Thus, what is observed in the laboratory may not occur in more naturalistic settings.

Manipulation of information about positive or negative outcomes on a test of a fictional illness (such as TAA enzyme deficiency, Croyle & Ditto, 1990) is a common experimental stressor. In this research, ambiguous and positive health outcomes frequently lead to defensive primary appraisals and avoidance behaviours, that is, minimization or downplaying of threat appraisals (Croyle, 1992; Ditto et al., 1988). This research suggests that threat appraisals precipitate activities to assess and reduce the probability of harm.

Experimental research has shown that appraisal may affect not only cognitive and behavioural coping responses but also physiological responses. For example, Tomaka et al. (1993) found that when the stressor required active participation by the subject in completion of a mathematical task, challenge appraisals generated greater cardiac reactivity and decreased

vascular activity than threat appraisals whereas threat appraisals had the converse affect. The authors suggested that the increase in cardiac reactivity was due to the greater effort expended by challenged subjects to complete the task.

Each research design has inherent limitations and benefits. The existing findings are not extensive but do provide encouraging evidence of an important relationship between appraisal and coping. Other research also suggests that appraisal may have a bearing on psychosocial adjustment for people who experience chronic health problems. For example, Weir et al. (1992) found that meaning of illness and social support were important predictors of poor psychosocial adjustment in a sample of patients attending a chronic pain service. The remaining question is: "What is the evidence of gender effects on this relationship?"

#### What is the Evidence of Gender Effects on Appraisal and Coping?

There is a substantial body of research arguing that women and men vary in their subjective experiences of stressful events (Barnett, Biener, & Baer, 1987). Several studies have demonstrated that gender role socialization influences vulnerability to particular stressors and influences the cognitive appraisal and coping processes of women and men (Eisler, Skidmore & Ward, 1988; Eisler & Skidmore, 1987; Gillespie & Eisler, 1992). In research among undergraduate students, women appraise difficulties in nurturing ability, physical appearance, situations requiring detachment or assertiveness, and situations involving possible victimization as more stressful than do men (Gillespie & Eisler, 1992). However, men appraise difficulties in intellectual, physical, occupational or sexual abilities as more stressful than women (Eisler & Skidmore, 1987). Men also report more stress in situations requiring emotional expressiveness and situations that require subordination to a woman (Eisler & Skidmore, 1987). "Feeling you are not in good physical condition" is identified as a specific masculine role stressor (Eisler & Skidmore, 1987). Overall, undergraduate women are more likely than men to appraise a set of life events as producing more stress and tension with an anticipation of greater required

recovery time (Jorgensen & Johnson, 1990). It is conceivable that as gender roles become more blurred these gender variations may also change. They may also be less apparent in older adult populations since young adults may be experiencing greater conflict and instability in their gender role expectations.

These studies point out that women and men vary in the nature of the events that they find stressful but they have not examined how women and men may vary in the cognitive appraisal of a stressful event. Unfortunately, there is very little research at this time that addresses the effect of gender on cognitive appraisal of stressful events.

Several correlational studies have found no important gender differences in cognitive appraisal of stressful events. For example, Holm et al. (1986) in a study of stress among undergraduates with tension headaches, found that gender variation in stress appraisal occurred only when subjects chose an ambiguous event as the event which had most changed or interrupted their activities in the past year. The event was considered ambiguous if personal responsibility for the event was unclear (eg. when a family member leaves home). Women appraised ambiguous events as having a significantly greater impact on their lives than did men.

Similarly, Klonoff et al. (1993) in a study of hypothetical pains among undergraduate students, found no gender difference in appraisal of pains as serious and life-threatening on the basis of pain location. However, women were significantly more likely than men to disclose their pain to their spouse/partner or friends. There were no gender differences in willingness to see a physician, stay home from work/school or treating pain by oneself. As noted earlier, the unknown reliability and validity of the measurements in this study are important limitations. Stanton et al. (1991) also found that husbands and wives who were coping with infertility were similar in their threat or challenge appraisals of this stressor though women with threat appraisals reported more personal distress.

While these studies have not found gender variations in appraisals of stressful events,

they do suggest that there may be some gender variation in response to appraisals of a stressful event as serious or as a threat. Women may experience more distress and they may be more likely to do something about the stressor.

Other investigators have reported gender differences. Magee and Mendelsohn (1980) in a phenomenological study of cancer interviewed 35 individuals three years and six years post primary treatment. Similar interviews were completed with an additional 21 people during primary treatment and again at six months and 12 months. In the follow-up interviews, men consistently viewed themselves as having declined in effectiveness, vigour, and ambition, with a loss in positive self-regard. They were more irritable, fearful, and ill at ease than women, and more likely to be smoking.

The most persuasive study to date on gender effects on appraisal and coping is the prospective study of Pfacek et al. (1992). Undergraduate women reported significantly more stress than men in a 21 day study of the most stressful event for the day. Men reported higher expectancy that a stressful event would occur, more perceived control over the outcome, and greater overall effectiveness in coping. Women and men did not differ in the frequency with which they appraised events as losses or threats. However, men reported significantly more challenge appraisals than women (48% vs. 38%). Coping strategies were measured using a modification of the Ways of Coping Checklist (Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) based on a definitional approach to scales (Stone & Neale, 1984). Women reported significantly more coping strategies per event than men. Both women and men used problem-focused coping more than any other coping scale. Problem-focused coping was defined as thinking about solutions to the problem, gathering information or actually doing something about the stressor. On the other hand, women reported seeking more social support and they were more likely to blame themselves for the stressful event. Women were also more likely to use wishful thinking and avoidance (emotion-focused coping). Problem-focused coping was significantly associated with challenge appraisals for women and men. However, men reported more



problem-focused coping for challenging and for threatening events.

### Implications

At present, there is good evidence that cognitive appraisal has a bearing on coping strategies. There is preliminary evidence of a gender effect on appraisal and on outcomes that may be associated with appraisal. However, the effect of gender may be dependent on the specific nature of the stressor. Very little is known about what factors inherent in a stressful event might lead to gender variation in appraisal.

Thus far, appraisal of pain has received very little attention in appraisal research. However, the distinction between threat and challenge appraisals may have important implications for health care for pain. Threat appraisals may carry an increased likelihood of anxiety, depression and health care utilization whereas challenge appraisals may be central to adequate management of chronic health problems such as chronic pain (Barkwell, 1991; Croyle, 1992). The transition in pain appraisal from challenge to threat and from threat to challenge may be important to ensure that health care for pain is accessed when necessary. Individuals who have difficulty making threat appraisals when appropriate, may be at greater risk of complications due to delay in seeking health care for a pain event. However, individuals who have difficulty in transitions from threat to challenge appraisal may have considerable difficulty adapting to a chronic pain problem.

There are clear differences between women and men in their use of health care services for pain but the explanations that have been offered to account for these differences are inadequate and sometimes based on unsubstantiated beliefs that women simply have a high tendency to complain (Wall, 1994). If we do not examine the appraisals women and men make about a pain event, then we have only a limited understanding of their coping behaviours. We risk making erroneous assumptions about their health care needs and we may contribute to misconceptions about men and women in pain.

## CHAPTER 2 - CONCEPTUAL FRAMEWORK, STUDY OBJECTIVES AND HYPOTHESES

### Definition of Pain

The International Association for the Study of Pain (IASP) defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (IASP, 1994, p.210). This definition highlights the duality of pain as a physiological event within the body that is dependent on subjective recognition, that is, without psychological awareness, pain cannot exist. Pain also differs from other stressors, in that acute pain has an inherent biological function; it is a warning of actual or potential physiological harm (Melzack & Wall, 1988). For this reason, there is likely to be an innate psychological bias towards threat appraisals of pain particularly at either end of the lifespan. Over time, recurrent experiences of pain may improve the ability to discriminate between pains with varying degrees of harm to modify or alter pain appraisals. Since infants and children have limited experiences of pain, and have more difficulty with cognitive adjustments due to their developmental stage, they may be more likely to perceive most pains as highly threatening. As people age and are at greater risk for injuries and illnesses that may lead to death, a pain event may again be biased towards threat appraisal.

Chronic pain is another matter. In the past, chronic pain was defined as pain that persisted beyond the normal time of healing (Bonica, 1953; Melzack & Wall, 1988). More recently, the IASP Task Force on Taxonomy (IASP, 1994) maintained that this definition of pain may be inadequate. Physiological changes may contribute to the experience of many chronic pains (e.g., phantom limb pain) as well as recurrent episodic pains (e.g., migraines). Normal healing has not occurred for other chronic pains such as rheumatoid arthritis or metastatic carcinomas. In addition, changes in the central nervous system due to injury may prolong and maintain pain long after the expected period of healing (Merskey, 1988; Wall, 1989). The IASP Task Force (1994) proposed that chronic pain be considered as "a persistent pain that is not amenable, as a rule, to treatments based upon specific remedies, or to the routine methods of

pain control such as non-narcotic analgesics" (p. xii). Persistent threat appraisals may have limited usefulness for the individual who experiences chronic pain and may lead to considerable disability and handicap. Challenge appraisals may lead to greater function in everyday life. Lastly, unlike other physiological events such as blood pressure and heart rate, pain cannot be directly observed and measured. Hence pain is a subjective experience most often measured by self-report as the gold standard (McGrath & Unruh, 1987).

The model of stress, appraisal and coping as constructed by Lazarus and Folkman (1984) gives a generic schema of the conceptual relationships between these phenomena. In this chapter, I will outline a model of pain appraisal and coping based on the work of Lazarus and Folkman (1984) and examine how gender may affect components of this model. This discussion will then be followed by an overview of the purpose of the research, and the research hypotheses.

#### Application of the Stress-Appraisal-Coping Model to Pain

Lazarus and Folkman (1984) identified three categories of appraisal of an event: irrelevant, benign-positive and stressful. Pain is appraised as irrelevant when the pain is assessed as unimportant. Such pains may include minor bumps, bruises or cuts. However, even these pains may be appraised differently in childhood. Benign appraisals are pains that are construed as positive. Since pain is defined as an unpleasant sensory and emotional event, it is difficult to imagine a pain that might be appraised solely as benign-positive. However, mild pain with exercise may not necessitate any change in behaviour and may be accepted as an essential component to beneficial exercise.

There are three primary sub-categories of stressful appraisals: loss or harm, challenge and threat (Lazarus & Folkman, 1984). For health-related stressors such as pain, threat and challenge appraisals are of particular interest. As Lazarus and Folkman (1984) proposed, threat is the anticipation of loss or harm. With respect to pain, threat may encompass both actual and

anticipated loss or harm particularly in terms of injury or damage. The threat may also concern function or health. On the other hand, challenge can be considered as a test of one's strength, endurance or abilities with a potential for growth, mastery or gain. Threat appraisals may be more likely to result in a health care visit and challenge appraisals may be essential to an individual's adjustment to a chronic illness. Either appraisal may precipitate coping behaviours and strategies to manage and reduce the pain.

In this study, I am particularly interested in the cognitive appraisal process of pain as a threat or challenge. As for any other stressful event, person and situation factors interact in the cognitive appraisal process to determine whether a pain is appraised as threatening or challenging.

#### Person Factors

Person factors are specific characteristics of the individual that may have a bearing on the appraisal process. Lazarus and Folkman (1984) identified beliefs and commitments as key person factors. There are several beliefs that may be pertinent to stressful appraisals of pain. For example, belief that one can control and manage pain may lead to an appraisal of pain as a challenge rather than a threat. Belief that pain may be associated with an underlying disease process (e.g. cancer) may heighten perceived threat of the pain. Belief that pain will resolve would decrease threat appraisal even if the pain were severe.

Commitments are those undertakings that are important to the individual. Although not specifically defined as commitments by Lazarus and Folkman (1984), commitments may also include perceived obligations and responsibilities towards employment, childcare, relationships, and household tasks. Multiple role responsibilities may affect pain appraisal in two ways. Pain may be appraised as threatening if fulfilment of these role responsibilities is in jeopardy. The threat appraisal is likely to produce coping strategies that are directed towards pain reduction. These strategies may cause temporary short-term interference, such as bed rest, but they may avoid long term disability. On the other hand, multiple role responsibilities may also produce

more challenge appraisals in order to prevent disruption of these obligations.

At times, commitments may exacerbate pain events. For example, some occupations may have inherent pain-inducing hazards through the nature of the work. Commitment to one's work may also increase risk of pain and may limit recovery from an acute pain event. Commitment to work may encourage challenge appraisals of pain despite risks of incurring pain through the nature or context of the work.

In addition to beliefs and commitments, factors such as age, gender, marital status, number of children and ethnic affiliation may be influential person factors. I discuss the effect of gender under a separate heading. As indicated in the literature review, prevalence of pain is associated with gender and with age. There is also some evidence of gender and age effects in appraisal research. Marital status and number of children may interact with commitments by increasing obligations and responsibilities. Ethnic affiliation may be associated with specific beliefs concerning causation and management of illness and pain.

#### Situation Factors

Situation factors are the characteristics of the event that may influence threat or challenge appraisals. Lazarus and Folkman (1984) argued that novelty, predictability, event uncertainty, imminence, duration, temporal uncertainty, and ambiguity were influential qualities of stressful events. With the exception of duration, these situation factors are essentially evaluative qualities. As previously outlined, pain has sensory and emotional components. Pain is also widely considered as an event with sensory, affective and evaluative qualities that can be captured and measured (Melzack, 1975; Melzack & Wall, 1988). These sensory, affective, and evaluative aspects may be strongly implicated as key pain event factors that in turn influence cognitive appraisal of pain.

#### Sensory pain event factors

Sensory pain event factors refer to the sensation and physical aspects of pain: intensity, duration, type and location of pain, and association of pain with other somatic or physical

symptoms. Intense acute pain captures attention as an immediate warning of possible tissue damage. Severe pain is more threatening than mild pain. However, duration of pain is also critical. Severe momentary pain may be given minimal attention. Since pain is expected to resolve, pain that persists is likely to increase threat appraisals particularly if the duration of pain is atypical for the individual. The location and type of pain may convey varying degrees of threat due to anticipation of impaired function or associated health risk. For example, undergraduate students appraised chest pain and genital pain as more serious and life-threatening than pain in other locations (Klonoff et al., 1993). Association of pain with other somatic or physical symptoms (eg. dizziness, nausea, vomiting, bleeding, laceration, swelling, bruising, fracture) may influence appraisal by providing an explanation for the source of the pain. An explanation of cause may increase or reduce threat appraisal. Some symptoms may themselves be perceived as threatening (eg. extensive bleeding or damaged tissue) and may increase the threat appraisal of pain.

#### Affective pain event factors.

Emotional components of a pain event may be strongly influenced by past memories of pain (Leventhal, 1993) as well as gender-related role expectations about how women and men should respond to pain. Pain may be associated with upset, fear, worry, or anger. Anxiety is thought to be a common component of acute pains whereas depression is more typical with chronic pain. In experimental research increasing the subject's anxiety about the pain (e.g. telling the subject the finger had been slammed in a car door or that the stimulus device was not dangerous but would produce extremely painful sensations) decreases pain threshold and pain tolerance, but the effect is stronger for women (Dougher, Goldstein, & Leight, 1987). Although the relationship between depression and chronic pain has received considerable research, less is known about the role of emotions in acute pain experience.

### Evaluative pain event factors

There are a number of evaluative factors that may affect pain appraisal including: unusualness of the pain, predictability, controllability and interference of pain. Characteristics such as novelty and ambiguity have less importance for pain than for other stressors such as bereavement, since pain is commonplace in life experience. Unusualness may encompass some aspects of novelty and ambiguity. Depending on the apparent cause of the pain, pain that is usual or familiar to the individual is not likely to be appraised as highly threatening. However, pain that is highly unusual in some way may have greater threat.

Experimental research has shown that predictability affects perception of pain. Subjects exposed to a predictable noxious stimulus anticipate that they will have higher pain thresholds and that they will feel less pain than when the stimulus is unpredictable (Braha, 1995).

Predictability may be associated with pain in the natural environment in two ways. Although most pains are unexpected and not predictable, some pains can be anticipated. For example, menstrual pain may be preceded by physical signs of impending menstruation. The preparatory steps involved in medical procedures such as swabbing the skin with alcohol, may signal onset of injection pain. Predictability of pain can also refer to the typical expected pattern of a pain, its onset, severity and pattern of resolution over time. A recurrent pain that follows a typical pattern of onset and resolution for that individual may be appraised as a challenge or a low level threat. However a usual pain that does not follow a predictable course may be appraised as threatening.

Assessment of controllability is often considered as a secondary appraisal that answers what can be done about the stressor. Controllability may also be influential on primary appraisal. For example, a rapid onset of severe pain may sharply reduce one's capacity to cope with the pain and may require emergency treatment. Uncontrollable pain is likely to be appraised as highly threatening.

Finally, pain that has a minimal or moderate interference on fulfilment of daily life responsibilities may be appraised as challenging. However, as interference increases the perceived seriousness of the pain also increases (Arathuzik, 1991a). Interference may increase both threat and challenge appraisals particularly in situations of multiple role responsibilities.

Pain event factors have a direct and interactive impact on the appraisal of pain. Severe persistent pain that is difficult to control, unusual in its nature or presentation, and does not follow a predictable course is likely to be perceived as highly threatening. However, mild, familiar pain that is resolving over time may be appraised as a low threat, or as a challenge.

#### Appraisal of Pain and Coping Strategies

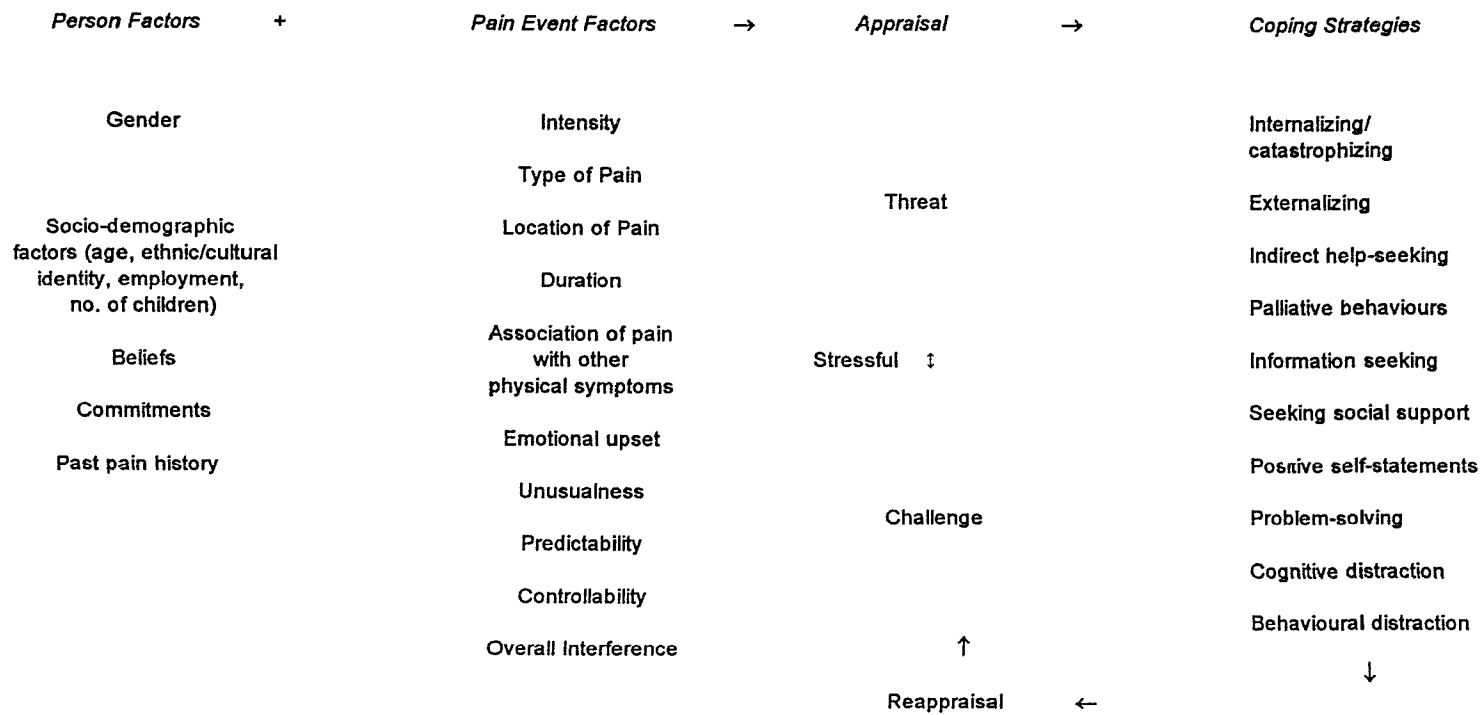
In existing stress appraisal and coping research, challenge appraisals have been associated with problem-focused coping whereas threat appraisals are correlated with emotion-focused coping (Ptacek et al., 1992) as well as increased use of both problem-focused and emotion-focused coping (Gass & Chang, 1989).

The distinction between emotion-focused coping and problem-focused coping has not been applied to pain with the exception of a recently developed pain coping instrument (e.g. Reid et al., 1994). Appraisal of pain as a threat is associated with remaining still and avoiding movement, whereas challenge is typified by greater use of activity (Arathuzik, 1991a, b). Similarly, appraisal of acute pains as serious and life-threatening leads to greater willingness to see a physician, to stay home from work/school, and to treat oneself (Klonoff et al., 1993). Perceptions of helplessness in response to chronic pain due to rheumatoid arthritis is associated with passive coping efforts such as staying in bed and restricting social activities instead of active coping attempts to function in spite of pain (Smith & Wallston, 1992). These outcomes suggest that threat appraisals of pain may be related to palliative behaviours that manage or reduce pain. On the other hand, challenge appraisals may be associated with denial of pain or working through pain by use of distraction, and cognitive restructuring.



The relationship between person factors, pain event factors, appraisal and coping is illustrated in Figure 1. Of the person factors, gender may have particular importance on appraisal due to the relationship between gender and pain prevalence. In addition, there may be an interaction between gender, age, other sociodemographic factors, and commitments on pain event factors especially interference. Due to gender variations in pain prevalence and the experiences of women related to reproduction, women and men also have some differences in their past pain experiences. These past experiences along with differences in social role expectations may in turn affect pain beliefs.

Pain event factors are more likely than person factors to have a direct effect on pain appraisal particularly for persistent, severe, unusual and uncontrollable pain. Women and men of any age regardless of pain beliefs or other factors are likely to appraise such pain as highly threatening. Similarly, their coping strategies in response to such pain may show very little variation. The interaction between person and pain event factors will determine first whether the pain is stressful, and then if the pain is threatening or challenging.



**Figure 1.** Model of the relationship between person factors, pain event factors, appraisal process and coping strategies.

A threat appraisal may have several dimensions. The pain may signify that something is wrong. There may be a concern that the pain is associated with real or potential harm. For example, chest pain is likely to be appraised as highly threatening due to the possibility of an underlying cardiac event. Worry that the pain is or will become more than what one can handle, may also be central to a threat appraisal. Pain that is not improving over time or pain that has increased in its severity may lead to threat appraisals in this way. In addition, concern, about the impact of pain on daily life or on one's overall mood, may contribute to threat appraisals of pain.

The appraisal of pain as a challenge also has several dimensions. Pain may be appraised as a challenge if the pain is considered as a test of strength and ability. Pain during a sports event may be perceived in this way. In addition, the pain may have some indirect positive benefits, such as pain associated with childbirth, or pain associated with a health procedure that will remediate an underlying problem. Challenge appraisal in these circumstances is especially likely if the person is given adequate analgesia and assistance with cognitive and behavioural strategies to manage the pain. Pain that is familiar and usually manageable for the individual may be appraised as a challenge. For example, a migraine or an episode of low back pain may be appraised as challenging unless the pain is unusual, does not respond to the individual's usual management strategies or increases in severity over time.

Many pains may be appraised as having some degree of threat and challenge. For example, labour pain, especially for a first childbirth experience, may have elements of both threat and challenge appraisals. Postoperative pain may pose some degree of threat due to its association with a wound but it may also be considered a challenge if the surgery had a beneficial outcome, and the pain was well-managed. Other pains may be perceived as either threat or challenge. Chest pain associated with symptoms of impending heart attack is likely to be appraised as threatening.

Threat and challenge appraisals generate coping strategies but the relationship between

these appraisals and specific strategies is difficult to anticipate. Some coping strategies such as seeking social support, and positive self-statements are likely to occur with both threat and challenge appraisals. In addition, at high levels of threat or challenge appraisals, the use of coping strategies may be very similar. However, catastrophizing in response to pain will occur only in response to a threat appraisal.

The relationship between person factors, situation factors, appraisal, and coping is initially linear but it very quickly becomes a circular process. Coping strategies as well as changes in the characteristics of pain over time cause reappraisals of pain that may lower or increase threat or challenge appraisals or shift appraisal from one form to another until the pain is resolved.

### The Rationale for Gender Effects

There are two reasons why one might expect to see gender variations in the appraisal of pain. The first reason is that women and men have somewhat different experiences of pain over a lifetime. These experiences may necessitate different constructs of pain meaning and related coping behaviours. Secondly, women and men are exposed to different social role expectations on the basis of their gender. As a result, a pain event may have greater risks of interference on roles and responsibilities for women and men. Difference in social expectations related to gender may also influence emotional responses to pain. I will consider each point in greater detail.

#### Pain Experiences

As reviewed in Chapter one, women are more likely than men to have persistent and recurrent pains due to chronic but not life-threatening conditions. For women, some pain is associated with normal biological events related to reproductive cycles. This pain may be variable from one menstrual cycle or pregnancy to another due to age, contraceptive use, exercise and diet. Other pains for women occur in conjunction with normal physiological events

but reflect pathological processes such as endometriosis, ectopic pregnancy, tumours and so on. Some pains may be exacerbated or relieved by their occurrence in association with menstruation or pregnancy, or they may be entirely unrelated to any normal biological process. Pain for women is a monitor of health as well as a potential symptom of injury, illness or disease.

Since pain from normal biological processes unrelated to pathological events may be experienced as moderate to unbearable in intensity (Taylor & Curran, 1985), intensity of pain is important in the appraisal process but for women it has some limitations as a predictor of pain due to actual or potential tissue damage. It would seem that appraisal of pain for women would incorporate multiple features of pain to assist in the separation of pain due to normal biological processes and pain due to other, potentially pathological sources. In addition, women must make distinctions between manageable and excessive pain due to normal biological processes. In contrast, men have recurrent pains of lesser intensity, frequency, and duration than women; however, men are more likely to experience pain from injury, and acute and chronic life-threatening diseases. As a result, men may develop a construct of meaning focused primarily on pain as a symptom of tissue damage or underlying pathology. Men may be less likely than women to attend to pain that is of mild or moderate intensity since the underlying tissue damage may be insignificant. Unless mild or moderate pain is associated with other factors such as additional problems or symptoms, or pain in a location that heightens anxiety such as chest pain or genital pain, men may be more likely than women to appraise pain of mild or moderate intensity as a challenge.

#### Social Role Expectations

For women and men, the impact of pain on roles and responsibilities can have a significant impact on overall well-being particularly when the pain is persistent. Anticipated and actual interference of pain on one's perceived responsibilities may increase the perceived seriousness of a pain event especially when pain interferes with occupational roles (Tunks,

1990b). Women with multiple primary role responsibilities resulting from childcare or care for elderly parents, household management, and paid employment have more than one reason to appraise pain as threatening. Women and men may have different perceptions about such role responsibilities. Using qualitative interviews, Simon (1995) found that multiple roles for women tended to be associated with negative self-evaluations and feelings of inadequacy whereas among men, multiple roles were associated with positive self-evaluations and feelings of self-worth. Women may attend to pain sooner in an effort to minimize its intrusiveness.

Although the involvement of men in childcare and household responsibilities is slowly increasing, paid work remains the dominant occupational role for men. Men may perceive work to be a cornerstone of their family responsibilities (Simon, 1995). Risk of work disability may be partially reduced for men by the greater opportunity to recover from pain if responsibilities for childcare, household management and relationships are considered secondary and possibly assumed by a partner. Men may also perceive pain as having limited importance unless pain becomes associated with work disability.

Overall, women may be more irritated and worried about pain (Bendelow, 1993; Klonoff et al., 1993). In developmental pain research, girls use more affectively laden words to describe their pain and what they do when they have pain (Savendra, Gibbons, Tesler, Ward, & Wegner, 1982). Anxiety is also higher for girls than boys in response to dental pain (Liddel & Murray, 1989; Wright, Lucas, & McMurray, 1980) but fear of dental pain is reported by both women and men (McNeil & Berryman, 1989).

Emotional response to pain may be related to role interference and perceived effectiveness or ineffectiveness of coping strategies. Exposure to troublesome pains due to normal biological process, recurrent pains with little or no pathological significance, and pains which are symptomatic of pathology increase the complexity of women's pain experience and may lead to some frustration with self-management and assessment of pain. Irritability and worry will increase risks of depression and disability associated with pain.

While women may be more irritated and worried about pain, men may be more embarrassed by pain. Klonoff et al. (1993) found that male undergraduate students were significantly more likely than women to rate their emotional response to common pain problems as embarrassment regardless of the location of the pain. Embarrassment may cause men to minimize pain and to be concerned about pain as pain increases in severity and interferes with work. Minimization of pain may be consistent with social and cultural norms that accept insensitivity to pain and pain endurance as measures of virility. High masculinity scores on the Sex Role Inventory (Bern, 1974) have been associated with reports of increased pain threshold in experimental pain research (Otto & Dougher, 1985).

### Summary

Pain can be conceptualized as a stressful event during which person and pain event factors interact to generate threat and/or challenge appraisals. These appraisals in turn prompt coping strategies in an effort to manage the pain and the emotional response to the pain.

There is very little research addressing gender and appraisal. Of the existing studies, three did not report gender variations (Holm et al., 1986; Klonoff et al., 1993; Stanton et al., 1991). However, Ptacek et al. (1992) found that women reported significantly more stress than men over a 21 day period. Men were significantly more likely than women to appraise these stressors as challenges. Since women also report more pain than men (e.g. Crook et al., 1984; Taylor & Curran, 1985 and others), and some coping behaviors, such as health care visits for pain, are also higher for women, women and men may differ in their appraisals of pain.

### Purpose of Study

The purpose of this study was to examine the relationship between gender and the cognitive appraisal of pain as a threat or challenge, and the coping strategies used in response to the appraisal. This study focused on the most troublesome pain experienced in the previous two weeks. The strongest evidence of gender difference is for pain event factors. For this

reason, I was concerned with determining whether the relationship between pain event factors and pain appraisal was mediated by gender.

#### Study Hypotheses, Dependent and Independent Variables

This study was designed to examine the relationships between gender, appraisal, and coping. The first two hypotheses addressed the relationship between gender, pain event factors and appraisal. For this relationship, the dependent variables were threat appraisal and challenge appraisal. The independent variables included two person factors (gender, age), and ten pain event factors (type of pain, location of pain, presence of other physical or somatic symptoms, intensity, duration, interference, unusualness, controllability, predictability, and emotional upset). These hypotheses were:

1. Gender will interact with the pain event factors on the appraisal of pain as a threat or challenge.
2. Gender will have an independent effect on threat or challenge appraisal when pain event factors are controlled.

The third hypothesis referred to the relationship between gender, appraisal and coping behaviours. In this case, the dependent variable was the specific coping behaviour and the independent variables were gender, threat appraisal, and challenge appraisal. The third hypothesis was:

3. Gender will interact with threat and challenge appraisals on the choice of coping strategies.



## CHAPTER 3. METHODOLOGY

### Research Design

This study was a cross-sectional, telephone survey to test a model of the relationships between gender and pain event factors on appraisal of pain as a threat or challenge, and the relationships between gender, appraisal and coping strategies. The survey focused on the most troublesome pain experienced in the previous two weeks in a random sample from a community population. Crook et al. (1984) argued that pain reports beyond a two week recall period have questionable reliability.

### Sample Size Estimation

Power analysis determines the size of the sample needed to reject the null hypothesis if the alternative hypothesis is true at a given level of probability (Cohen & Cohen, 1983). It is based on the alpha value set for the study, and the magnitude of the expected effect size in the population. Exact formulas for sample size calculation are dependent on the planned analyses for inference testing. In studies such as this one when multiple regression is used to test hypotheses, it becomes very difficult to determine expected effect sizes for the regression coefficients of all of the independent variables, particularly when very little is known about gender variation of these variables in the population. In such situations, sample size calculation is typically based on the principle of five to ten observations per independent variable (Hair, Anderson, Tatham, & Black, 1992; Kleinbaum, Kupper, & Muller, 1988; Norman & Streiner, 1994). Accepting the more conservative approach of ten observations with approximately 20 variables, generated a sample size of 200 women and men with an identified troublesome pain in the previous two weeks.

Some pains such as headache and migraine are more prevalent among women than men, and other pains such as menstrual pain occur only in women. To ensure that the sample

was sufficient to ensure greater variability in represented types of pain, the required sample size was increased from 200 to 300 individuals.

### Procedures

Participants were contacted using a random numbers table to select households from the 1995 Halifax-Dartmouth-Bedford telephone directory. The SYSTAT Uniform Number Generator program was used to generate 200 hundred, random, four digit numbers. The first three numbers ranged in possible size from 001 to 593, the total number of pages in the Halifax-Dartmouth-Bedford telephone directory. The fourth digit ranged from 0 to 9. The first three digits of a number were used to select the telephone page number. The fourth digit was used to identify all telephone numbers of private households that ended in this number on the page. For example, the number 0036, referred to all telephone numbers on page 3 of the directory that ended with the number 6. A total of 1,430 telephone numbers were entered into the sample.

To ensure that people would be reached when they were most likely to be available, telephone calls were made between the hours of six and nine o'clock in the evening on weekdays, on Saturdays from 11 o'clock to six o'clock, and three days a week between 9:30 a.m. and 3:30 p.m. Up to five attempts were made to contact each household varying each call by time and day of the week. A call record was used to note the date and time of calls, call-back information, whether the contacted individual was eligible or ineligible, and her or his gender. All refusals were recorded with an explanation where given.

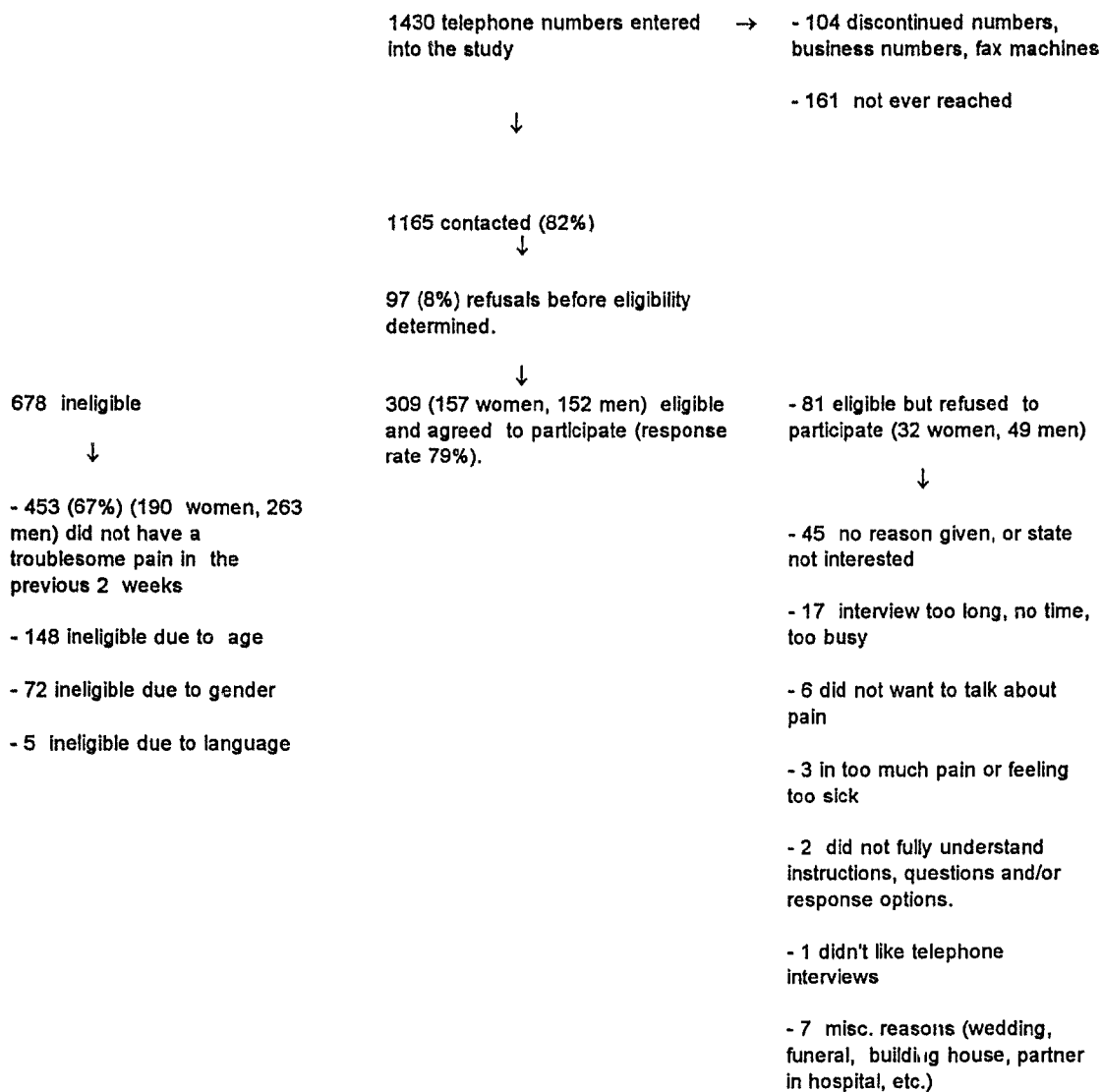
An individual in each household, who was between the ages of 18 and 65 years of age and who had a pain in the previous two weeks, was invited to participate. Where there was more than one possible respondent, the respondent who had the next birthday was selected. To avoid over-representation of women respondents in this sample, data collection from women was terminated when 157 women with pain were recruited. Thereafter, efforts were directed at

recruitment of male respondents. All interviews were completed in English.

Five experienced telephone interviewers (four women and one man) were trained in the interview procedures for this study. Each interviewer was provided with a brief procedural booklet that outlined recruitment, recording of telephone calls, responding to interviewee questions, conducting the interview, and checking the completed questionnaire before beginning the next interview (Appendix A - Procedural Booklet). To determine whether non-respondents differed substantially from respondents, non-respondents were asked if they would give a reason for choosing not to participate. Interviewers began each telephone interview with a brief introduction to the study outlining its purpose, selection of respondents, and the voluntary and confidential nature of the respondent's participation (Appendix B - Interview Protocol). Respondents were advised that all information would be represented in aggregate form. All interviews were conducted using the facilities of the Pain Research Program at Dalhousie University. A summary copy of the results was made available for participants who indicated that they wanted to be informed about the outcomes of this study.

#### Characteristics of the Sample

Eighty-two percent (1,165 households) of the sampling frame of 1,430 households was contacted (Figure 2). Ninety-seven people did not want to hear about the study. In most cases, these respondents were hostile, objected to being solicited at home, believed the study was a form of market research to sell a product, and/or maintained that the telephone number was not obtained by a random selection of all numbers in the 1995-96 telephone directory.



**Figure 2.** Recruitment of the respondent sample of 157 women and 152 men.

Of those persons contacted and not giving an outright refusal, 678 respondents were ineligible for the pain interview. In most cases, the reason for ineligibility was that the respondent did not have a troublesome pain in the previous two weeks. Twenty-two percent of contacted individuals in the sample were ineligible due to their age. In the final week of the study we focused recruitment on male respondents to ensure an equitable gender distribution in the sample. For this reason, 72 women were considered ineligible due to gender.

Of those respondents who were considered eligible, 79% agreed to participate. More men than women refused (49 vs. 32). In most cases, the respondent did not give a reason for refusal, or said she or he was not interested. Seventeen respondents said they did not have time or the interview was too long. Some of these respondents were interested but could not find time to participate. Six respondents did not want to talk about their pain or had been instructed not to talk about their pain. Other circumstances, such as a wedding, or funeral, limited seven respondent's readiness to be interviewed.

One hundred and fifty-seven women and 152 men agreed to participate in this study. The sociodemographic characteristics of the sample are given in Table 1. More women than men were single, and more women had children living at home. Seventy-six percent of women had completed courses beyond the high school level compared to 67% of men. However, the only significant difference between women and men was in their employment ( $p = .000$ ). More men were employed full-time. Although men tended to report higher income levels than did women, 43% of women had family incomes greater than \$40,000, whereas 52% of men reported incomes of this level, this difference was not significant.

Table 1

Sociodemographic Characteristics of Women and Men in the Sample

Characteristic	Female		Male		$\chi^2$	p value
	n	(%)	n	(%)		
Age Group					4.7 (4, N=309)	ns
18-25yrs	28	(18)	18	(12)		
26-35yrs	45	(29)	49	(32)		
36-45yrs	39	(25)	48	(32)		
46-55yrs	32	(20)	23	(15)		
56-65yrs	13	(8)	14	(9)		
Marital Status					1.8 (1, N=309)	ns
Single	45	(29)	44	(29)		
Separated or divorced	24	(15)	15	(10)		
Widow or widower	4	(3)	-	-		
Married or common law	84	(54)	93	(61)		
Have Children	103	(66)	88	(58)	1.9 (1, N=309)	ns
Employment					8.4 (1, N=309)	p= .003
Employed full-time	71	(45)	107	(70)		
Employed part-time	21	(13)	9	(6)		
Full-time homemaker	21	(13)	0	(0)		
Unemployed	6	(4)	6	(4)		
Student	7	(5)	5	(3)		
Retired	7	(5)	11	(7)		
Multiple roles*	18	(12)	10	(7)		
Disability pension	6	(4)	4	(3)		
Family Income					3.7 (2, N=309)	ns
< \$40,000	82	(57)	68	(48)		
\$41,000-\$80,000	46	(32)	61	(43)		
\$81,000 or more	16	(11)	13	(9)		
Education					4.9 (2, N=309)	ns
Some junior high or high school, or completed high school	37	(24)	51	(43)		
Some college or university courses, or completed college	68	(43)	50	(33)		
Completed undergrad, or graduate degree	52	(33)	51	(34)		

*Note.* Multiple roles refers to respondents who had more than one job. Percentages refer to the proportion of respondents in the specific category with the denominator either 157 women or 152 men. All percentages were rounded.

The study sample represented a random selection of people with a troublesome pain in a two-week period from Halifax-Dartmouth-Bedford community. The sample was similar to the larger community in its ethnic characteristics, but differed in age distribution, employment levels, reported income, and education level. The majority of the study sample considered themselves as Canadian or as Anglo-Saxon Canadian (68%). Twenty respondents were French Canadian or Acadian. Three individuals were native and one respondent reported African heritage. Five percent of the sample indicated multiple ethnic affiliations. In the 1991 census of Canada, the majority of the residents of Halifax, Dartmouth, and Bedford community considered themselves to be Anglo-Saxon (Statistics Canada, 1994a,b). Thirty-nine percent of citizens reporting a single ethnic origin, claimed British ethnicity. The largest number of immigrants came from the United Kingdom and other European countries. There were small populations of Blacks (3,785) and French individuals (10,210).

The age distribution of women in this sample was similar to the age distribution of women in the population of this community (Statistics Canada, 1994a,b). Fifty-four percent of the women in both the study sample and the community population were between the ages of 26 and 45 years. However, the percentage of men between 26 and 45 years was slightly higher in the sample than in the community population (64% vs. 54%). In addition, 12% of the men in the sample were aged 18 to 26 years whereas 22% of the men in this community were in this age category.

The study sample and the community population differed in the distribution of full-time and part-time unemployment particularly for women. In the population, the number of women employed full-time was very similar to the number employed part-time, whereas in the sample, more women were employed full-time (45%) than part-time (13%). The majority of men in the sample were employed full-time (70%) with only 6% reporting part-time employment. However, in the community, many more men were employed part-time. Further, the unemployment rate was lower in the study sample than in the population (4% and 9% respectively). This rate was

similar for women and men respondents whereas in the community, women reported a slightly higher unemployment rate than men in the 1991 census.

As one would expect from the employment comparisons, the reported family income was higher in the study sample for women and men than total incomes reported by the community population in the 1991 census. Thirty-three percent of women and 52% of the men in the study sample reported annual family incomes of more than \$40,000 (7% of women and 28% of men in the population).

Study respondents were better educated than one might have expected. Seventy-one percent of the sample reported education beyond the secondary school level (33% of all respondents had an undergraduate or graduate degree), whereas 63% of the community population reported this level of education (21% had an undergraduate or graduate degree). Unfortunately the 1991 census report for Halifax, Bedford and Dartmouth, did not provide a breakdown of education by gender.

These differences between the sample and the population may reflect difference in the risks for experiencing a troublesome pain in a two week period on the basis of age, income, employment, or education, as well as potential differences in the severity of pain. For example, the higher rate of full-time employment in the study sample combined with fewer men in the youngest age group, may be related to work-related injuries, and the severity of these injuries, particularly repetitive injuries that increase the risk of recurrent/chronic pain. However, these differences may also reflect other issues such as willingness to talk about pain or to participate in research, or to have a telephone number in the phone book.

In summary, sample respondents reported more employment, higher income levels and higher education levels than were reported on the 1991 census for the community. These differences may reflect sociodemographic characteristics of people between the ages of 18 and 65 years who are at greater risk of experiencing a troublesome pain in a two-week period.



## Instruments

Five instruments were incorporated as the Pain Appraisal and Coping Questionnaire for use in this study (Appendix C). These instruments included: the Pain Appraisal Inventory, and the Use of Health Care Form, developed for this study, the short form of the McGill Pain Questionnaire (Melzack, 1987), the Pain Disability Index (Pollard, 1984), and the Pain Coping Questionnaire (Reid et al., 1994). In addition, pain event factors were measured in a series of single-item 10 point scales, or by open-ended questions. The strategies proposed by Carmines and Zeller (1979), Dillman (1978), Streiner and Norman (1989), and Woodward and Chambers (1986) were used as guidelines for questionnaire construction.

### Pain Event Factors

In most instances, the internal stability of measures of psychological constructs are strengthened by the use of multiple items. However, some constructs, such as those concerning pain event factors, cannot be easily asked using several items since the single-item may encompass the construct to a considerable extent. Asking the same question in several different ways may task the respondent excessively without generating additional information about the construct. Pain intensity is typically measured by a single-item rating scale including 101-point, 11-point, and 6-point numerical rating scales, 4-or 5-point verbal rating scales, as well as the 10 cm. visual analogue scale with anchors at either end (Jensen, Karoly, & Braver, 1986). In a study of present, least, most, and average pain for 75 patients with chronic pain, a series of factor analyses demonstrated a large degree of association between the scales, and a loading of each scale on one factor. However, although visual analogue measures of pain have good reproducibility and demonstrate concurrent validity by high correlations with the MPQ (Melzack, 1975), there may be more measurement error for these scales than for numerical or verbal rating scales (McDowell & Newell, 1987). More recently, Jensen, Turner, and Romano (1994) in a comparative study of three numerical pain rating scales reported that 11- and 21-point scales provided sufficient levels of discrimination. For these reasons, an 11-point scale

for pain intensity, with "0" as no pain at all and "10" as extreme pain, was used in the proposed study. Overall interference, emotional upset, and controllability were also constructed as single-item 11-point scales using the same format. The respective questions were: "Overall, to what extent did the pain interfere in your activities and responsibilities?" "How upset were you, emotionally, about the pain?" "Were you able to control the pain by ignoring, using medication, rest or some other method?". "Not at all" and "extremely" were used as anchors.

Unusualness was measured by "Was the pain more severe than you might have expected?" and "Did the pain last longer than you might have expected?". Predictability was determined by two questions: "Did the pain get better in the way you might have expected?" and "Did you expect to have the pain?". An 11-point rating scale was used for each question with "not at all" and "extremely" as anchors.

Duration of pain was assessed using an 11-point scale with "0" as one hour or less, and "10" as 10 days or more. The association of pain with other physical symptoms was determined by the question: "Was the pain associated with any other physical symptoms?". The respondent had eleven options including no other symptoms, dizziness, nausea/vomiting, diarrhoea, bruising, swelling, bleeding, cut, broken bone, burn, or no other symptoms.

Cross-validation was used to determine whether the pattern of relations between the pain event factors, gender and threat appraisal remained consistent when the sample was split.

The type of pain was determined by two open-ended questions inquiring whether the pain was caused by an injury or was associated with an illness or a disease, and by a third question concerning the frequency of pain in the respondent's life. Although the respondent's information was subjective and possibly not medically supported, the respondent's beliefs about the cause of the pain were likely to be influential on the respondent's appraisal of the pain even if these beliefs were not accurate. On the basis of these responses, pain was classified as acute with or without an underlying injury or condition, or as a recurrent/chronic pain with or without an underlying injury or condition. Details about the scoring schema are included in

Appendix D. Only a small group of women reported pain due to menstruation or ovulation. These pains were considered acute or recurrent/chronic with an underlying condition based on whether the respondent had experienced the pain six or more times in her lifetime. To determine inter-rater reliability of this scoring, a sample of 77 questionnaires was generated by selecting subject numbers ending in 1, 4 or 8. A doctoral student and I independently rated the type of pain. Inter-rater reliability was 90%. Several errors in scoring occurred for respondents who reported pain due to a health procedure. For this reason, these pains were subsequently classified as pain due to a health procedure rather than as an acute or recurrent/chronic pain. Items concerning measurement of pain event factors are given as Q-2 to Q-14 on the Pain Appraisal and Coping Questionnaire.

#### Pain Appraisal Inventory

The Pain Appraisal Inventory was developed for this study to measure threat and challenge appraisal. The final scale included 16 statements, eight statements for each scale. Each statement was rated on a 6-point scale of agreement-disagreement (Appendix C - Pain Appraisal and Coping Questionnaire, Q-37 to Q-52). Mean scores were generated for an overall threat and challenge score. Development of the Pain Appraisal Inventory, and evidence of its reliability and validity is given in chapter 4.

#### McGill Pain Questionnaire (MPQ)

The MPQ (Melzack, 1975) is a commonly used pain measurement for acute, chronic, and experimentally-induced pain. It was derived from a model of pain as an experience with three major psychological dimensions: sensory-discriminative, motivational-affective, and cognitive-evaluative (Melzack & Casey, 1968). These three dimensions led to a search for word descriptors that would capture these dimensions and the pain intensities associated with these words (Melzack & Torgerson, 1971). The original MPQ (Melzack, 1975) consisted of 20 word descriptors classified as sensory, affective, evaluative, or miscellaneous. The short form MPQ (Melzack, 1987) consists of 11 sensory words and 4 affective words. Each descriptor is rated

on an intensity scale of 0 = none, 1 = mild, 2 = moderate, 3 = severe. Pain rating scores are the sum of the intensity values for the descriptors in each subclass. A total pain score can also be obtained.

As with most pain measures, retest reliability may not be meaningful since pain is not a stable event. However, Love, Leboeuf, and Crisp (1989) did report very strong test-retest reliability coefficients for the long form of the MPQ in a sample of patients with chronic low back pain where the test administrations were separated by several days. The three dimensional model underlying the MPQ is supported in some factor analytic studies but challenged by others (Reading, 1989). The sensory and affective dimensions are generally supported but there is less clarity about whether the evaluative and affective dimensions are separate (Melzack & Katz, 1994). In part, the difficulty in different results from factor analytic studies may reflect sample differences since the samples have varied considerably in the pain problems that have been represented (Melzack & Katz, 1994).

The face and content validity and to some extent the construct validity of the MPQ are demonstrated by the apparent consistency of distinctive constellations of pain words given by patients for various pain problems on the MPQ (Melzack & Katz, 1994). The MPQ is not a diagnostic test. However, Dubuisson and Melzack (1976) and others have demonstrated the discriminative power of the MPQ in a sample of patients with one of eight pain syndromes. When a descriptor class was set for each syndrome the MPQ correctly classified the pain in 77% of cases. Scores from the short form of the MPQ (Melzack, 1987) were highly correlated with scores obtained using the original MPQ (Melzack, 1975) in samples of patients from four different pain settings.

The short form of the MPQ (Melzack, 1987) was used in this study to determine the concurrent criterion validity of threat and challenge appraisals (Appendix C - Pain Appraisal and Coping Questionnaire, Q-15 to Q-29).

### The Pain Disability Index (PDI)

The PDI, developed as a brief measure of pain-related disability for patients with chronic pain, is based on seven items: family/home responsibilities, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activity. The PDI (Pollard, 1984) (Appendix C - Pain Appraisal and Coping Questionnaire, Q-30-35 ) was used in this study to provide a measure of concurrent validity for the single-item measure of interference (Q-36) and to allow for more detailed examination of gender variation in the interference of pain. Each item of the PDI is rated on an 11-point scale with anchors of "no disability" and "total disability". A total score for the PDI is based on these ratings.

The anchors of the PDI were modified for this study. Since respondents were more likely to report temporary, acute pains rather than ongoing chronic pain, "interference" was considered more appropriate than "disability" as a measure of the impact of pain on activity. For this reason, the anchors of the PDI were changed to "no interference" and "total interference" for this study. In addition, the item measuring sexual interference was removed since this item was likely to result in a non-response during the telephone interview.

The Cronbach's alpha of the Pain Disability Index in a sample of patients with chronic pain was 0.86 (Tait, Chibnall, & Krause, 1990). Previous research demonstrated that the PDI scores discriminated post-operative patients from surgical patients at follow-up visits, as well as inpatients with chronic pain from outpatients with chronic pain (Pollard, 1984; Tait, Pollard, Margolis, Duckro, & Krause, 1987). In addition, high disability scores have been significantly associated with increased psychological distress, more severe pain, and increased restriction of activities.

### Pain Coping Questionnaire (PCQ)

The PCQ (Reid et al., 1994) was developed on a model of coping using problem-focused and emotion-focused functions with approach and avoidance distinctions. The original questionnaire consisted of 39 coping strategies. Each item is rated on a 5-point scale by the

extent to which the item was used to cope with the pain (1 = never, 5 = very often). Cluster analyses suggested ten scales: information seeking, problem solving, seeking social support, positive self-statements, behavioural distraction, cognitive distraction, externalizing, internalizing/catastrophizing, palliative behaviours, indirect help-seeking. Internal consistency for two of these scales, palliative behaviours and indirect help-seeking was low but may have reflected responses from subjects who described their coping based on hypothetical pains (Reid et al., 1994). Factor analysis suggested a three factor structure for 8 of the scales: approach, problem-focused avoidance and emotion-focused avoidance. Two scales, palliative behaviours and indirect help-seeking did not load well on any of the three factors.

The PCQ can be scored in at least two ways. The first method is to obtain scores for the three factors of the PCQ (approach, problem-focused avoidance, and emotion-focused avoidance) by taking the mean of all ratings of items included in each factor. The second method provides a score for each of the 10 scales. These scores are obtained by taking the mean of all ratings for the items within the scale.

Cronbach's alphas ranged from .79 to .89 for the three factor scores, and from .70 to .87 for nine of the ten scale scores (Reid et al., 1994). The internal consistency reliability was low for the palliative behavior scale (Cronbach's alpha .46). Concurrent validity for the PCQ was demonstrated by strong correlations between some scales of the PCQ and scales of Coping with Health, Injuries and Problems (Endler, Parker, & Summerfeldt, 1992) (Reid et al., 1994). Information seeking, problem solving, seeking social support, positive self-statements, behavioural distraction, and cognitive distraction were related to higher levels of pain and perceived coping effectiveness.

The Pain Coping Questionnaire (Reid et al., 1994) was revised for this study by the addition of items to improve the palliative and indirect help-seeking scales. The items of the

Pain Coping Questionnaire are given in Appendix C - Pain Appraisal and Coping Questionnaire, Q-53 to Q-103.

#### Use of Health Care Form

Gender variation is particularly persistent in health care utilization. However, instruments measuring coping may exclude mention of health care utilization or, as in the Pain Coping Questionnaire (Reid et al., 1994), include a single item asking whether the respondent asked questions of a health professional. Health care utilization may have several components including: thinking about making a visit, the suggestion by someone that the respondent should see a health professional, making an appointment, seeing a health professional, or going to a hospital emergency department. The Use of Health Care Form, consisting of five close-ended questions, was developed for this study to capture these components (Appendix C - Pain Appraisal and Coping Questionnaire, Q-104 to Q-109).

#### Data Analysis

Means and standard deviations were used to describe women's and men's reports of pain event ratings, appraisals, and coping strategies. Independent *t*-tests with 2-tailed significance, were used for gender comparisons of continuous variables, and chi-square analyses were used for gender comparisons of ordinal or nominal data.

Hypothesis testing was approached in three ways for hypotheses 1 and 2 (Gender would interact with the pain event factors on the appraisal of pain as a threat or challenge, and gender would have an independent effect on threat or challenge appraisal when pain event factors were controlled). The dependent variables for these hypotheses were threat appraisal and challenge appraisal. The independent variables included, two person factors (gender, age) and ten pain event factors (type of pain, location of pain, presence of other physical or somatic symptoms, intensity, duration, interference, unusualness, controllability, predictability, and emotional upset). The first strategy was based on a conceptual argument about the key pain

event factors that were expected to be the most important influence on appraisal, and the most likely to be affected by gender. These variables were entered into hierarchical multiple regression analyses comparing interaction models with main effect models. The second strategy was by exploratory backward stepwise multiple regression to determine how other pain event factors, also measured in this study, might contribute to the threat or challenge appraisal of pain, or change the relationship between the appraisal and the variables used in Strategy 1. The third strategy was application of the models from strategies 1 and 2, to hierarchical multiple regression analyses to examine the specific pattern of contributions for women and men in separate samples.

Stepwise regression procedures can be conducted using a forward or backward elimination process (Cohen & Cohen, 1983). The forward method is based on the correlations of the dependent and independent variables. The first variable entered into a predictive model of the dependent variable is that variable which has the highest correlation with the dependent variable. In a backward method all variables are entered simultaneously. The variables are then regressed on the dependent variable and in each step the independent variable with the smallest contribution is dropped from the model.

The use of stepwise procedures is sharply criticised for primarily two reasons (Cohen & Cohen, 1983; Norman & Streiner, 1994). First, as the number of independent variables in the model increase, the probability of finding significant relationships on the basis of chance alone increase. Secondly, without prior theoretical hypotheses about relationships between dependent and independent variables, the outcomes of stepwise regressions are less interpretable. Cohen and Cohen (1983) argued that stepwise methods are supportable only for predictive research goals when samples are large in proportion to the number of independent variables (approximately 40 subjects per variable). In addition, the outcomes of the stepwise analysis should be verified in a second sample (Cohen & Cohen, 1983; Norman & Streiner, 1994). Lastly, if stepwise procedures are to be used, backward regression is more likely to reduce the



problem of chance correlations (Scogin, Schumacher, Gardner, & Chaplin, 1995). In this study, backward stepwise regression was used to determine whether an alternative regression strategy would give a different predictive model of threat appraisal. The ratio of dependent variables to respondents was 1/34.

The third hypothesis proposed that gender would interact with threat and challenge appraisals on the choice of coping strategies as measured by the Pain Coping Questionnaire (Reid et al., 1994). For this hypothesis, threat and challenge appraisal became independent variables along with gender. The dependent variable was the specific coping behaviour. Hierarchical multiple regression analyses were used to test these relationships.

The third hypothesis also concerned the relationship between health care utilization, gender, and appraisal. Logistic regression was used for this analysis since the dependent variable was now categorical (the respondent did or did not report seeing a health professional for the pain in the previous two weeks).

To avoid a Type 1 error in research outcomes (finding significant relationships that do not really exist), alpha is commonly set at .05 with .01 considered a more conservative probability value (Cohen & Cohen, 1983). However, the probability of the occurrence of a Type 1 error increases with the number of comparisons employed in the data analysis (Cohen & Cohen, 1983). In this study, approximately 28 t-tests, 12  $\chi^2$  analyses, 40 correlations, 7 multiple regression analyses for hypotheses 1 and 2 related to threat appraisal, 3 multiple regression analyses concerned with challenge appraisal, as well as 13 multiple regression analyses and 1 logistic regression for hypothesis 3 were used in the primary data analysis. Additional t-tests, correlations and/or regression analyses were used in the cross-validation of outcomes, and supplementary analyses.

There are a number of statistical strategies that can be used to readjust the criterion alpha to a more stringent criteria to avoid incurring a Type 1 error. The most conservative approach is the Bonferroni correction in which  $\alpha = .05$  is divided by the number of comparisons

used in the data analysis (Miller, 1966). However, while adjustment of alpha for multiple comparisons in this way decreases the risk of Type 1 error, this adjustment also increases Type 2 error, that is, not finding significant outcomes when, in fact, they exist. Rothman (1986) argued that achieving a balance between Type 1 error and Type 2 error should be based on the implications of false positive and false negatives in the specific research context, and whether the research purpose is exploratory or confirmatory of previous research findings.

Although three hypotheses were tested in this study, the research itself was largely exploratory as one of the few studies of pain appraisal in a general population. False positive outcomes in this study could present some difficulty since any gender differences could be interpreted to the disadvantage of women or men (Caplan & Caplan, 1994). Given the number of multiple comparisons used in the primary data analysis for this study, reduction in the study criterion alpha was advisable. To avoid increasing Type 2 error excessively by a Bonferroni correction, I set the criterion alpha for this study at .005. Outcomes at this level are unlikely to have occurred by chance alone. This alpha was applied for all t-tests,  $\chi^2$  tests, and all multiple and logistic regression analyses. I retained alpha at .05 only for partial F tests, change in  $R^2$  tests, and the t-tests within a multiple regression analysis if the overall F test was significant at  $p < .005$ .

All outcomes associated with the supplementary analyses should be considered suggestive of future hypotheses. Exact p values are given for all outcomes associated with  $p < .05$ . Outcomes with a p value  $< .05$  and  $> .005$  should be considered suggestive of hypotheses.

### Ethical Considerations

All individuals, who were contacted by telephone for this study, were informed about the purpose of the research, the means by which their name was selected, and the voluntary and confidential nature of their participation. Completed questionnaires were identified with a study code number that was unrelated to the respondent's telephone number. Respondents' telephone numbers were discarded on completion of the study. A brief summary of the purpose and the results of this study was made available to all respondents who expressed an interest in the study outcomes.

There were no known risks to participation in this study. Interviewers were instructed to direct respondents to their physician if the respondent asked for advice about her or his pain. Training of interviewers emphasized the confidentiality of interviews. The procedural booklet used by interviewers outlined potential areas of difficulty in the telephone interview and strategies for their management. Interviewers were supervised during the period of data collection. The study received ethical approval from the Dalhousie University Faculty of Graduate Studies.

## CHAPTER 4. RELIABILITY AND VALIDITY OF MEASURES

The Pain Appraisal Inventory was developed for this study. Two measures, the McGill Pain Questionnaire and the Pain Disability Index, were designed primarily for use with a client population and have not been used previously in a community sample. The Pain Coping Questionnaire has been used in samples of university and high school students for hypothetical pains, but not in a community sample reporting about an actual pain event. For these reasons, in this chapter, I will discuss in detail the development of the Pain Appraisal Inventory and its reliability and validity, and address the internal stability reliability of the McGill Pain Questionnaire, the Pain Disability Index and the Pain Coping Questionnaire in the community sample. The correlations among all of the measures are given in Appendix E, Tables E1 and E2.

### Pain Appraisal Inventory (PAI)

The most common strategy in construction of appraisal measures is use of one or more defining statements of threat or challenge appraisal (e.g. Ptacek et al., 1992). Development of the PAI used the same approach. Care was taken to ensure that statements and their response options were of sufficient clarity that they would be understood and could be answered by most if not all respondents in a community sample. A critical issue in the developmental process was determining the reliability and validity of the PAI as a measure of pain appraisal.

Reliability is a question of how much variance in outcomes is due to random error within the measure (Carmines & Zeller, 1979; Nunnally, 1978). Depending on the nature of the phenomena and its measurement, intra-rater or inter-rater agreement, stability of the measurement over time, stability of the measurement in different contexts, and/or internal stability of the measurement may be important aspects of an instrument's reliability. The retest

method is often used when memory is not likely to have a significant effect or when the repeatability of a test score is more important than the content of the measure (Nunnally, 1978). The retest and alternative forms methods are appropriate for traits that are expected to be stable over time since their measurement must also reflect stability over time (Nunnally, 1978).

In contrast to traits such as intelligence, pain is a less stable phenomenon since pain can show considerable change and fluctuation over time. Even common repetitive pain such as menstrual pain can be highly variable from cycle to cycle due to the effects of stress, contraceptive use, medication, diet, exercise, smoking, or early spontaneous miscarriages (Brown, Vessey, & Stratton, 1988; Calesnick & Dinan, 1987; Metheny & Smith, 1989). Although stability over time is not expected of pain measures in most circumstances, internal stability as demonstrated by using the split-half method or methods of internal consistency may be applicable if the particular pain construct is measured using multiple items.

Methods based on internal consistency give the correlation between items in a measure and a hypothetical equivalent of the measure as if their items were parallel (Carmines & Zeller, 1979; Nunnally, 1978). Since some methods of internal consistency estimate the average of item correlations based on all possible subdivisions of the measure, they are superior to split-half approaches (Carmines & Zeller, 1979). Cronbach's alpha (Cronbach, 1970), the most common reliability coefficient of internal consistency, will give a conservative estimate of the measure's reliability, that is, the reliability of a measure can never be lower than alpha (Carmines & Zeller, 1979).

A measure may be reliable without being a valid instrument. Determining the extent of the validity of a measure is often an ongoing process in which various studies over time with different populations in varying contexts build the case for the overall validity of a measure. In this process, content validity (Do the items sample the constructs of threat and challenge?), criterion validity (Do the scores concur with other pain measures?), and construct validity (Does the measure produce outcomes consistent with theoretically derived hypotheses about these

outcomes and the outcomes of related measures?) are key issues (Carmines & Zeller, 1979). Reliability and validity of the PAI were examined in five stages.

In the first stage, two defining statements were used to measure threat. These were: "I was concerned that the pain might mean something was wrong with me" and "I was concerned that the pain might become more than I could manage". Two statements were used to measure challenge. These were: "I thought the pain was a test of my strength and ability" and "I thought the pain was a bother but something I could overcome". In addition, two questions were used to determine directly the threatening or challenging nature of the respondent's pain. These questions were: "How threatening was the pain?" and "How challenging was the pain?". A convenience sample of 17 women and five men was recruited from undergraduate students, graduate students, and faculty participating in the psychology pain research laboratory at Dalhousie University, and from faculty and staff from the School of Occupational Therapy, members from a church choir, women from a house-cleaning company, and one woman from Connections Clubhouse (a program for people with psychiatric disorders). The sample was selected to reflect diversity in gender, age, education and income. The purpose of this pretest was to determine the face validity of this measure and correlations among items.

In this initial pretest, the two defining statements measuring threat were correlated with each other ( $r=0.67$ ), and with the question "How threatening was the pain?" ( $r=0.77$ ,  $r=0.57$  respectively). However, the two defining statements of challenge were not related to each other, or to the question "How challenging was your pain?" The question itself was difficult for respondents to complete, even though the majority of the respondents thought of their pain as a challenge as indicated by high ratings on one of the two challenge statements (I thought the pain was a bother but something I could overcome). Respondents commonly stated that they did not understand the question.

In the second stage of instrument development, threat and challenge were defined more broadly to capture the physical and psychosocial dimensions of these constructs. Threat was defined as anticipated or actual physical and/or psychological harm, loss, injury, or damage associated with a pain event. Challenge was defined as a test of one's strength, endurance or abilities with the potential for growth, mastery or gain associated with a pain event. Two scales were constructed based on 12 statements rated as strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, strongly agree (Table 2).

Table 2

Draft Pain Appraisal Inventory

Threat Appraisal	Challenge Appraisal
I was concerned that the pain might mean something was wrong with me.	I thought the pain was a test of my strength and ability.
I was concerned that the pain might become more than I could manage.	I thought the pain was something I could overcome.
The pain seemed threatening.	I thought something good might come out of having the pain.
I was concerned about how much more pain I could take.	I thought the pain made me a stronger person.
I was concerned about my ability to do things that needed getting done.	I thought the pain was an opportunity to learn more about myself.
I was concerned about becoming depressed or discouraged because of the pain.	I thought of this pain as a challenge.

A sample of 46 individuals, including a class of dentistry students, and volunteers from an electronic occupational therapy list participated in a pre-test to assess the internal consistency and reliability of the revised Pain Appraisal Inventory. Respondents were asked to consider their most troublesome pain in the previous two weeks. Cronbach's alpha was .78 for the threat scale and .67 for the challenge scale. Threat and challenge were moderately correlated ( $r=0.38$ ). Item analysis identified difficulty with one threat statement (I was concerned about my ability to do things that needed getting done), and one challenge statement

(I thought the pain was something I could overcome). The challenge statement correlated with some threat and challenge statements. For this reason, the statement was removed. The problematic threat statement was shortened to improve its clarity. Two statements were added to both the threat and challenge scales to improve the internal consistency of these scales.

In the third stage, content validity of the Pain Appraisal Inventory was determined using an interdisciplinary panel of eighteen health professionals representing psychology, nursing, occupational therapy, physical therapy, and medicine. Several panel members had extensive research experience in the field of pain, whereas others had clinical experience with infants, children and/or adults in an acute or chronic health care setting. Panel members were given the threat and challenge definitions and a random selection of 18 statements from the Pain Appraisal Inventory. They were asked to classify each statement according to whether it reflected a threat or challenge appraisal of pain. One hundred percent correct classification occurred for eight statements, with 94% correct agreement for an additional six statements, and 89% agreement for one other statement. One threat statement (I was concerned about doing things that needed getting done) was classified correctly only 55% of the time. To improve the content validity of this statement, it was rephrased as "I am worried about getting things done" to emphasize its threat appraisal. Despite high agreement in classification of most statements, several panel members believed some statements to have elements of both threat and challenge appraisal. In response to this feedback, some statements were slightly modified. The final Pain Appraisal Inventory is given in Table 3.



Table 3

Pain Appraisal Inventory

Threat Appraisal	Challenge Appraisal
I am (was)* concerned that the pain might mean something is (was) wrong with me.	I think (thought) the pain is (was) a chance to prove myself.
I am (was) concerned that the pain might become more than I can (could) manage.	I think (thought) the pain is (was) a test of my strength and ability.
I am (was) worried about getting things done.	I think (thought) something good might come out of having the pain.
I am (was) concerned about how much more pain I can take.	I think (thought) the pain makes (made) me a stronger person.
The pain seems (seemed) threatening.	I think (thought) the pain is (was) a chance to learn more about myself.
I am (was) worried about being depressed or discouraged because of the pain.	I think (thought) without this pain, there would be no gain.
I feel (felt) controlled by the pain.	I thought of this pain as a challenge.
I think (thought) of this pain as a threat	I think (thought) the pain tests (tested) how well I can (could) manage.

Note. \*The change in verb tense reflects the rephrasing of the PAI when pain is not present at the time that the PAI is completed.

The fourth stage was implementation of the Pain Appraisal Inventory in a community sample. The first 10 respondents in the community telephone survey were used to pilot the Pain Appraisal Inventory. Since no respondent had difficulty understanding the items on these scales or selecting a response option, the scales were not altered; the data was included in the analysis of the complete sample.

The fifth stage was use of the Pain Appraisal Inventory in a field study of 309 individuals randomly selected from the Halifax-Dartmouth-Bedford population. The sample is described in detail in Chapter 3. The Cronbach's alphas for the threat and challenge scales were .86 and .81 respectively.

A confirmatory factor analysis using principal components with oblique rotation and two factors requested, identified two factors. In contrast to orthogonal rotations, oblique rotations allow for some correlation between factors. Since threat and challenge appraisal were expected

to be correlated to some degree, an oblique rotation was used for the analysis. Factor analysis based on an oblique rotation produces two matrices, the structure matrix consisting of partial regression coefficients (regression of each item on each factor), and a pattern matrix of the correlation between each item with each factor (Norman & Streiner, 1994). The Factor Structure Matrix of partial regression coefficients demonstrated that each of the statements loaded most strongly on one of the two factors (Table 4). Similarly, individual scale items had strong correlations with only one factor as shown on the Factor Pattern Matrix (Table 5). Both matrices confirmed the two factor structure of the Pain Appraisal Inventory. The factors themselves had low correlations with each other ( $r = 0.16$ ).

Table 4

Factor Structure (Loading) Matrix of the Threat and Challenge Statements

Statement	Factor 1	Factor 2
	Partial Regression Coefficients	
<b>Threat Statements</b>		
I am concerned that the pain might mean something is wrong with me.	.63	.03
I am concerned that the pain might become more than I can manage.	.79	-.003
I am worried about getting things done.	.68	-.04
I am concerned about how much more pain I can take.	.74	-.01
The pain seems threatening.	.76	.05
I am worried about being depressed or discouraged because of the pain.	.70	.10
I feel controlled by the pain.	.67	-.07
I think of this pain as a threat.	.72	.02
<b>Challenge Statements</b>		
I think the pain is a chance to prove myself.	.02	.62
I think the pain is a test of my strength and ability.	.11	.70
I think something good might come out of having the pain.	-.21	.61
I think the pain makes me a stronger person.	-.12	.73
I think the pain is a chance to learn more about myself.	.13	.62
I think without this pain, there is no gain.	.03	.51
I think of this pain as a challenge.	-.02	.70
I think the pain tests how well I can manage.	.18	.69

Table 5

Factor Correlation Matrix of the Threat and Challenge Statements

Statement	Factor 1	Factor 2
	r	r
<b>Threat Statements</b>		
I am concerned that the pain might mean something is wrong with me.	.64	.14
I am concerned that the pain might become more than I can manage.	.79	.13
I am worried about getting things done.	.68	.06
I am concerned about how much more pain I can take.	.75	.11
The pain seems threatening.	.77	.18
I am worried about being depressed or discouraged because of the pain.	.71	.22
I feel controlled by the pain.	.66	.03
I think of this pain as a threat.	.72	.14
<b>Challenge Statements</b>		
I think the pain is a chance to prove myself.	.12	.63
I think the pain is a test of my strength and ability.	.23	.72
I think something good might come out of having the pain.	.11	.58
I think the pain makes me a stronger person.	.01	.71
I think the pain is a chance to learn more about myself.	.24	.64
I think without this pain, there is no gain.	.12	.51
I think of this pain as a challenge.	.09	.70
I think the pain tests how well I can manage.	.29	.72

When respondents disagreed with a challenge statement, they tended to strongly disagree. Forty-one percent to 80% of respondents strongly disagreed with specific challenge statements. Ten percent to 37% of respondents agreed to some extent with each challenge statement whereas agreement ranged from 32% to 60% for threat statements. The means, standard deviations, and percentage of respondents agreeing with the threat or challenge statement are given in Table 6.

Table 6

Means, Standard Deviations and Percentage of Respondents Agreeing with Individual Appraisal Statements

Statements	M	SD	(%)*
<b>Threat Statements</b>			
I am concerned that the pain might mean something is wrong with me.	3.7	1.9	(63)
I am concerned that the pain might become more than I can manage.	3.4	1.9	(53)
I am worried about getting things done.	3.6	1.8	(60)
I am concerned about how much more pain I can take.	3.0	1.8	(48)
The pain seems threatening.	2.7	1.7	(38)
I am worried about being depressed or discouraged because of the pain.	2.9	1.8	(44)
I feel controlled by the pain.	3.0	1.8	(47)
I think of this pain as a threat.	2.5	1.8	(32)
<b>Challenge Statements</b>			
I think the pain is a chance to prove myself.	1.6	1.2	(12)
I think the pain is a test of my strength and ability.	2.0	1.6	(20)
I think something good might come out of having the pain.	1.6	1.3	(13)
I think the pain makes me a stronger person.	2.0	1.5	(20)
I think the pain is a chance to learn more about myself.	2.2	1.5	(25)
I think without this pain, there is no gain.	1.5	1.2	(10)
I think of this pain as a challenge.	2.1	1.5	(23)
I think the pain tests how well I can manage.	2.6	1.8	(37)

Note. \*Percentage of respondents who slightly, moderately, or strongly agreed with the statement.

The concurrent criterion validity of the Pain Appraisal Inventory was shown in two ways. First, although both threat and challenge appraisal correlated with the sensory and affective scales of the short form of the McGill Pain Questionnaire (Melzack, 1987), threat appraisal correlated more highly ( $r = .40$  and  $.55$  respectively,  $p = .000$ ) than did challenge appraisal ( $r = .16$ ,  $p = .004$ , and  $.19$ ,  $p = .001$  respectively). Secondly, threat appraisal correlated more strongly with the Pain Disability Index (Pollard, 1984) than did challenge appraisal ( $r = .5$ ,  $p = .000$  and  $r = .19$ ,  $p = .001$  respectively).

Construct validity of a measure is typically established over several studies that examine hypotheses related to the measure. Initial construct validity for the Pain Appraisal Inventory was shown by the relationship between different aspects of health care utilization on the Use of Health Care Form and appraisal. Threat appraisal was significantly correlated with

positive responses to the items on the Use of Health Care Form, whereas challenge appraisal was unaffected by the respondents' responses to these items (Table 7).

Table 7

Means and Standard Deviations of Threat and Challenge Appraisal by Components of Health Care Utilization

Item	Threat Appraisal		Challenge Appraisal	
	M	SD	M	SD
<b>Thought about seeing a health professional for pain in the past 2 weeks</b>				
no (n = 164)	2.7	1.2	1.9	1.0
yes (n = 145)	3.5*	1.2	2.0	1.0
<b>Someone suggested seeing a health professional for pain in the past 2 weeks</b>				
no (n = 212)	2.9	1.3	1.9	1.0
yes (n = 97)	3.5**	1.3	2.0	1.0
<b>Made an appointment for the pain in the past 2 weeks</b>				
no (n = 235)	2.9	1.3	2.0	1.0
yes (n = 74)	3.8***	1.1	1.9	1.0
<b>Saw a health professional for pain in the past 2 weeks</b>				
no (n = 250)	2.9	1.3	2.0	1.0
yes (n = 59)	3.7****	1.2	1.9	1.0

Note Independent t-tests, 2-tailed significance, comparing mean threat appraisal for respondents who answered no or yes for each item. \*  $t(307) = 5.56, p = .000, 95\% \text{ CI } -1.05 \text{ to } 5$ , \*\*  $t(307) = 4.19, p = .000, 95\% \text{ CI } - .95 \text{ to } -34$ , \*\*\*  $t(307) = 5.47, p = .000, 95\% \text{ CI } -1.22 \text{ to } -57$ , \*\*\*\*  $t(307) = 3.72, p = .000, 95\% \text{ CI } -1.04 \text{ to } -32$ . Since the differences in means for challenge appraisal were negligible, no comparisons were used.

### McGill Pain Questionnaire

The short form McGill Pain Questionnaire (MPQ) (Melzack, 1987) was developed to measure sensory and affective aspects of pain in a chronic pain population. The present study was the first use of the MPQ in a general population. As expected, the internal consistency of the MPQ was moderate. Cronbach's alphas for the sensory and affective scales were .69 and

.61 respectively. The Affective Scale was expected to correlate moderately with a single item rating of emotional upset in response to the pain event. This correlation was .48 ( $p = .000$ ).

#### Pain Disability Index

Altering the anchors for the Pain Disability Index (Pollard, 1984) from "no disability" or "total disability" to "no interference" or "total interference", and removal of the item referring to interference of pain on sexual behaviour, did not impair the internal consistency of this measure. Cronbach's alpha for the PDI in this sample was .87. The PDI was expected to correlate with a single-item question about the overall interference of pain on daily activities and responsibilities. Correlation between the PDI and this single-item was .88 ( $p = .000$ ).

#### Pain Coping Questionnaire

The Pain Coping Questionnaire (Reid et al., 1994) has not been used in a community adult sample other than in undergraduate and high school student populations. To determine the reliability of this measure and its appropriate scoring for a community population, analysis of internal consistency and factor analysis were conducted. Cronbach's alphas for the three factors and the ten scales are given in Table 8.

Cronbach's alphas for the three factors were above .80, and for the PCQ scales Cronbach's alphas ranged from .61 to .90. The Cronbach's alpha for seeking social support was high (.90) suggesting that there was some redundancy in the test items. The low alpha for the palliative behaviours scale (.61) may be a function of the idiosyncratic nature of some of the test items and may be strongly related to the type and location of the pain. For example, "rub the part of me that is sore" and "put heat or ice on the sore spot" are both palliative items. For a musculoskeletal pain, both behaviours may be used to relieve pain, whereas heat but not rubbing may be used to relieve abdominal or pelvic pain.

Table 8

Cronbach's Alphas for the PCQ Factors and Scales

PCQ Factors and Scales	Cronbach's alpha
<b>Factors</b>	
Approach	.87
Problem-focused avoidance	.87
Emotion-focused avoidance	.81
<b>Scales</b>	
Information-seeking scale	.76
Problem-solving scale	.72
Seeking social support scale	.90
Positive self-statements scale	.75
Behavioural distraction scale	.81
Cognitive distraction scale	.82
Externalizing scale	.78
Internalizing/catastrophizing scale	.79
Palliative behaviours scale	.61
Indirect help-seeking scale	.81

Reid et al. (1994) used factor analysis with the principal axis method and an oblique rotation, identifying the three factor structure of approach, problem-focused avoidance, and emotion-focused avoidance coping strategies. In this factor analysis, the problem-solving scale loaded on two factors. In the present study, the same method of factor analysis reported by Reid et al. (1994) was used to confirm the three factor structure for the PCQ and to determine whether the problem-solving scale loaded more strongly on one factor over another. In this study, problem-solving loaded and correlated more highly with the approach factor. For this reason, the problem-solving scale score was considered only in the approach factor. In all other respects, scoring of the PCQ in the present study was consistent with the method reported by Reid et al. (1994).

## CHAPTER 5. RESULTS

### Overview

The results of the following analyses provided partial support for some study hypotheses but women and men were surprisingly similar in their experiences of pain and in their appraisal of pain. The most important and striking outcome in this study was the consistency and the size of the effect for two pain event factors, overall interference and emotional upset, on threat appraisal. Other pain factors, that were concerned with the more sensory qualities of pain, had a more limited and variable impact on pain appraisal. Age, and interaction of gender with overall interference, had a small but significant impact on threat appraisal. Women used more coping strategies than did men irrespective of their pain appraisal. Threat and challenge appraisal had a significant impact on coping strategies but the strongest relationship was between threat appraisal and internalizing/catastrophizing. Although there was a significant interaction effect of gender with threat appraisal on health care utilization, appraisal of pain had a very limited impact on predicting health care utilization.

All data analyses were performed using SPSS6.0 for Windows. Missing values occurred in the data sets for eight individuals. In seven cases, the missing value concerned an item within a scale. Since the scale score for these measures was based on the mean response of items completed, these respondents still received a scale score. One missing value concerned a single-item scale for the measurement of predictability (a pain event factor). This respondent was removed from the data analysis for analyses that concerned this variable.

As discussed in chapter 3, alpha was set at .005. Outcomes associated with alpha values approximating .05 or .01 are indicated but should be considered suggestive of possible relationships for future research. Exact alpha values are given for all analyses except correlation matrices, change in  $R^2$  tests, and for partial F tests for sets of variables in multiple regression analyses where alpha was determined by comparison of the statistic with a set



value. Correlation matrices of pain event factors, and coping strategies with appraisal of pain are given in Appendix E, Tables E2-E4.

I will discuss prevalence of pain in the study sample, characteristics of the pain and its relationship to appraisal, outcomes pertaining to the three study hypotheses, and cross-validation outcomes. Six exploratory questions, which emerged from this data, were examined as supplementary analyses.

#### Prevalence of Pain in the Sample

Prevalence rates in this study referred to household rates since only one individual in a household was eligible to participate in the study. Eight hundred and forty-three people (379 women, 464 men), aged 18 to 65 years, were questioned about whether they had experienced a troublesome pain in the previous two weeks. The household prevalence of troublesome pain in this sample was 46% (Table 9).

Prevalence of pain by age group can only be approximated since this sample was not stratified by age, and for 78 of the 843 individuals (9%), no age was available (Table 9). In addition, the standard errors of these prevalence rates were large ranging from 4.1 to 9.3. For women, prevalence of pain in the previous two weeks was highest among 18 to 25 year olds (65%). Among men, prevalence of pain ranged from 44% to 49% and decreased to 35% among 56 to 65 year old men.

Table 9

Household Prevalence of Troublesome Pain in the Previous Two Weeks by Age and Gender

Age Group	Women				Men			
	n*	n**	(%)***	SE	n*	n**	(%)***	SE
18-25 years	48	31	(65)	9.3	41	20	(49)	7.6
26-35 years	91	47	(52)	5.4	129	58	(45)	3.9
36-45 years	101	42	(42)	4.1	127	60	(47)	4.1
46-55 years	66	38	(58)	7.1	70	31	(44)	5.2
56-65 years	38	19	(50)	8.0	54	19	(35)	4.7
age unknown	35	12	(34)	-	43	13	(30)	-
	<u>379</u>	<u>189</u>	<u>(50)</u>		<u>464</u>	<u>201</u>	<u>(43)</u>	

Note. \*n = total number of individuals in the specific age group who were questioned about troublesome pain in the previous two weeks. \*\*n = number of individuals in the specific age group who did have a troublesome pain in the previous two weeks. 157 women and 152 men of these individuals agreed to be interviewed.

\*\*\*Percentage =  $(n^{**} / n^{*}) \times 100$ .

Sixty-six percent of women and 70% of men, who had a troublesome pain in the previous two weeks and agreed to complete the interview, also reported that they had been often troubled by persistent or on-going pain over the past year.

#### Characteristics of Pain in the Sample

##### Location of Pain

The three most common sites of troublesome pain for women and men were the head, limbs, and back (Table 10). The location of some pains may be under-reported because respondents who had pain in multiple locations (predominantly limbs and back) were asked to identify their most troublesome pain. In some cases, the respondent was unable to select only one location; these pains were then recorded in the category of "multiple pain sites".

Table 10

Location of Pain for Women and Men

Location	Women		Men	
	n	(%)*	n	(%)**
Head	48	(31)	25	(16)
Limbs (muscles, joints)	44	(28)	53	(35)
Back	22	(14)	36	(25)
Abdomen, side	12	(8)	11	(7)
Multiple pain sites	11	(7)	5	(3)
Face, mouth, jaw	3	(2)	3	(2)
Neck	4	(3)	7	(5)
Chest, breast	6	(4)	5	(3)
Pelvis, groin	5	(4)	2	(2)
Genital, rectal	2	(1)	4	(1)
Eyes, ears	0		1	

Note. Percentages were rounded. \*Demoninator refers to the sample of 157 women. \*\* Denominator refers to the sample of 152 men.

Due to small sample sizes for some locations and to simplify this variable for regression analysis, head, mouth, jaw, eyes and ears were combined as a group of head pain (51 women, 29 men). Pelvis, groin, rectal and genital pain were combined as one group (7 women, 6 men). Limbs, back, and multiple pains were combined as musculoskeletal pain (81 women, 101 men). Although, men reported more pain in the limbs and the back, and women experienced more head pain, there was no significant gender difference in the reported location of pain,  $\chi^2(4, N = 309) = 8.4, ns$ . It should be noted that musculoskeletal pain refers here to location of the pain and not a specific pain. Pain in this location may be due to irritation, or damage to nerves or blood vessels as well as muscles, joints, ligaments, or bones. Fifty-nine percent of all reported pain was musculoskeletal in location.

Type of Pain

Recurrent/chronic pain was the most troublesome pain experienced by women and men in the previous two weeks (83% of women, 77% men) (Table 11). Not surprisingly, due to the recurrent/chronic nature of the majority of the reported pains, more than 40% of women and men had experienced their pain for ten days or more (41% of women, 43% of men). There

was no significant difference in the type of pain reported by women and men,

$\chi^2 (4, N = 309) = 5.6, ns.$

Table 11

Type of Pain for Women and Men

Type of pain	Women		Men	
	n	(%)*	n	(%)**
Acute, without injury, illness or disease.	9	(6)	18	(12)
Acute, with injury, illness or disease.	15	(10)	13	(9)
Recurrent/chronic without injury, illness or disease.	82	(52)	64	(42)
Recurrent/chronic with injury, illness or disease.	48	(31)	53	(35)
Due to a health procedure.	3	(2)	4	(3)

Note. Percentages were rounded. \*Denominator refers to the sample of 157 women. \*\* Denominator refers to the sample of 152 men.

Intensity, Emotional Upset, Uncontrollability and Overall Interference of Pain

These variables were rated on a 0 to 10 scale. Women reported significantly more intense pain than did men (6.3 vs. 5.7 respectively),  $t (307) = 2.85, p = .005$  (Table 12).

Women also tended to report more emotional upset and overall interference due to pain than men but these differences were not significant.

Table 12

Means and Standard Deviations for Intensity, Emotional Upset, Uncontrollability, and Overall Interference.

Pain Characteristic	Women	Men
Intensity		
M	6.3*	5.7
SD	1.9	1.9
Emotional upset		
M	4.3	3.8
SD	3.0	2.9
Uncontrollability		
M	3.9	4.0
SD	3.2	3.3
Overall interference		
M	4.7	4.2
SD	2.7	1.2

Note. \*Independent t-test, 2-tail significance.  $t(307) = 2.85$ ,  $p = .005$ , 95% CI for the difference 0.193, 1.052. All

other comparisons were associated with  $p > .05$ .

Predictability and Unusualness of Pain

Predictability was measured by two questions: Did you expect to have the pain?, Did the pain get better in a way you expected? Unusualness of pain was also examined by two questions: Was the pain more severe than you might have expected?, Did the pain last longer than you might have expected? Men tended to report that their pains were more unpredictable and more unusual than did women but the differences in means were small and the standard deviations for women and men were large (Table 13). These gender variations were not significant.

Table 13

Means and Standard Deviations for Predictability and Unusualness of Pain

Variable	Women*	Men
Predictability - pain unexpected	5.9	6.0
M	4.0	4.1
SD		
Predictability - pain not getting better	4.4	5.4
M	3.8	3.6
SD		
Unusualness - pain more severe	4.5	4.8
M	3.2	3.3
SD		
Unusualness - pain lasting longer	5.4	5.5
M	3.4	3.5
SD		

Note. \*Independent t-tests, 2-tail significance, no significant gender differences.

Other Physical Problems Associated with Pain

For many people, pain was associated with other physical problems such as dizziness, vomiting, bleeding, or fractures. Women reported one or more problems more often than did men (69% and 53% respectively) (Table 14) but the difference did not reach significance,  $\chi^2$  (2, N = 309) = 9.01,  $p = .011$ . Twenty-five women and 30 men reported other problems than those listed, such as visual disturbances, loss of balance, stiffness, indigestion, flatulence, sweating, muscle spasms, fatigue/weakness, or pain in an additional location. Dizziness, diarrhoea, nausea, bruising, and swelling were more common among women (Table 15).

Table 14

Number of Problems Associated with Pain

Number of problems	Women*		Men	
	n	(%)**	n	(%)***
No problems	48	(31)	71	(47)
One problem	51	(33)	42	(28)
Two problems	31	(20)	27	(18)
Three or more problems	27	(17)	12	(8)

Note. \*  $\chi^2$  (2, N = 309) = 9.01, p = 0.11 \*\*Percentage = (n + 157) x 100 \*\*\*Percentage = (n + 152) x 100 All percentages were rounded

Table 15

Type of Problems Associated with Pain

Problem	Women		Men	
	n	(%)***	n	(%)****
Dizziness	32	(20)	19	(13)
Diarrhoea	22	(14)	11	(7)
Nausea	44*	(28)	13	(9)
Bruising	15	(10)	9	(6)
Swelling	55**	(35)	35	(23)
Bleeding	14	(9)	10	(7)
Cut	4	(3)	5	(3)
Broken limb	0		3	(2)
Burn	2	(1)	2	(1)
Any other physical problem	25	(16)	30	(20)

Note. \*  $\chi^2$  (1, N = 309) = 20.4, p = 0.00 \*\*  $\chi^2$  (1, N = 309) = 5.4, p = 0.02 \*\*\*Percentage = (n / 157) x 100

\*\*\*\*Percentage = (n / 152) x 100 All percentages were rounded

Appraisal and Its Relationship to Gender,  
Type, and Location of Pain

Gender

The majority of the pains reported in this sample were appraised as moderately threatening and a low challenge. Threat appraisal of pain approximated a normal distribution. The distribution was not skewed (skewness = .13, SE skewness = .14), but there was substantial kurtosis (kurtosis = -1.01, SE kurtosis .28). The mean threat score in this sample was 3.1 (possible range 1 to 6) with a standard deviation of 1.3. There was no significant gender difference in the threat appraisal of pain (threat appraisal - women,  $M = 3.2$ ,  $SD = 1.3$ ; men,  $M = 3.02$ ,  $SD = 1.2$ ),  $t(307) = 1.03$ , ns.

Challenge appraisal was negatively skewed (skewness = 1.12, SE skewness = .14; kurtosis = .77, SE kurtosis .28). Only 43 respondents (14%) scored higher than 3 on the challenge scale. There was no significant gender difference in the challenge appraisal (challenge appraisal - women,  $M = 1.9$ ,  $SD = .93$ ; men,  $M = 2.0$ ,  $SD = .96$ ),  $t(307) = 1.17$ , ns. There was no predominance of these scores in any age group. Such scores occurred in each age group for women and men.

Type and Location of Pain

The pattern of threat and challenge appraisal with type and location of pain was compromised by the small sample sizes for some of the categories of these variables. Means and standard deviations of threat and challenge appraisals according to type and location of pain are given in Tables 16 and 17.



Table 16

Mean and Standard Deviations for Threat and Challenge Appraisals by Type of Pain

Type of pain	n	Threat	Challenge
Acute with no condition	17		
M		2.9	2.2
SD		1.2	1.3
Acute with condition	28		
M		3.3	2.0
SD		1.2	1.0
Recurrent/chronic with no condition	146		
M		2.9	1.6
SD		1.3	0.7
Recurrent/chronic with condition	101		
M		3.4	2.2
SD		1.3	0.9
Due to health procedure	7		
M		2.2	3.1
SD		0.6	1.4

Table 17

Means and Standard Deviations for Threat and Challenge Appraisals by Location of Pain

Location of pain	n	Threat	Challenge
Head	80		
M		2.9	1.6
SD		1.1	0.7
Musculoskeletal	182		
M		3.2	2.1
SD		1.3	0.9
Abdomen, side	23		
M		3.1	2.1
SD		1.3	1.3
Chest, breast	11		
M		3.3	1.7
SD		1.3	0.9
Pelvis, groin, genital, rectal	13		
M		3.8	1.9
SD		1.5	1.1

Type of pain (5 types) and location of pain (5 locations) were coded as categorical variables for regression analysis (8 regression variables). Regressing the threat appraisal on type of pain, location of pain, and gender, with interaction terms for gender and type of pain, and for gender with location of pain, did not produce any significant gender interactions. Location and type of pain accounted for 7% of the variance in threat appraisal,  $F(8, 300) = 2.68$ ,  $p = .007$ , but the  $F$  statistic did not meet the criterion of  $p < .005$ .

Regressing challenge appraisal in the same manner as was used for threat appraisal, produced no significant interaction of gender with type or location of pain on challenge appraisal. Together, type of pain and location of pain accounted for 15% of the variance in challenge appraisal,  $F(8, 300) = 6.55$ ,  $p = .000$ . Of the five types of pain, recurrent pain without an underlying injury, disease or condition decreased challenge appraisal ( $p = .005$ ) whereas pain due to a health procedure increased challenge appraisal ( $p = .008$ ).

#### Correlations of Pain Event Factors with Threat and Challenge Appraisal

As anticipated, threat appraisal of pain was correlated with more pain event factors for women than men (Table 18). For women, overall interference, emotional upset, intensity of pain, predictability, unusual severity and unusual length were most strongly correlated with threat appraisal ( $p = .000$ ), whereas emotional upset, overall interference, intensity of pain, and unusual severity were most important for men ( $p = .000$ ). Overall interference also had a significant impact on the challenge appraisal of pain for men ( $p = .001$ ).

Table 18

Correlations of Age and Pain Event Factors with Threat Appraisal for Women and Men

Variable	Women		Men	
	r	p value	r	p value
Overall interference	.61	p = .000	.49	p = .000
Emotional upset	.57	p = .000	.54	p = .000
Intensity	.38	p = .000	.40	p = .000
Predictability - not getting better in an expected way	.35	p = .000	.07	ns
Unusual - in severity	.35	p = .000	.39	p = .000
Unusual - in length	.25	p = .000	.26	p = .001
Duration	.24	p = .002	.06	ns
Uncontrollability	.24	p = .003	.06	ns
Predictability - pain was unexpected	-.06	ns	-.02	ns
Age	-.003	ns	.15	p = .058

Table 19

Correlations of Age and Pain Event Factors with Challenge Appraisal for Women and Men

Variable	Women		Men	
	r	p value	r	p value
Overall interference	.21	p = .007	.27	p = .001
Emotional upset	.05	ns	.21	p = .011
Intensity	.15	ns	.08	ns
Unusual severity	.18	p = .022	.18	p = .030
Unusual length	.09	ns	.15	ns
Predictability - not getting better in an expected way	.06	ns	-.02	ns
Predictability - pain unexpected	-.14	ns	-.12	ns
Duration	.14	ns	.11	ns
Uncontrollability	.0001	ns	-.09	ns
Age	-.002	ns	.03	ns

### Hypothesis Testing

Prior to hypothesis testing, the pain event factors were examined for possible collinearity. The pain event factors were moderately correlated with each other in the bivariable correlation matrix but no correlation was higher than .51 (Appendix E, Table E4). There was no apparent evidence of multicollinearity. The tolerance level of the independent variables ranged from .59 to .91. The variance inflation factor ranged from 1.08 to 1.68.

As discussed in Chapter 3, hypothesis testing was approached in three ways for hypotheses 1 and 2. The first strategy was based on a conceptual argument about the key pain event factors that were expected to be the most important influence on appraisal, and the most likely to be affected by gender. The second strategy was by exploratory backward stepwise multiple regression to determine how other pain event factors, also measured in this study, contributed to the threat or challenge appraisal of pain, or changed the relationship between the appraisal and the variables used in Strategy 1. The third strategy was application of the models from strategies 1 and 2, to hierarchical multiple regression analyses to examine the specific pattern of contributions for women and men in separate samples.

The American Psychological Association (1994) guidelines were used as a baseline for presentation of regression tables to display all major regression analyses. In these tables, B represents the regression coefficient associated with the independent variables, SE B gives the standard error of the regression coefficient, and  $\beta$  is the standardized beta coefficient, that is, the size of the coefficient if the independent variables were measured on the same scale. Outcomes for changes in  $R^2$  and for partial F tests are given in footnotes to the tables. Lastly, gender was coded "0" for women and "1" for men in all regression analyses. Therefore, all interaction terms become "0" for women, and "0" for men only if the variable itself was also scored "0".

Hypothesis 1 - Gender will interact with the pain event factors on the appraisal of pain as a threat or challenge.

### Threat Appraisal

#### Strategy 1 (conceptually driven regressions).

As discussed in Chapter 2, overall interference, emotional upset, intensity, and the presence of other physical problems were expected to have a central role on the threat appraisal of pain, and to interact with gender in their effect. There was also suggestive evidence that age might have an important role in appraisal. Although there has been no prior research suggesting that the effect of age might be mediated by gender, changes in some of women's pain experiences with age (cessation of menstrual pain and increased muscle and joint pain) raised the possibility of an age by gender interaction effect.

An hierarchical, 2-step multiple regression analysis was used to test the relationship of these variables with threat appraisal (Table 20). Overall interference, emotional upset, intensity of pain, problems, age and gender were entered as Step 1. The presence of physical problems was treated as a categorical variable with three levels: no problems, one problem, and two or more problems. Interaction terms were created for gender with all other main effect variables, and then added to the main effect model as Step 2. The partial F-test for the interaction model was non-significant although the presence of one problem had a significant interaction effect.

Table 20

Summary of Hierarchical Regression Analysis of Variables Predicting Threat Appraisal

Variables	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Overall interference	.16	.03	.33	p = .000
Emotional upset	.17	.02	.39	p = .000
Intensity	.07	.03	.11	p = .039
One problem	-.08	.14	-.03	ns
Two or more problems	-.03	.14	-.01	ns
Age	.13	.05	.11	p = .009
Gender*	.04	.11	.02	ns
<b>Step 2 - Model with Interactions</b>				
Overall interference	.19	.03	.40	p = .000
Emotional upset	.19	.03	.43	p = .000
Intensity	.06	.05	.08	ns
One problem	.19	.20	.07	ns
Two or more problems	.12	.20	.04	ns
Age	.19	.07	.17	p = .007
Gender*	.85	.47	.33	ns
Gender x interference**	-.08	.05	-.17	ns
Gender x upset**	-.03	.04	-.08	ns
Gender x intensity**	.03	.07	.07	ns
Gender x one problem**	-.56	.28	-.15	p = .044
Gender x two or more problems**	-.23	.28	-.06	ns
Gender x age**	-.10	.10	-.12	ns

Note \* Women = 0, men = 1, \*\* Interaction = 0 for all women, and 0 for men if variable scored 0

$R^2 = .45$  for Step 1,  $F(7, 301) = 34.7$ ,  $p = .000$ ,  $\Delta R^2 = .02$  (ns) Partial  $F(6, 295) = 1.97$  (ns)

The change in  $R^2$  between Step 1 and Step 2 was non-significant, indicating that there was no statistical significance for the interactions as a block. Statistical significance of individual interactions may have been obscured by the loss in power to detect a statistical difference due to the increased degrees of freedom in the full model of main effects with all possible interactions. Prior inspection of the plots of the main effect variables on threat appraisal with examination of their correlation matrices suggested that interactions of gender with pain intensity or emotional upset were unlikely. Moreover, interaction with one problem was significant in the regression analysis (Table 20, Step 2), and the standardized betas for this variable and for interaction of gender with overall interference were very similar (-.15 and -.17

respectively). For these reasons, the regression analysis was repeated with interaction terms created only for gender with problems and with overall interference (Table 21).

Table 21

Summary of Hierarchical Regression Analysis of Variables Predicting Threat with Interactions for Interference and Problems

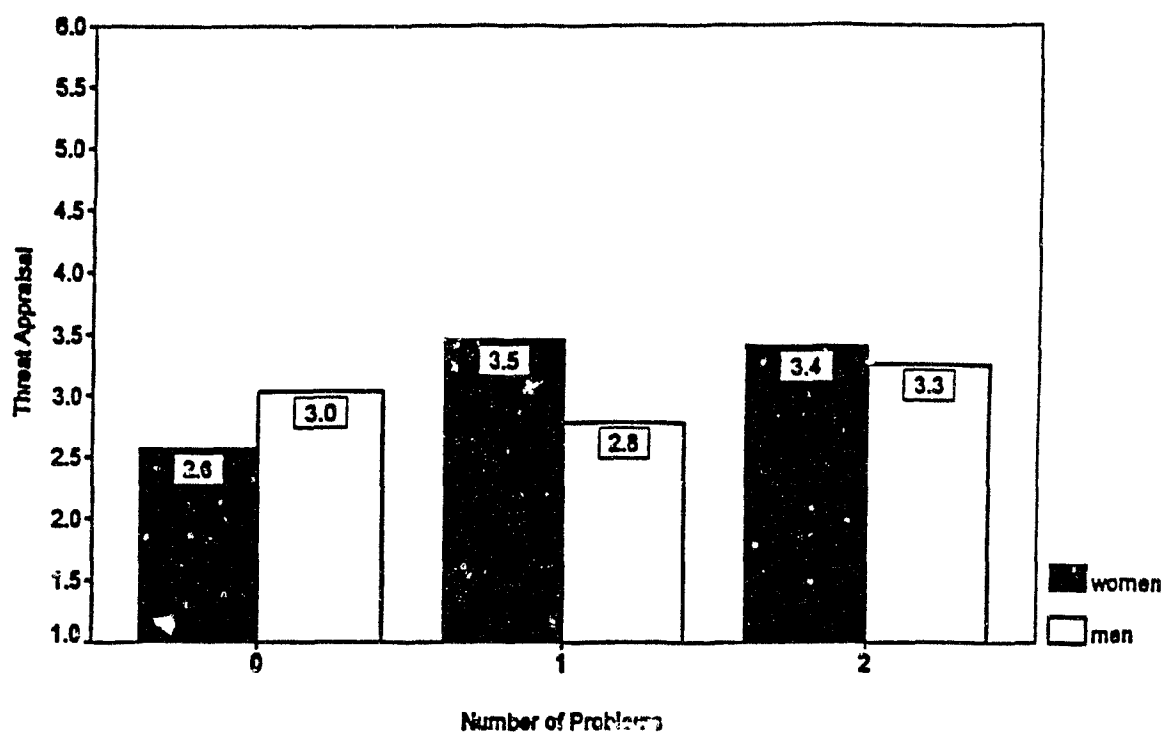
Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effects Model</b>				
Overall interference	.16	.03	.33	p = .000
Emotional upset	.17	.02	.39	p = .000
Intensity	.07	.03	.11	p = .039
One problem	-.08	.14	-.03	ns
Two or more problems	-.03	.14	-.01	ns
Age	.13	.05	.11	p = .009
Gender*	.04	.11	.02	ns
<b>Step 2 - Model with Interactions</b>				
Overall interference	.19	.03	.41	p = .000
Emotional upset	.17	.02	.39	p = .000
Intensity	.07	.03	.11	p = .039
One problem	.21	.20	.08	ns
Two or more problems	.13	.20	.05	ns
Age	.13	.05	.12	p = .006
Gender	.65	.23	.25	p = .005
Gender x interference**	-.08	.04	-.18	p = .034
Gender x one problem**	-.58	.28	-.16	ns
Gender x two or more problems**	-.24	.28	-.06	p = .059

Note. \*Women = 0, men =1, \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .45$  for Step 1,  $F(7, 301) = 34.71$ ,  $p = .000$ ;  $\Delta R^2 = .02$  ( $p < .025$ ), partial  $F(3, 298) = 3.41$  ( $p < .025$ ).

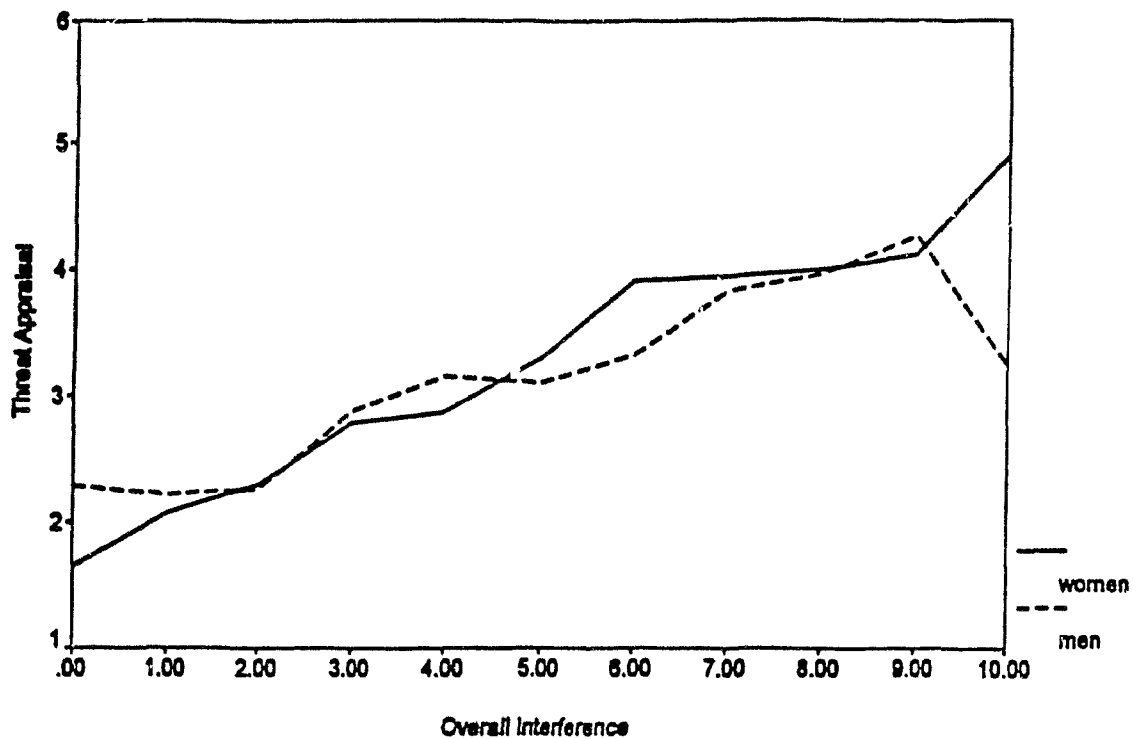
This interaction model accounted for a significant but small percent (2%) of the variance in threat appraisal. Mean threat appraisal increased for women when they experienced one or more problems with pain (Figure 3). Women also increased their threat appraisal more quickly than did men in response to increasing overall interference of pain (Figure 4). For men, threat appraisal was higher when there were no problems, decreased with one problem and did not increase until men experienced two or more additional problems with their pain complaint

(Figure 3). However, this increase in threat appraisal with two or more problems was not significant for women or men.



**Figure 3.** Relationship between threat appraisal and the presence of other physical problems for women and men.





**Figure 4.** Relationship between threat appraisal and overall interference for women and men.

In the next four steps, multiple regression was used to determine the best predictive model of threat appraisal. As two or more problems had no important effect on threat appraisal, problems was now treated as a categorical variable with two levels: no problems, and one or more problems. In this regression (Table 22, Step 1), problems no longer had an interaction effect. Since, there was also no main effect for this variable, it was removed completely in the

second regression step. The one remaining interaction term in Step 2 was interaction of gender with overall interference. This interaction term was significant ( $p = .019$ ), but accounted for a small 1% of the variance. This model was used for comparisons of change in  $R^2$  in Steps 3 and 4. In Step 3, the remaining pain event factors, duration, unpredictability, unusualness and uncontrollability of pain, were entered as a block to determine whether they made a significant contribution to the model of Step 2 (overall interference, emotional upset, intensity of pain, age, gender, interaction of gender with overall interference). In Step 4, type of pain was entered to assess its possible contribution. The change in  $R^2$  for steps 3 and 4 were non-significant.

Overall interference, emotional upset, intensity of pain, age and interaction of gender with overall interference explained 46% of the variance in threat appraisal. Together, two variables, overall interference and emotional upset, accounted for 42% of the variance. Although the interaction of gender with overall interference was significant, its effect size was very small.

Table 22

Summary of Hierarchical Multiple Regression Analysis Determining the Best Predictive Model of Threat Appraisal

Variable	B	SE B	$\beta$	p value
<b>Step 1</b>				
Overall interference	.19	.03	.41	p = .000
Emotional upset	.17	.02	.39	p = .000
Intensity	.07	.03	.10	p = .042
One or more problems	.17	.18	.07	ns
Age	.13	.05	.12	p = .006
Gender*	.63	.23	.25	p = .007
Gender x problems**	-.42	.24	-.15	ns
Gender x overall interference**	-.07	.04	-.16	ns
<b>Step 2</b>				
Overall interference	.20	.03	.42	p = .000
Emotional upset	.17	.02	.39	p = .000
Intensity	.07	.03	.11	p = .027
Age	.13	.05	.12	p = .005
Gender*	.47	.21	.18	p = .026
Gender x overall interference**	-.09	.04	-.21	p = .019
<b>Step 3</b>				
Overall interference	.19	.03	.40	p = .000
Emotional upset	.16	.02	.36	p = .000
Intensity	.05	.03	.08	ns
Age	.13	.05	.12	p = .012
Gender*	.39	.22	.15	ns
Gender x overall interference**	-.09	.04	-.19	p = .036
Predictability - pain unexpected	-.02	-.06	-.06	ns
Predictability - not getting better	.03	.08	.08	ns
Uncontrollability	.01	.02	.03	ns
Unusual severity	.04	.02	.10	p = .058
Unusual length	-.01	.02	-.03	ns
Duration	-.001	.02	-.02	ns
<b>Step 4</b>				
Overall interference	.21	.03	.43	p = .000
Emotional upset	.16	.02	.37	p = .000
Intensity	.07	.03	.11	p = .036
Age	.13	.05	.12	p = .007
Gender*	.45	.21	.18	p = .034
Gender x overall interference**	-.09	.04	-.20	p = .025
Acute pain with condition	-.08	.26	-.02	ns
Recurrent/chronic pain no condition	-.05	.20	-.02	ns
Recurrent/chronic pain with condition	.05	.21	.02	ns
Health procedure	-.86	.41	-.10	p = .038

Note. \*Women = 0, men = 1. \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .46$  for Step 1 (adj.  $R^2 = .447$ ).  $R^2 = .46$  for Step 2 (adj.  $R^2 = .445$ ),  $F(6, 301) = 42.46$  ( $p = .000$ );

$\Delta R^2 = .017$  for Step 3 (adj.  $R^2 = .45$ ) (ns), partial  $F(6, 295) = 1.32$  (ns).

$R^2 = .46$  for Step 2;  $\Delta R^2 = .021$  for Step 4 (adj.  $R^2 = .448$ ) (ns), partial  $F(8, 294) = 1.41$  (ns).

Age had a small but significant main effect with threat appraisal in the preceding data analysis. However, the relationship between age, gender and threat appraisal may be more complex than is suggested. Threat appraisal tended to increase with age for men, whereas for women, threat appraisal was lowest at ages 18-25 years, and highest for women aged 26 to 35 years (Table 23). After the age of 36 years, threat appraisal for women decreased. A regression analysis, testing for interactions of age with gender and the possible curvilinear relationship of threat, age and gender, was non-significant,  $F(5, 303) = 1.19$ , ns. It should be noted that age was measured in this study primarily as a demographic variable with respondents placed in age groups. No attempt was made to obtain equal numbers of women and men in each age group. It is possible that the relationship between age and gender is linear for women and men, but a stratified sampling for age and gender may confirm that the relationship between threat appraisal and age for women may be curvilinear for women and linear for men. The relationship between age, gender and other pain characteristics is discussed in more detail under supplementary analyses.

Table 23

Means and Standard Deviations of Threat and Challenge Appraisal by Age and Gender

Age Group	Women		Men	
	Threat	Challenge	Threat	Challenge
<b>18-25 years</b>				
M	2.9	1.8	2.8	2.2
SD	1.2	1.0	1.2	1.1
<b>26-35 years</b>				
M	3.4	2.1	2.8	1.9
SD	1.3	1.0	1.3	1.0
<b>36-45 years</b>				
M	3.1	1.6	3.1	2.1
SD	1.4	0.8	1.1	1.0
<b>46-55 years</b>				
M	3.2	1.8	3.2	1.9
SD	1.6	0.8	1.1	0.8
<b>56-65 years</b>				
M	3.0	2.0	3.5	2.3
SD	1.6	1.0	1.1	1.2

Strategy 2 (backward stepwise multiple regression)

Overall interference, emotional upset, intensity, uncontrollability, duration, problems (no problems, one or more problems), unusual severity, unusual length, pain not getting better, pain unexpected, and age were entered into a backward stepwise multiple regression. In this procedure, overall interference, emotional upset, intensity, pain not getting better, and age were selected as the final variables (Table 24, Step 1 Model). These variables were then entered into a hierarchical stepwise regression with interaction terms for gender and overall interference, and gender with pain not getting better (Step 2). The partial F test for the interaction block was significant but only the interaction of gender with overall interference approached significance.

Table 24

Summary of Strategy 2 Multiple Regression Analysis of Variables Predicting Threat Appraisal

Variables	B	SE	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Overall interference	.15	.03	.38	p = .000
Emotional upset	.17	.02	.32	p = .000
Predictability - pain not getting better	.03	.02	.09	p = .040
Age	.11	.05	.11	p = .013
Intensity	.07	.03	.10	p = .051
Gender*	.03	.11	.01	ns
<b>Step 2 - Interaction Model</b>				
Overall interference	.19	.03	.40	p = .000
Emotional upset	.17	.02	.38	p = .000
Predictability - pain not getting better	.05	.02	.14	p = .021
Age	.13	.05	.12	p = .007
Intensity	.07	.03	.10	p = .046
Gender*	.60	.25	.22	p = .015
Gender x overall interference**	-.08	.04	-.17	p = .056
Gender x predictability - pain not getting better**	-.04	.03	-.13	p = .145

Note. \*Women = 0, men =1, \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .45$  for Step 1,  $F(6, 301) = 41.99$  ( $p = .000$ );  $\Delta R^2 = .012$  for Step 2 ( $p < .05$ ), partial  $F(2, 299) = 3.39$  ( $p < .05$ ).

### Strategy 3 (multiple regression analyses in separate samples of women and men)

Strategies 1 and 2 demonstrated that overall interference, emotional upset, intensity of pain, pain not getting better, and age of the respondent were the important influences on threat appraisal with overall interference having a stronger effect for women than for men. In Strategy 3, I entered these variables in single steps in a hierarchical regression to examine the specific pattern of contributions for women and men in separate samples.

Entering the final set of variables in hierarchical steps (Tables 25) revealed that overall interference accounted for 36% of the variance in threat appraisal for women, and emotional upset contributed another 12% when overall interference was controlled. Intensity of pain, pain not getting better, and age of the respondent, added a further 6% to the variance but intensity of pain did not have a significant effect. Altogether, this set of variables accounted for 54% of the variance in threat appraisal for women.

Table 25

Summary of Hierarchical Multiple Regression of Variables Predicting Threat Appraisal for Women

Variable	B	SE B	$\beta$	p value
<b>Step 1</b>				
Overall interference	.30	.03	.61	p = .000
<b>Step 2</b>				
Overall interference	.22	.03	.44	p = .000
Emotional upset	.17	.03	.40	p = .000
<b>Step 3</b>				
Overall interference	.21	.03	.41	p = .000
Emotional upset	.16	.03	.37	p = .000
Intensity	.06	.05	.08	ns
<b>Step 4</b>				
Overall interference	.20	.03	.40	p = .000
Emotional upset	.16	.03	.35	p = .000
Intensity	.04	.05	.05	ns
Predictability - pain not getting better	.05	.02	.15	p = .016
<b>Step 5</b>				
Overall interference	.19	.03	.38	p = .000
Emotional upset	.18	.03	.41	p = .000
Intensity	.04	.05	.06	ns
Predictability - pain not getting better	.05	.02	.13	p = .028
Age	.18	.07	.16	p = .007

Note.  $R^2 = .366$  for Step 1,  $F(1, 155) = 89.69$ , ( $p = .000$ );

$\Delta R^2 = .118$  for Step 2 ( $p < .001$ ), partial  $F(1, 154) = 35.22$  ( $p < .001$ );

$\Delta R^2 = .005$  for Step 3 (ns), partial  $F(1, 153) = 1.50$  (ns);

$\Delta R^2 = .025$  for Step 4 ( $p < .01$ ), partial  $F(1, 151) = 7.78$  ( $p < .01$ );

$\Delta R^2 = .023$  for Step 5 ( $p < .01$ ), partial  $F(1, 150) = 7.54$  ( $p < .01$ ).

Overall interference accounted for 24% of the variance in threat appraisal for men with a further 13% for emotional upset when overall interference was controlled (Table 26). Intensity of pain, pain not getting better, and age did not have a significant effect on threat appraisal for men. This model accounted for 37% of the variance in threat appraisal for men.

Table 26

Summary of Hierarchical Multiple Regression of Variables Predicting Threat Appraisal for Men

Variable	B	SE B	$\beta$	p value
<b>Step 1</b>				
Overall interference	.22	.03	.49	p = .000
<b>Step 2</b>				
Overall interference	.14	.03	.31	p = .000
Emotional upset	.17	.03	.40	p = .000
<b>Step 3</b>				
Overall interference	.11	.04	.25	p = .003
Emotional upset	.16	.03	.38	p = .000
Intensity	.09	.05	.14	ns
<b>Step 4</b>				
Overall interference	.11	.04	.24	p = .003
Emotional upset	.16	.03	.38	p = .000
Intensity	.09	.05	.14	ns
Predictability - pain not getting better	.01	.02	.03	ns
<b>Step 5</b>				
Overall interference	.11	.04	.24	p = .004
Emotional upset	.16	.03	.37	p = .000
Intensity	.09	.05	.14	ns
Predictability - pain not getting better	.007	.02	.02	ns
Age	.08	.07	.08	ns

Note.  $R^2 = .237$  for Step 1,  $F(1, 150) = 46.83$ , ( $p = .000$ );

$\Delta R^2 = .129$  for Step 2 ( $p < .001$ ), partial  $F(1, 149) = 22.08$  ( $p < .001$ );

$\Delta R^2 = .013$  for Step 3 (ns), partial  $F(1, 148) = 1.95$  (ns);

$\Delta R^2 = .0008$  for Step 4 (ns), partial  $F(1, 147) = 0.117$  (ns);

$\Delta R^2 = .0057$  for Step 5 (ns), partial  $F(1, 146) = 0.894$  (ns).

The predictability variable "pain not getting better" may be a more important variable in threat appraisal than intensity of pain. There were no significant interaction effects of gender with emotional upset, intensity, pain not getting better or age in earlier analyses suggesting that while the last two variables contributed to threat appraisal only for women, the only important gender difference is the proportion of variance in threat appraisal accounted for by the overall interference of pain.



## Challenge Appraisal

### Strategy 1 (conceptually driven regressions)

Hypothesis testing for challenge appraisal was hindered by the few respondents who appraised their pain in this way. Only type and location of pain were proposed a priori to be more influential than other variables in challenge appraisal. Type of pain and location of pain accounted for 15% of the variance in challenge appraisal (see earlier discussion of appraisal, and type and location of pain). The best predictive model for threat appraisal (overall interference, emotional upset, intensity, age and gender) when applied to challenge appraisal accounted for 6% of the variance in challenge appraisal,  $F(6, 302) = 3.4, p = .003$ , but only overall interference had a significant impact on challenge appraisal. There was no main effect or interaction effect (with overall interference) for gender.

### Strategy 2 (backward stepwise multiple regression)

The backwards stepwise regression analysis concluded with overall interference, unexpected pain, and unusual severity of pain accounting for 9% of the variance in challenge appraisal. This model was used as step 1 in a hierarchical multiple regression analysis (Table 27). Type and location of pain were then added to this model in Step 2. The change in  $R^2$  for step 2 was significant ( $p < .01$ ). Type and location of pain accounted for an additional 13% of the variance in challenge appraisal. Challenge appraisal was significantly higher for musculoskeletal pain and pain due to health care procedures. In contrast, challenge appraisal was significantly lower for recurrent/chronic pains that were not associated with an underlying injury, illness or other condition.

Table 27

Summary of Hierarchical Regression Analysis of Variables Predicting Challenge Appraisal

Variables	B	SE B	$\beta$	p value
<b>Step 1</b>				
Overall interference	.06	.02	.19	p = .002
Predictability - pain was unexpected	-.04	.01	-.17	p = .002
Unusual severity	.04	.02	.15	p = .015
<b>Step 2</b>				
Overall interference	.07	.02	.20	p = .001
Predictability - pain was unexpected	-.03	.01	-.13	p = .021
Unusual severity	.03	.02	.09	ns
Musculoskeletal pain	.28	.13	.14	p = .031
Pain in abdomen or side	.36	.21	.10	ns
Chest or breast pain	-.32	.29	-.06	ns
Genital, pelvic, groin or rectal pain	-.16	.27	-.03	ns
Acute pain with condition	-.18	.24	-.05	ns
Recurrent/chronic no condition	-.58	.19	-.31	p = .002
Recurrent/chronic with condition	-.19	.19	-.10	ns
Due to health procedures	.81	.38	.13	p = .032

Note.  $R^2 = .09$  for Step 1,  $F(3, 304) = 10.35$  ( $p = .000$ );  $\Delta R^2 = .13$  for Step 2 ( $p < .01$ ),

partial  $F(8, 297) = 6.59$  ( $p < .01$ ).

Strategy 3 (multiple regression analysis in separate samples of women and men)

Since there was no evidence of a main effect or an interaction effect for gender for challenge appraisal in strategy 1, strategy 3 was not used to examine the pattern of contributions of variables obtained in strategy 2 in separate samples of women and men. Overall interference, expected pain, musculoskeletal pain, and pain due to health procedures increased challenge appraisals for women and men, whereas recurrent/chronic pain that was not associated with a known condition significantly decreased challenge appraisal.

Hypothesis 2 - Gender will have an independent effect on threat or challenge appraisal when pain event factors are controlled.

Gender did not have a main effect on either threat or challenge appraisal of pain in any of the multiple regression analyses that were previously discussed. The effect of gender on threat or challenge appraisal occurred only as an interaction effect, but even in this regard, the effect of gender on threat or challenge appraisal of pain was small.

All of the p values for regression analyses of hypotheses 1 and 2 were associated with  $p < .005$ . A Bonferroni correction for multiple regression analyses concerning threat appraisal would have been  $p < .005$ , and for challenge appraisal  $p < .01$ .

Hypothesis 3 - Gender will interact with threat and challenge appraisals on coping strategies.

For the previous two hypotheses, threat and challenge appraisal were the dependent variables. For this hypothesis, threat and challenge appraisal became independent variables, and various coping strategies were used as the dependent variable.

This hypothesis was examined in three ways, first, by using the factor scores of the Pain Coping Questionnaire (Reid et al., 1994) (approach, problem-focused avoidance, emotion-focused avoidance), and second, by the ten individual scales of the questionnaire (information-seeking, seeking social support, problem-solving, positive self-statements, behavioral distraction, cognitive distraction, externalizing, internalizing/catastrophizing, palliative behaviours, indirect help-seeking). The third approach was to determine whether interaction of gender with pain appraisal had an impact on health care utilization.

#### PCQ Factor Scores

The means and standard deviations of factor scores for women and men are given in Table 28. Women used significantly more approach coping strategies than did men, but women and men were similar in their use of problem-focused avoidance and emotion-focused avoidance.

Table 28

Comparison of Means and Standard Deviations of PCQ Factor Scores for Women and Men

Factor	Women	Men
Approach		
M	3.01*	2.7`
SD	.61	.62
Problem-focused avoidance		
M	3.19	3.21
SD	.72	.79
Emotion-focused avoidance		
M	2.05	1.96
SD	.62	.66

Note. Independent t-test, 2-tail significance.  $t(307) = 3.7, p = .000$ , 95% CI for difference .121 to .395. No other significant comparisons.

Hierarchical multiple regression analysis to predict approach coping did not reveal an interaction effect of gender with threat or challenge. However, there was a significant main effect for gender in addition to a significant effect of threat and challenge on the use of approach strategies (Table 29). Women were more likely than men to use approach strategies regardless of their appraisal of pain. Threat appraisal was more important than challenge appraisal but challenge appraisal also contributed.

Table 29

Summary of Hierarchical Multiple Regression Analysis of Threat, Challenge and Gender on Approach

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Challenge score	.14	.03	.22	p = .000
Threat score	.17	.02	.34	p = .000
Gender*	-.25	.06	-.20	p = .000
<b>Step 2 - Interaction Model</b>				
Challenge score	.11	.05	.16	p = .027
Threat score	.21	.03	.42	p = .000
Gender*	-.12	.19	-.09	ns
Gender x challenge**	.07	.07	.11	ns
Gender x threat**	.21	.05	-.24	ns

Note. \*Women = 0, men = 1, \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .24$  for Step 1,  $F(3, 305) = 31.45, p = .000$ ;  $\Delta R^2 = .008$  for Step 2 (ns), partial  $F(2, 303) = 1.67$  (ns).

There was no interaction effect of gender with threat or challenge appraisal and no main effect for gender on problem-focused avoidance (Table 30). Both threat appraisal and challenge appraisal influenced problem-focused avoidance but their combined effect with gender was only 8%. Threat appraisal decreased problem-focused avoidance whereas challenge appraisal increased use of these strategies.

Table 30

Summary of Simultaneous Multiple Regression Analysis of Threat, Challenge and Gender on Problem-Focused Avoidance

Variables	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Challenge score	.15	.04	.23	p=.004
Threat Score	-.08	.03	-.17	p=.000
Gender*	-.11	.07	-.08	ns
<b>Step 2 - Interaction Model</b>				
Challenge score	.11	.05	.17	ns
Threat score	-.05	.04	-.11	p=.001
Gender*	-.08	.21	-.06	ns
Gender x challenge**	.08	.08	.15	ns
Gender x threat**	-.06	.06	-.16	ns

Note. \*Women = 0, men =1, \*\*Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .07$  for Step 1,  $F(3, 305) = 8.6$ ,  $p = .000$ ,  $\Delta R^2 = .003$  (ns), partial  $F(2, 302) = 0.84$  (ns).

There was no interaction effect for gender with threat or challenge appraisal on emotion-focused avoidance, nor was there a main effect. The only important variable in this analysis was threat appraisal (Table 31). The model accounted for 39% of the variance in emotion-focused avoidance.

Table 31

Summary of Hierarchical Multiple Regression Analysis of Threat, Challenge and Gender on Emotion-FocusedAvoidance

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Challenge score	.03	.03	.05	ns
Threat score	.30	.02	.60	p = .000
Gender*	-.05	.06	-.04	ns
<b>Step 2 - Interaction Model</b>				
Challenge score	.01	.04	.02	ns
Threat score	.31	.03	.63	p = .000
Gender*	-.06	.18	-.05	ns
Gender x threat**	-.02	.05	-.06	ns
Gender x challenge**	.01	.06	.08	ns

Note. \*Women = 0, men = 1, \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

R<sup>2</sup> = .39 for Step 1, F (3, 305) = 64.21, p = .000;  $\Delta R^2$  = .001 (ns), partial F (2,302) = 0.25 (ns).

PCQ Scale Scores

Means of scale scores were higher for women than men on all but one of the scale scores (Table 32). The difference was significant for problem-solving, seeking social support, positive self-statements, and using palliative behaviours. Externalizing and indirect help-seeking were the least commonly utilized strategies by women and men. Problem-solving, behavioural and cognitive distraction, using positive self-statements, and palliative behaviours were the most frequently reported coping strategies.

Table 32

Comparison of Means and Standard Deviations of PCQ Scale Scores for Women and Men

Scale scores	Women	Men	t (307)	p value	95% CI
Information-seeking					
M	2.54	2.38	-	-	-
SD	.94	.93			
Problem-solving					
M	3.44	3.20	2.88	p = .004	.074 to .392
SD	.69	.73			
Seeking social support					
M	2.81	2.44	3.63	p = .000	.171 to .576
SD	.89	.92			
Positive self-statements					
M	3.27	3.00	2.94	p = .004	.089 to .451
SD	.78	.83			
Behavioural distraction					
M	3.29	3.21	-	-	-
SD	.85	.85			
Cognitive distraction					
M	3.09	3.22	-	-	-
SD	.74	.93			
Externalizing					
M	1.73	1.60	-	-	-
SD	.67	.71			
Internalizing/ catastrophizing					
M	2.37	2.32	-	-	-
SD	.81	.85			
Palliative behaviours					
M	3.26	3.04	3.06	p = .002	.081 to .376
SD	.64	.68			
Indirect help-seeking					
M	1.54	1.26	-	-	-
SD	.66	.43			

Note. Independent t-tests, 2-tail significance. All other comparisons were non-significant.

The multiple regression tables testing the relationships between threat, challenge, gender and coping for PCQ scale scores are given in Appendix F. All of these analyses were associated with p = .000.

There were no interaction effects of threat or challenge with gender for information-seeking, problem-solving, seeking social support, and positive-self statements, the four scales inherent in the approach strategy. Together, threat and challenge appraisal with gender accounted for 9% to 20% of the variance in these scales. Gender had a main effect on problem-solving ( $p = .005$ ), seeking social support ( $p = .000$ ) and the use of positive self-statements ( $p = .001$ ), but not on information-seeking. Women reported significantly more use of problem-solving, social support, and positive self-statements than did men independent of their pain appraisal. Threat appraisal was more influential on these coping strategies than challenge, with one exception. Use of positive self-statements was significantly related to challenge appraisal ( $p = .000$ ) but not to threat appraisal.

Threat, challenge and gender, accounted for 6% to 7% of the variance in behavioural distraction and cognitive distraction (problem-focused avoidance). There were no interaction effects for gender with threat or challenge appraisal, and there was no main effect for gender. Threat appraisal had a significant but negative impact on cognitive and behavioral distraction ( $p = .000$ ) indicating that as threat appraisal increased, respondents used distraction methods less frequently. Challenge appraisal increased cognitive and behavioral distraction ( $p = .01$  and  $p = .006$  respectively).

Emotion-focused avoidance consisted of the externalizing and internalizing/catastrophizing scales. Gender, threat and challenge appraisal accounted for 10% of the variance in externalizing but the only significant variable was threat appraisal ( $p = .000$ ). Similarly, gender, threat and challenge appraisal accounted for 49% of the variance in internalizing/catastrophizing but the only significant variable was again threat appraisal ( $p = .000$ ). There was no interaction or main effect for gender with externalizing or internalizing/catastrophizing.

Palliative behaviours and Indirect help-seeking are separate scales and were not considered in PCQ factor scores. Together, gender, threat and challenge appraisal accounted



for 21% of the variance in palliative behaviours. Threat appraisal was the most influential variable ( $p = .000$ ) but gender also had a significant independent effect ( $p = .004$ ). Women used palliative strategies more frequently to manage the pain. There was a significant interaction effect of gender with threat appraisal ( $p = .004$ ) on indirect help-seeking. As threat appraisal increased for women, their reported use of indirect help-seeking increased. For men, indirect help-seeking also increased in response to increased threat scores but not as steeply.

#### Health Care Utilization

Women and men tended to differ in a number of ways concerning their use of health services for pain in the previous two weeks (Table 33). More women reported thinking about seeing a health professional for pain than did men. They tended to report more often that someone had suggested a health visit, and they made more appointments for pain. However, these differences were not statistically significant. Health care utilization was reported by 59 respondents (19% of sample) (37 women, 22 men). Twenty-four percent of women and 14% of men used health care services, but this difference was also not significant,  $\chi^2(1, N = 309) = 4.2, p = .04$ . Two women and three men made an emergency visit for the pain. Sixty-nine percent of women and 70% of men reported that they had sought health care services for this pain at some time in the past.

Table 33

#### Use of Health Care Services by Women and Men for Pain in the Previous Two Weeks

Item	Women		Men	
	n	(%)	n	(%)
Thought about seeing a health professional for pain.	83*	(53)	72	(47)
Someone suggested that the respondent should make a health visit.	52	(33)	45	(30)
Made an appointment.	44**	(28)	30	(18)
Saw a health professional for the pain.	37	(24)	22	(15)
Made an emergency visit for the pain.	2**	(1)	3	(2)

Note. \*  $\chi^2(4, N = 309) = 4.5, p = .03$ , \*\*  $\chi^2(4, N = 309) = 4.2, p = .04$ , \*\*\* No comparisons were made for this group due to the few respondents who visited a hospital emergency for pain. These respondents also saw a health professional for pain outside of the emergency department. There were no other significant comparisons.

As discussed in chapter 4, increasing threat appraisal was associated with thinking about making a visit to a health professional, reporting that someone suggested making a visit, making an appointment, and seeing a health professional. This relationship may be stronger for women than for men (Table 34).

Table 34

Means and Standard Deviations of Threat Appraisal by Variables Associated with Use of Health Care Services

Item	Women		Men	
	no*	yes	no	yes
Thought about making a health care visit.				
M	2.7	3.6	2.8	3.3
SD	1.2	1.2	1.2	1.2
Someone suggested making a health care visit.				
M	2.9	3.8	2.9	3.3
SD	1.3	1.2	1.3	1.1
Made an appointment for a health care visit.				
M	2.9	3.9	2.9	3.6
SD	1.3	1.1	1.2	1.1
Saw a health professional for pain.				
M	2.9	4.0	3.0	3.1
SD	1.3	1.2	1.3	1.0
Made a visit to a hospital emergency for pain.				
M	3.2	4.6	3.0	3.3
SD	1.3	1.9	1.2	1.2

Note. \* No or Yes classified respondents according to whether the respondents answered "no" or "yes" to the item.

Regression analysis was used to test the relationship between health care utilization, threat appraisal, challenge appraisal, and gender. The dependent variable was health care utilization scored as a categorical variable with "0" indicating "did not make a health care visit", and "1" indicating "did make a health care visit". Logistic regression is used for regression analyses with a categorical dependent variable. In this analysis, threat appraisal interacted significantly with gender on health care utilization (Table 35). As threat appraisal increased, women were more likely to use health services, whereas, threat appraisal had very little impact

on health care utilization for men. However, while this model resulted in 98% correct classification of those respondents who did not use a health professional, the model correctly classified only 10% of those respondents who did make a health visit for pain. In other words, this model was not very helpful in predicting which respondents were most likely to report health care utilization for their pain in the previous two weeks. Clearly, other factors than threat or challenge appraisal may be more important in determining health care utilization for pain by women or men. This issue is further examined in the supplementary analysis.

Table 35

Summary of Logistic Regression of Relationship between Gender, Threat Appraisal and Health Care Utilization

Variable	B	SE B	WALD	p value
Threat score	.7	.2	17.0	p = .000
Challenge score	-.4	.3	2.8	ns
Gender*	.8	1.0	.7	ns
Gender x threat**	-.7	.3	6.3	p = .012
Gender x challenge**	.5	.4	1.8	ns

Note. \*Women = 0 , men = 1. \*\*Interaction = 0 for all women, and 0 for men if variable scored 0.

Model  $\chi^2$  (5, N = 309) = 25.05, p = .000, specificity 98%, sensitivity 10%.

### Cross-Validation of Outcomes

To determine whether the relationships between gender, the pain event factors, and threat appraisal were stable, two random samples, of approximately 50% of the original sample, were generated. Gender distribution in each sample was approximately equal. The correlations of pain event factors with threat appraisal for each sample are given in Table 36. Since challenge appraisal was low in the whole sample, it was not considered in the analyses of these samples.

Table 36

Correlations of Age and Pain Event Factors with Threat Appraisal for Women and Men in Samples 1 and 2

Variables	Women				Men			
	S-1		S-2		S-1		S-2	
	r	p value	r	p value	r	p value	r	p value
Overall interference	.64	p=.000	.54	p=.000	.47	p=.000	.44	p=.000
Emotional upset	.60	p=.000	.51	p=.000	.55	p=.000	.60	p=.000
Intensity	.45	p=.000	.30	p=.007	.38	p=.001	.44	p=.000
Predictability - pain not getting better	.26	p=.018	.40	p=.000	.05	ns	.08	ns
Unusual - in severity	.46	p=.000	.21	ns	.36	p=.001	.46	p=.000
Unusual - in length	.38	p=.000	.12	ns	.14	ns	.23	p=.033
Duration	.23	p=.033	.24	p=.031	.13	ns	.09	ns
Uncontrollability	.27	p=.012	.36	p=.001	.06	ns	.11	ns
Predictability - pain was unexpected	-.05	ns	-.02	ns	-.05	ns	-.002	ns
Age	-.14	ns	.15	ns	.18	ns	.15	ns

Note . Sample 1 women, n = 84, n = 80, Sample 2, women, n = 80, men, n = 86.

As in the whole sample, more pain event factors were significantly correlated with threat appraisal for women in both samples 1 and 2. Similarly, the correlation of overall interference with threat appraisal was higher for women than men in the whole sample (Table 17) and in both samples (Table 36). In addition, for women, the correlation of overall interference with threat appraisal surpassed correlations between emotional upset and threat appraisals in all three samples. In contrast, men had higher correlations for emotional upset and threat appraisal than for overall interference and threat appraisal in the three samples.

Strategy 1 as described earlier in the multiple regression analysis for hypothesis testing of threat appraisal was used in the cross-validation analysis. Overall interference, emotional upset, intensity of pain, age, gender and interaction of gender with overall interference were entered into multiple regression analyses for each sample (Tables 37 and 38). Overall interference and emotional upset accounted for 45% of the variance in threat appraisal in

sample 1 and 39% of the variance in sample 2. There were no main effects for gender. The interaction of gender with overall interference was significant only in sample 2 (Table 38).

Table 37

Summary of Hierarchical Multiple Regression Analysis for Sample 1

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Overall interference	.17	.03	.36	p = .000
Emotional upset	.17	.03	.40	p = .000
Intensity	.07	.05	.10	ns
Age	.10	.06	.04	ns
Gender*	.19	.15	.07	ns
<b>Step 2 - Interaction Model</b>				
Overall interference	.22	.04	.46	p = .000
Emotional upset	.17	.03	.40	p = .000
Intensity	.07	.04	.10	ns
Age	.11	.06	.10	ns
Gender*	.63	.28	.25	p = .027
Gender x Interference**	-.10	.05	-.23	ns

Note. \* Women = 0, men = 1. \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .47$  for Step 1,  $F(5, 158) = 28.45$ ,  $p = .000$ ;  $\Delta R^2 = .01$  for Step 2 (ns), partial  $F(1, 157) = 3.31$  (ns).

Table 38

Summary of Hierarchical Multiple Regression Analysis for Sample 2

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Overall interference	.12	.03	.25	p = .001
Emotional upset	.17	.03	.40	p = .000
Intensity	.08	.05	.11	ns
Age	.17	.07	.15	p = .01
Gender*	-.12	.16	-.05	ns
<b>Step 2 - Interaction Model</b>				
Overall interference	.18	.04	.38	p = .000
Emotional upset	.17	.03	.40	p = .000
Intensity	.09	.05	.13	ns
Age	.19	.07	.16	p = .007
Gender*	.43	.31	.17	ns
Gender x Interference**	-.12	.06	-.27	p = .046

Note. \* Women = 0, men = 1. \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .42$  for Step 1,  $F(5, 160) = 23.62$ ,  $p = .000$ ;  $\Delta R^2 = .01$  ( $< .05$ ), partial  $F(1, 159) = 4.0$  ( $p < .05$ ).

These regression analyses continued to support the central importance of overall interference and emotional upset on threat appraisal. The absence of a significant effect for intensity of pain on threat appraisal may be the result of changes in the distribution of type and or location of pain.

There was no main effect for gender on threat appraisal in either sample. The interaction of gender with overall interference was only significant in sample 2. Similarly, the effect of age on threat appraisal was significant only in sample 2. The random selection process to create the two samples may have altered the distribution of type of pain, or other sociodemographic characteristics of the sample, such as the employment and education characteristics. Changes in the age distribution of the samples did occur. Less than 19% of the respondents in sample 2 were 46 years of age or older (27% whole sample); 69% of the respondents in sample 1 were between the ages of 26 and 45 years (58% whole sample). Nevertheless, the effect of age and interaction of overall interference with gender may be less stable from one sample to another due to other changes in pain event factors.

#### Supplementary Analyses

Patterns of outcomes in the descriptive statistics and results of hypothesis testing raised six additional questions that were examined more closely in supplementary analyses. These questions were:

1. What was the relationship of age with pain event factors for women and men?
2. Did the past/present nature of the pain report affect pain event ratings or the appraisal of pain?
3. Were there specific aspects of interference that were more strongly associated with a threat appraisal?

4. Were there differences in pain event factors for respondents who appraised pain as a challenge as opposed to respondents who appraised pain as threatening?
5. Were other factors, in addition to appraisal and gender, important in predicting health care utilization?
6. Did interviewer gender affect the respondent's responses?

Since these questions were not raised as hypotheses, any outcomes from their analyses should be considered as speculative and suggestive of questions that should be examined in future research.

#### Relationship Between Age and Gender

As noted previously, the relationship between threat appraisal, age and gender, may not be linear at least for women. The tendency for women to report higher ratings in the 26-35 year age group with a decrease in ratings in higher age groups was observed for other variables in this study including reported pain intensity, emotional upset, unusual length and severity of pain, the number of physical problems associated with pain, sensory and affective scores of the MPQ, and the Pain Disability Index (Appendix G). Health care utilization for pain was highest for women aged 26 to 35 years; women of this age also reported more persistent pain. Overall interference was highest for women in the 26 to 35 years age group but only a small decrease in this rating occurred in older age groups.

For men, there were less consistent age-related patterns with the exception that most pain-related factors were highest in the 56 to 65 years age group (Appendix G). Threat appraisal and emotional upset due to pain increased with age. Other variables such as pain intensity, overall interference, unusual severity of pain, and number of physical problems associated with the pain complaint were highest in the 18 to 26 years and the 56 to 65 years age groups. Other factors such as the uncontrollability of pain, unusual length of pain, the sensory and affective scores of the MPQ were highest for the oldest age group. However,

health care utilization was highest for men aged 36 to 45 years. Persistent pain was most common among men aged 56 to 65 years.

#### Past and Present Nature of the Pain Report

Respondents in this survey reported on their most troublesome pain for the previous two weeks. For 164 respondents (53%), this pain was present at the time of the telephone interview (women, past pain n = 84, present pain n = 73; men, past pain n = 61, present pain n = 91). As illustrated in Tables 39 and 40, this temporal nature affected the ratings of pain event factors, the appraisal of pain, and how women and men said they coped with pain.

Table 39

#### Means of Pain Event Factors and Appraisal Scores by Past/Present Nature of Pain for Women

Variable	Past	Present	t (307)	p value	95% CI
Overall interference	4.2	5.3	2.52	p=.013	-1.88 to -.21
Emotional upset	3.8	4.8	2.09	p=.038	-1.95 to .06
Intensity	6.2	6.4	.69	ns	
Uncontrollability	3.4	4.6	2.41	p=.017	-2.22 to -.22
Unusual severity	4.6	5.3	2.78	p=.006	-2.40 to -.41
Unusual length	4.0	6.2	3.09	p=.002	-2.64 to -.58
Predictability - not getting better as expected	3.4	6.3	5.12	p=.000	-3.99 to -1.77
Predictability - not expected	6.3	5.3	1.66	ns	
Duration	4.1	8.6	10.10	p=.000	-5.37 to -3.58
Threat score	2.9	3.5	2.80	p=.006	-1.00 to -.17
Challenge score	1.7	2.1	2.85	p=.005	-.71 to -.13
Approach coping	2.8	3.2	4.14	p=.000	-.57 to -.20
Problem-focused avoidance	3.1	3.3	1.26	ns	
Emotion-focused avoidance	2.0	2.1	1.75	ns	

Note. Independent t-tests, 2-tail significance.



Table 40

Means of Pain Event Factors and Appraisal Scores by Past/Present Nature of Pain for Men

Variable	Past	Present	t (307)	p value	95% CI
Overall interference	4.1	4.2	.12	ns	
Emotional upset	3.9	3.8	.16	ns	
Intensity	5.8	5.5	.95	ns	
Uncontrollability	4.4	3.9		ns	
Unusual severity	5.2	5.7	.13	ns	
Unusual length	4.9	4.8	.86	ns	
Predictability - not getting better as expected	4.1	6.3	3.97	p=.000	-3.36 to -1.13
Predictability - not expected	7.0	5.4	2.52	p=.013	.35 to 2.89
Duration	3.8	7.9	8.23	p=.000	-5.13 to -3.14
Threat score	3.1	3.0	.27	ns	
Challenge score	1.8	2.1	2.21	p=.029	-.66 to -.04
Approach coping	2.7	2.8	.62	ns	
Problem-focused avoidance	3.1	3.3	1.53	ns	
Emotion-focused avoidance	1.9	2.0	.32	ns	

Note. Independent t-tests, 2-tail significance.

The difference in ratings was significant for women and men for duration of pain and predictability - pain not getting better. Women also gave significantly higher ratings, when pain was present, for unusual length of pain, challenge appraisal, and use of approach coping strategies ( $p \leq .005$ ). These response differences may have been influenced by the type and location of pain. Sixty-seven percent of pain that was still present at the time of the interview was recurrent or chronic musculoskeletal pain (63% for women, 69% for men) compared to 36% of the pain that occurred during the two week period but was not present at the time of the interview (23% for women, 30% for men).

To determine whether the past/present report of pain confounded the relationships between pain event factors, gender and threat appraisal, the multiple regression analysis, used as strategy 1 in hypothesis testing, was repeated in a sample of women and men whose pain was present at the time of the interview. In this analysis, overall interference, emotional upset, intensity of pain, age and gender were entered as main effect independent variables in Step 1. Interaction of gender with overall interference was added to the model in Step 2. Overall

interference, emotional upset, intensity of pain, age and gender accounted for 43% of the variance in threat appraisal (Table 41). Intensity had no significant contribution to threat appraisal. There was no main effect for gender, nor any interaction effect of gender with overall interference. However, the sample no longer had equal gender representation (73 women, 91 men). Overall interference and emotional upset were again the most important variables on threat appraisal. However, the standardized betas (emotional upset .46, overall interference .33) suggested that emotional upset had a stronger influence on threat appraisal than overall interference, and may have reflected the greater number of men in this sample.

Table 41

Summary of Hierarchical Regression Analysis of Variables Predicting Threat Appraisal Among Respondents with Pain Present at Time of Interview

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Overall interference	.15	.04	.31	p = .000
Emotional upset	.19	.03	.46	p = .000
Intensity	.003	.05	.005	ns
Age	.11	.06	.10	ns
Gender*	-.15	.15	-.06	ns
<b>Step 2 - Interaction Model</b>				
Overall interference	.16	.05	.33	p = .003
Emotional upset	.19	.03	.46	p = .000
Intensity	.003	.05	.005	ns
Age	.11	.07	.10	ns
Gender*	-.07	.34	-.03	ns
Interaction with interference**	-.02	.06	-.04	ns

Note. \*Women = 0, men = 1. \*\* Interaction = 0 for all women, and 0 for men if variable scored 0.

$R^2 = .43$  for Step 1.  $F(5, 158) = 23.55$ ,  $p = .000$ ;  $\Delta R^2 = .0002$  (ns).

### Overall Interference

Overall interference in this study was measured by a single question concerning interference of the pain on daily activities and responsibilities. The Pain Disability Index (Pollard, 1984) provided more specific information about this interference, that is, interference

with home responsibilities, social activities, recreational activities, occupation (paid and unpaid work), self-care, and life-support activities such as eating and sleeping. Each of these items was measured on a 0 to 10 scale. For women and men, the highest interference of pain was on recreational activities and occupational activities (Table 42). However, women reported significantly more interference due to pain with home activities (4.5 vs. 3.4 respectively,  $p = .001$ ) and social activities (4.4 and 3.3 respectively,  $p = .005$ ) than did men.

Table 42

Means and Standard Deviations of Pain Disability Index Total Score and Item Scores for Women and Men

Pain Disability Index	Women	Men	t (307)	p value	95% CI
<b>Total score</b>					
M	25.3	21.9	2.0	$p = .047$	.05 to 6.7
SD	14.9	14.7			
<b>Home interference</b>					
M	4.5	3.4	3.2	$p = .001$	.44 to 1.79
SD	3.0	3.1			
<b>Social interference</b>					
M	4.4	3.3	2.8	$p = .005$	.34 to 1.88
SD	3.1	3.4			
<b>Recreational interference</b>					
M	5.1	5.0	-	-	-
SD	3.4	3.3			
<b>Occupational interference</b>					
M	4.8	4.1	1.9	$p = .049$	.004 to 1.48
SD	3.4	3.4			
<b>Self-care interference</b>					
M	2.6	2.8	-	-	-
SD	2.9	2.8			
<b>Life-support interference</b>					
M	3.8	3.5	-	-	-
SD	3.1	3.1			

Note. Independent t-tests, 2-tail significance. All other comparisons were associated with  $p > .05$ .

Although interference in all of these areas was significantly correlated with threat appraisal, the most important influential factor on threat appraisal for women may be occupational interference, and for men, interference with self-care activities (Table 43).

Table 43

Correlation of Individual Items on the Pain Disability Index with Threat Appraisal for Women and Men

Items	Threat Appraisal	
	Women	Men
	r	r
Occupational interference	.53	.33
Life-support interference	.46	.36
Recreational interference	.45	.29
Home interference	.41	.32
Social interference	.41	.29
Self-care interference	.40	.41

Note. All correlations between items and threat appraisal for women and men were associated with  $p = .000$ .

Characteristics of Challenge Appraisal

Only 43 individuals (21 women, 22 men) had challenge scores greater than 3 whereas 158 respondents (80 women, 78 men) had threat scores greater than 3. The differences between these two groups is not clear. The age distribution was similar in both groups. Approximately 75% of the individuals in each group also had persistent pains. Seventy percent of the individuals who had higher challenge scores, reported a musculoskeletal pain; 47% of their pains were classified as recurrent/chronic pain associated with an underlying injury, illness or disease. Higher challenge appraisal did not preclude a moderate or high threat appraisal. Twenty-two respondents (11 women, 11 men) reported challenge and threat appraisals greater than 3.

Overall, people who had higher threat scores tended to be more upset about the pain, reported more unpredictable pain and pain that was less controllable than individuals who considered the pain as a challenge (see Appendix H). Respondents with higher threat scores

were more likely to see a health professional for their pain (25%) than were people who had high challenge scores (16%). In earlier hypothesis testing, threat appraisal but not challenge appraisal had a significant impact on health care utilization. The impact of challenge or threat appraisal of pain on overall health or quality of life was not measured in this study.

#### Other Predictors of Health Care Utilization

In the logistic regression analysis presented earlier, threat appraisal, gender, and interaction of gender with threat appraisal successfully predicted 10% of the health care utilization reported in this study. To determine whether prediction of health care utilization could be improved, all pain event factors, with the exception of type and location of pain, (duration, intensity, emotional upset, overall interference, unusualness, predictability, uncontrollability, problems) were entered into a backward logistic regression along with threat appraisal, challenge appraisal, gender, age, and whether a health care visit was suggested to the respondent (Table 44). Problems, suggested visit, and gender were categorical variables with two levels. In this analysis uncontrollability, overall interference, the suggestion of a health visit, and the presence of other physical problems associated with the pain were the final selected variables. Together, these variables predicted 26% of the health care utilization reported in this study. In a second step, location and type of pain were added to the model increasing the sensitivity of the prediction to 39%; however, the model chi-square for type and location of pain was not significant. The most important variables in predicting health care utilization were the presence of other physical problems ( $p = .000$ ) and whether another person had suggested a health care visit to the respondent ( $p = .000$ ).

Table 44

Summary Backward Logistic Regression of Variables Predicting Health Care Utilization

Variable	B	SE	WALD	p value
<b>Step 1</b>				
Problems	1.97	.51	14.69	p = .000
Uncontrollability	.10	.05	3.61	p = .057
Overall interference	.20	.07	7.66	p = .006
Health visit suggested	1.44	.33	18.71	p = .000
<b>Step 2</b>				
Problems	1.73	.53	10.44	p = .001
Uncontrollability	.11	.06	4.05	p = .044
Overall interference	.16	.07	5.01	p = .025
Health visit suggested	1.43	.35	16.37	p = .000
Musculoskeletal pain	-.73	.48	2.24	ns
Pain in abdomen or side	-.06	.72	.01	ns
Chest or breast pain	.22	.81	.08	ns
Genital, pelvic, groin or rectal pain	.06	.77	.01	ns
Acute pain with condition	-.02	.80	.001	ns
Recurrent/chronic no condition	-.96	.71	1.82	ns
Recurrent/chronic with condition	-.18	.70	.07	ns
Due to health procedures	-.10	1.18	.01	ns

Note. -2 Log Likelihood of Step 1 Model = 227.08, Model  $\chi^2$  (4, N = 309) = 70.918, p = .000.

Specificity of Step 1 Model = 94%, Sensitivity of Step 1 Model = 26%.

-2 Log Likelihood of Step 2 Model = 211.77; Improvement  $\chi^2$  (8, N = 309) = 7.63 (ns).

Specificity of Step 2 Model = 94%, Sensitivity of Step 3 Model = 39%.

Interviewer Gender

The absence of a gender difference in ratings of emotional upset due to pain, in the contribution of emotional upset to threat appraisal, and the reported use of emotive coping behaviours (externalizing and internalizing/catastrophizing) was surprising given the tendency in clinical practice to attribute greater importance to emotional factors in women's pain experiences than in pain problems occurring among men (Unruh, in press). The absence of a gender variation in these variables also made the interaction of gender with threat appraisal on reported use of indirect help-seeking (moaning or groaning, crying for help, crying to release feelings, crying about pain, or seeking affection) puzzling. Women reported more indirect help-seeking in

response to increasing threat appraisal than did men although overall there was no gender difference in the mean indirect help-seeking scores and reported use of these behaviours was quite low for women and men. Each item on this scale was scored from 1 to 5 with the numbers representing "never", "hardly ever", "sometimes", "often" and "very often". These emotive behaviours are usually considered more socially permissible for women and may have been under-reported by men who participated in the telephone interview, particularly when the interviewer was male.

Inspection of the data for the indirect help-seeking scale by the gender of the interviewer (4 women and 1 man) revealed that all male respondents answered "never" to four of the five coping statements of this scale (crying for help, crying to release feelings, crying about pain, or seeking affection) ( $M = 1.0$ ,  $SD = 0$ ) when the questions were asked by the male interviewer. Greater variance occurred for the fifth item (moaning or groaning in response to pain) ( $M = 1.29$ ,  $SD = .55$ ). While the means of these items given by male respondents to female interviewers were low, ranging from 1.1 to 1.7, for each item, there were some men who reported using these behaviours at least "sometimes" and in some cases "often" or "very often". The difference in the means for the indirect help-seeking scale of male respondents by gender of the interviewer was significant,  $t(141.8) = 5.13$ ,  $p = .000$ . The influence of interviewer gender on the response given to the individual items of the indirect help-seeking scale was not apparent for female respondents (means ranged from 1.3 to 2.3 for female interviewers, 1.4 to 1.8 for the male interviewer). There was no significant difference in the means of the indirect help-seeking scale for female respondents by gender of the interviewer,  $t(155) = .55$ , ns. The effect of interviewer gender raises important questions about the potential impact of the gender of the health care provider on the responses given by people with pain.

### Summary of Results

The first study hypothesis, that gender had an interactive effect with pain event factors on appraisal, was supported for threat appraisal but not for challenge appraisal. The effect of gender on threat appraisal of pain occurred as an interaction effect for one pain event factor, overall interference. Overall interference and emotional upset were the most important pain event factors on threat appraisal accounting for approximately 42% of the variance. Pain intensity, in strategy 1 (conceptually driven regression analyses), and "pain not getting better" in strategy 2 (stepwise multiple regression) had similar but small contributions to threat appraisal. The most important of these two variables in any given sample may be related to the type of pain, or the distribution of gender within a sample. Age had a small main effect on threat appraisal. However, measurement of age as a categorical variable, may have partially obscured the contribution of age.

Challenge appraisal also increased with overall interference of pain but this variable contributed considerably less to challenge appraisal than to threat appraisal. When pain was expected, challenge appraisals increased. Similarly, musculoskeletal pains were significantly more likely to have a higher challenge appraisal than pain in other locations. However, challenge appraisal decreased significantly for recurrent/chronic pain that was not associated with an underlying injury, illness or other condition.

The second hypothesis, that gender had an independent effect when pain event factors were controlled for threat or challenge appraisal was not supported in this study. Gender had only an interactive effect on threat appraisal, and neither an interactive or an independent effect on challenge appraisal.

The third hypothesis, that gender interacted with appraisal on the choice of coping strategies, was supported only for the Indirect Help-Seeking scale of the Pain Coping Questionnaire (Reid et al., 1994) and for health care utilization. As threat appraisal increased, women were more likely than men to increase their use of these behaviours. Threat appraisal,



challenge appraisal, and interaction of gender with threat appraisal predicted 10% of all visits to a health professional reported in this survey.

Threat appraisal, and challenge appraisal to a smaller extent, contributed significantly to the use of approach, emotion-focused avoidance strategies, palliative behaviours, and indirect help-seeking. Increasing threat appraisal significantly decreased the use of problem-focused avoidance strategies, whereas increasing challenge appraisal increased the use of these coping strategies. However, the impact of appraisal was more important for approach strategies and emotion-focused avoidance strategies than for problem-focused avoidance strategies. When appraisal was controlled, women used more coping strategies to manage pain than did men, especially, problem-solving, seeking social support, positive self-statements, and palliative behaviours. An interaction between gender and appraisal occurred only for indirect help-seeking; women reported significantly more indirect help-seeking with increasing threat appraisal.

Lastly, the supplementary analyses, suggested that the interaction of gender with age on threat appraisal and also on the reporting of pain event factors should be examined more closely in future research using a sample stratified by age. Pain that is present at the time of the interview is common and may be rated differently than pain that is recent but no longer present. All aspects of interference as measured on the Pain Disability Index (Pollard, 1984) were correlated more highly with threat appraisal for women than for men, reinforcing the greater impact of overall interference on threat appraisal of pain for women. There were few differences between respondents who appraised pain as high threat and respondents who appraised pain as a high challenge. The presence of other physical problems in association with pain, and a suggestion by someone that the respondent see a health professional for the pain, were important factors in predicting health care utilization.

## CHAPTER 6. DISCUSSION AND CONCLUSION

Several issues arise from this study about the relationship between gender, characteristics of pain, its appraisal, and the effect of appraisal on coping. In this chapter, I will briefly compare gender variations in this sample in prevalence of troublesome pain, characteristics of this pain over the two week study period, and health care utilization. The stress-appraisal-coping model (Lazarus & Folkman, 1984) as it was applied in this study to examine gender variation in pain appraisal is summarized, with a discussion of the implications of the study outcomes on this model for future research. I will then examine the meaning of challenge appraisal and its implications for overall psychological adjustment to a health problem such as chronic pain. Lastly, I will address the major limitations of this study.

### Prevalence of Troublesome Pain and Its Characteristics

There were both similarities and differences in the prevalence of pain in this study, and in the characteristics of the pain with outcomes reported in other pain research. Crook et al. (1984) found that a noteworthy pain was reported by at least one family member in 36% of the households surveyed in a two week period. In the present study, the occurrence of a troublesome pain was reported by at least one family member in 46% of households. The higher household prevalence of pain may reflect differences in respondents' interpretations of "noteworthy pain" and "troublesome pain". However, there were several differences in the demographic characteristics of these two samples that may have contributed to the likelihood of a pain event in the previous two week period. More respondents in the present study reported income levels higher than \$40,000 per year (51% vs. 18%). This difference may to some extent reflect inflation over the intervening 12 years. However, full-time employment was also higher in this study (58% vs. 42%). Full-time employment may mean that, respondents in this study were at greater risk for pain due to work-related factors, or they may have had more underlying

problems that were aggravated by work conditions, or exacerbated by multiple role responsibilities. In addition, the mean age of women and men in the Crook et al. study was 41.3 years, whereas the respondents in this study may have been younger; 74% of the respondents were between the ages of 18 and 45 years. There is some evidence that prevalence of headache, migraine, muscle pain, and abdominal pain decreases with age (Taylor & Curran, 1985; Lester et al., 1994).

As is found in many other studies (e.g. James et al., 1991; Lester et al., 1994) the most common locations of pain were the limbs, back, and head. There was no significant gender difference in the location of the pain though women reported twice as much head pain (31% vs 16% respectively), and men reported more musculoskeletal pain (60% vs. 42%). There was also no significant gender difference in the type of pain. Eighty-three percent of women and 77% of men had a recurrent/chronic pain.

Consistent with other population based studies, women reported significantly more intense pain than did men (Andrasik, Holroyd, & Abell, 1979; Nikiforow & Hokkanen, 1978; Stewart et al., 1991), but there were no significant gender differences in ratings of duration, unusualness, predictability, controllability, or emotional upset due to pain. There was also no gender difference in ratings of overall interference due to pain, but women did report significantly more home and social interference due to pain in the previous two weeks than did men. Women tended to report more physical problems in association with their pain; they reported significantly more dizziness.

#### Health Care Utilization

Health care utilization in this study (19%) was lower than might have been expected on the basis of an earlier study of pain prevalence in a two week period. Crook et al. (1984) reported that one-third of the respondents in their sample used health care services for pain in the previous two weeks. The sampling frame consisted of households on medical practice lists

of participating physicians, and all individuals with pain in a household were eligible to participate. However, in the present study, only one respondent with pain in a household was interviewed, and all households were randomly selected from the community. Seventy-four respondents made appointments with a health professional for this pain. If all 59 respondents who reported health care utilization made appointments for their visits, then another 15 visits were yet to occur. Considering that the pain reported by respondents was recent troublesome pain in a community sample, 19% health care utilization is rather high.

Women reported more health care utilization for pain in the previous two weeks but the difference between women and men was not significant ( $p = .04$ ). The size of the difference (37 women vs. 22 men) is similar to that reported in many epidemiological studies (Unruh, in press). Given that women tend to use more health care services for pain as well as other health problems than do men, it is tempting to conclude that women are high users of health care services when in fact the differences between women and men are not always significant (e.g. Crook & Tunks, 1992), and when significant differences do occur, they are often small.

#### Summary of the Stress-Appraisal-Coping Model

Lazarus and Folkman (1984) proposed that interaction between person and situation factors determined the specific nature of appraisal of a threat or challenge appraisal of a stressful event. Appraisal in turn influenced coping strategies. Person factors concerned qualities of the individual such as gender, age, role responsibilities, beliefs, and commitments. Situation factors referred to characteristics of the event itself. In this study, I reconstructed this model specifically for a pain event (see Chapter 2, Figure 1). Any one pain event can be described by a set of situation or pain event factors including: overall interference of the pain, emotional upset, pain intensity, other physical problems associated with the pain, unusual severity of the pain, unusual length of pain, unexpected pain, pain not getting better as might be expected, duration, controllability, type and location of pain.

Appraisals can take many forms but the primary focus in the majority of appraisal research is the distinction between threat and challenge appraisals. Appraisal may partially explain why some individuals have significant chronic pain but continue to live productive and meaningful lives despite pain whereas other individuals will experience considerable disability and handicap. Although challenge appraisals may be crucial to maintenance of overall quality of health and well-being in the face of health problems such as chronic pain, the mechanisms of threat and challenge appraisals are not well understood.

In this study, I was concerned primarily with the effect of one person factor, gender, and its relationship with other situation or pain event factors on threat and challenge appraisals of everyday pain experiences in a community sample. There is substantial research to show that there are differences between women and men in their risks for specific types of pain experiences (Unruh, in press). Other research has shown that women manage pain and other health concerns somewhat differently than do men. In general, women use more coping strategies and access more health services, but they also report more short-term disability than men, possibly in order to prevent long term consequences. Many explanations, typically speculative, and in some cases both sexist and derogatory, have been used to account for these differences. For example, some researchers suggest that women with chronic pelvic pain are psychologically addicted to their pain, seek out relationships through pain, or have conflict with their feminine roles (Guzinski, 1990; Jones, 1988; Woods, Wiesner, & Reiter, 1990). Without more detailed understanding of the way in which women and men appraise pain, it is difficult to examine underlying processes that may influence response to pain events.

### Development of a Pain Appraisal Measure

Since there were no adequate measures of pain appraisal suitable for a community population, a Pain Appraisal Inventory to measure threat and challenge was developed for this study. Cronbach's alphas for these scales provided good evidence for the internal consistency reliability of the PAI. Factor analysis confirmed the two scale structure of the inventory. Content validity was determined using an expert multidisciplinary panel of health professionals. Concurrent validity was shown by moderate correlations of the threat scale and low correlations of the challenge scale with the sensory and affective scales of the short-form McGill Pain Questionnaire (Melzack, 1987) and the Pain Disability Index (Pollard, 1984). In addition, increasing threat appraisal was associated with thinking about seeing a health professional, suggestion that one should see a health professional, making an appointment, and seeing a health professional.

### The Pain-Appraisal-Coping Model and Study Outcomes

#### Relationship between Gender, Pain Event Factors, and Pain Appraisal

Analyses of the relationships between gender, age, and pain event factors with appraisal, and then again between gender, appraisal, and coping, revealed both confirmatory outcomes and unexpected relationships. Women and men were very similar in reported pain experiences differing only significantly in ratings of pain intensity which was higher for women ( $p = .005$ ). However, as anticipated, more pain event factors were significantly correlated with threat appraisal for women than for men. Surprisingly, the correlations of pain event factors for men in the whole sample and in the two samples, placed emotional upset due to pain as the most important pain event factor in threat appraisal for men whereas overall interference due to pain was the most influential factor for women.

In multiple regression analyses, the more direct sensory aspects of pain such as intensity, duration, controllability, predictability, unusualness, or even the type of pain and its

location, had much less importance on the threat appraisal of pain than two other pain event factors, overall interference and emotional upset. Together, overall interference and emotional upset accounted for 42% of the variance in threat appraisal. Overall interference explained 37% of the variance in threat appraisal for women and 24% of the variance for men. When overall interference was controlled, emotional upset contributed a further 12% in the threat variance for women and 13% for men. Interaction of gender with overall interference was significant but accounted for 1% of the variance in threat appraisal. Depending on the specific regression strategy, intensity or "pain not getting better", with age of the respondent contributed another 3% to the variance in threat appraisal.

The difference in the effect of overall interference on threat appraisal between women and men was not significant in one of the two samples used for cross-validation, or in analysis restricted to respondents with pain at the time of the interview. The construction of the two samples for cross-validation maintained equivalent gender distribution within each sample. However, splitting the sample is likely to have altered the distribution in age of respondents, and the reported type and location of pain within each sample and thereby also affected the correlations among the independent variables in the regression analysis. Since the interaction effect is small, it may be less stable and inconsistent from one sample to another. However, the absence of a statistical significance for the interaction term for respondents with pain at the time of the interview is likely influenced by the disproportionate number of men when the sample was restricted in this manner.

The greater importance of overall interference on threat appraisal when compared to other more sensory qualities of pain highlights the meaningfulness of the activities and responsibilities associated with everyday life for women and men. Health care practice is typically concerned with treatment of the sensory aspects of pain, particularly pain intensity. However, pain intensity, had very little bearing on threat appraisal when overall interference, emotional upset and gender were controlled. Nevertheless, it would be misleading to suggest

that intensity of pain has minimal importance. Both overall interference and emotional upset were significantly correlated with ratings of pain intensity ( $r = .51$  and  $r = .33$  respectively,  $p = .000$ ).

Overall interference also contributed significantly to challenge appraisals but accounted for less than 6% of the variance. Although the reliability and validity of the challenge scale was very good, individual challenge items were not often endorsed in the community sample suggesting either difficulty in the measurement of challenge appraisal, or resistance to the challenge appraisal of pain.

Some degree of threat appraisal may be essential to ensure adequate management of pains that are commonly experienced in everyday life and to manage any of its underlying precipitant factors. A challenge appraisal may only have benefit for persistent recurrent/chronic pain that is associated with potential interference of daily activities and responsibilities. Challenge appraisal may be a learned phenomenon and may only occur over time in response to changes in the pain experience, underlying phenomena, and the social context in which the pain has occurred. The significantly lower challenge appraisal when pain has no known underlying injury, illness or condition, and the higher mean challenge appraisal for pain due to a health procedure suggests that challenge appraisal may occur more readily when the cause of pain is known and possibly associated with recovery from some other underlying problem. Low threat appraisal combined with a moderate or high challenge appraisal may be an important component for successful self-management of chronic pain and optimal psychosocial adjustment.

The similarity between women and men in their rating of emotional upset due to pain, and the contribution of emotional upset on threat appraisal suggests that men and women may be equally distressed by pain despite common beliefs that women are more upset by pain.



### Relationship between Gender, Appraisal and Coping

The Pain Coping Questionnaire (Reid et al., 1994) is based on a three factor structure of approach (information-seeking, problem-solving, positive self-statements, seeking social support), problem-focused avoidance (behavioural and cognitive distraction), and emotion-focused avoidance strategies (externalizing, internalizing/catastrophizing), and two additional scales, palliative behaviours and indirect help-seeking.

Although there is not an extensive body of research examining appraisal and coping, some of the outcomes of this study supported the findings reported by other researchers. The significant relationship between threat appraisal and palliative behaviours was similar to the finding reported by Arathuzik (1991a) and (Klonoff et al., 1993) that threat appraisals were associated with remaining still, avoiding movement, and using medication. Information-seeking and problem-solving strategies were also significantly associated with threat appraisal consistent with the experimental appraisal research of Croyle (1992) and Ditto et al. (1988) suggesting that threat appraisals would precipitate activities to assess and reduce the probability of harm.

Threat appraisal of pain was also associated with a number of emotive strategies including emotion-focused avoidance (internalizing/catastrophizing, externalizing), and indirect help-seeking. Threat appraisal increased all of these coping behaviours; challenge had a smaller but significant impact only on indirect help-seeking. The strongest relationship between appraisal and coping occurred between threat appraisal and internalizing/catastrophizing. This relationship may have important clinical significance. Threat appraisal accounted for 49% of the variance in this scale. Internalizing/catastrophizing reflects an exaggerated tendency to dwell on the negative aspects of the pain (Sullivan, Bishop, & Pivik, 1995). The items measuring internalizing/catastrophizing included frequent worry that one will always be in pain, persistent thinking about the pain, belief that nothing will help, and belief that the pain will never stop. Such negative thinking may be a relatively stable coping behaviour (Gil, Abrams, Phillips, & Keefe, 1992).

Both catastrophizing and threat appraisal involve a cognitive process. However, catastrophizing reflects emotive thinking that is concerned with ruminating about pain, magnifying or exaggerating pain, and feeling helpless about pain (Sullivan et al., 1995), whereas threat appraisal is a cognitive assessment of anticipated or actual physical and/or psychological harm, loss, injury or damage (Lazarus & Folkman, 1984). It is unlikely that catastrophizing will occur without at least a moderate degree of threat appraisal. In fact, it may be that threat appraisal in these circumstances is exaggerated in proportion to the actual probability of harm associated with the pain event. In addition to threat appraisal, other factors, such as pain intensity, and emotional upset, may also have an important role in catastrophizing (Sullivan et al., 1995). The relationship between threat appraisal and internalizing/catastrophizing may be important for people who experience chronic pain since low tolerance of pain is often associated with catastrophizing in experimental and clinical pain research (Tunks & Bellissimo, 1988).

The relationship between threat appraisal and the emotive coping behaviours of emotion-focused avoidance (externalizing, internalizing/catastrophizing), and indirect help-seeking, would suggest that efforts to control emotion such as the use of positive self-statements would be associated with challenge appraisal, and indeed this was the case. Threat appraisal had no impact on the use of positive self-statements whereas challenge appraisal increased their use.

Challenge appraisals were also associated with cognitive and behavioural distraction strategies (problem-focused avoidance coping). Threat appraisal had a significant but inverse relationship with problem-focused avoidance, that is, as threat appraisal increased cognitive and behavioral distraction decreased. Ptacek et al. (1992) also found that challenge appraisals resulted in more problem-focused coping than did threat appraisal in a prospective study of stress, appraisal and coping among undergraduate students.

Appraisal and coping research has given more attention to the differences between problem-focused coping and emotion-focused coping than to determining distinctions between

approach and avoidance aspects of coping. The approach scale of the Pain Coping Questionnaire would appear to contain items that reflect a mixture of problem-focused as well as emotion-focused strategies. The outcomes of this study suggest that threat appraisal leads to approach strategies that are intended to manage pain and/or control the emotional response to pain (information-seeking, seeking social support, problem-solving), as well as emotion-focused avoidance strategies that increase emotional behaviours of externalizing and internalizing/catastrophizing, and indirect help-seeking. On the other hand, increasing challenge appraisal is associated with information-seeking and positive self-statements (approach strategies), as well as problem-focused avoidance (cognitive and behavioural distraction), all strategies that are concerned with controlling the emotional response to pain and managing the pain. It is not clear at this stage of coping research whether distinctions between approach and avoidance coping will be important in understanding the psychological adjustment of individuals who experience chronic pain. It could be argued that while cognitive and behavioral distraction may be avoidance strategies, externalizing and internalizing/catastrophizing (emotion-focused avoidance) involve heightened attention to pain rather than avoidance of pain.

Overall, women reported more coping behaviours than did men as measured by the Pain Coping Questionnaire (Reid et al., 1994). Women reported significantly more use of problem-solving, seeking social support, positive self-statements, and palliative coping behaviours. However, an interaction between gender and appraisal occurred only for threat appraisal and indirect help-seeking. Women were more likely than men to increase their use of indirect help-seeking strategies with increasing threat appraisal.

#### Appraisal, Coping and Psychosocial Adjustment

In some studies, coping strategies that are concerned with negative thinking and passive strategies have been associated with poor adjustment to chronic pain problems (Gil et al., 1992). Training in coping strategies has been shown to increase coping attempts, decrease

negative thinking, and lower pain reports in experimental pain research (Gil et al., 1996). Nevertheless, it is not clear that differences in coping strategies are actually what determines psychosocial adjustment for people who experience chronic pain (Crook, Tunks, Kalaher, & Roberts, 1988; Weir et al., 1992). Tunks and Bellissimo (1988) pointed out that there is no agreement among pain researchers about whether some coping strategies are more effective than others for the management of pain. Crook et al. (1988) suggested that reducing the risk of catastrophizing, avoidance, and withdrawal would be of greater benefit to people who experienced persistent pain than teaching stress management skills.

In this study, high threat appraisal was associated with coping strategies that could have a positive impact on pain (information-seeking, seeking social support, problem-solving), but high threat appraisal was also strongly associated with internalizing/catastrophizing. High challenge appraisal was related to coping strategies that may be difficult to maintain in combination with internalizing/catastrophizing (positive self-statements, cognitive and behavioural distraction).

Further research will be needed to determine how threat and challenge appraisals affect psychosocial adjustment for people who experience chronic pain, irrespective of their effect on coping strategies, and whether pain appraisals can be modified by specific interventions.

#### Relationship between Gender, Appraisal, and Health Care Utilization

Pain appraisal was also expected to be associated with health care utilization. Surprisingly, threat appraisal and challenge appraisal contributed very little as predictors of health care utilization for women and men. In other research, respondents have said that their primary reason for not seeking health care was that the pain was not "serious enough" (Crook et al., 1984; Taylor & Curran, 1985). What does "serious enough" mean? The supplementary analysis suggested that the presence of other physical problems associated with the pain (e.g. dizziness, nausea), as well as overall interference of the pain, pain duration, location and type

of pain contributed significantly to health care utilization. "Serious enough" may refer not only to specific aspects of the pain. It may have some social implications since respondents who reported that someone suggested a visit to a health professional were more likely to follow through on this advice. Again there may be other person factors, such as multiple role responsibilities, as well as specific contextual factors surrounding the pain event, that add to the perceived seriousness of the event and increase health care utilization.

### Reconstructing the Pain-Appraisal-Coping Model

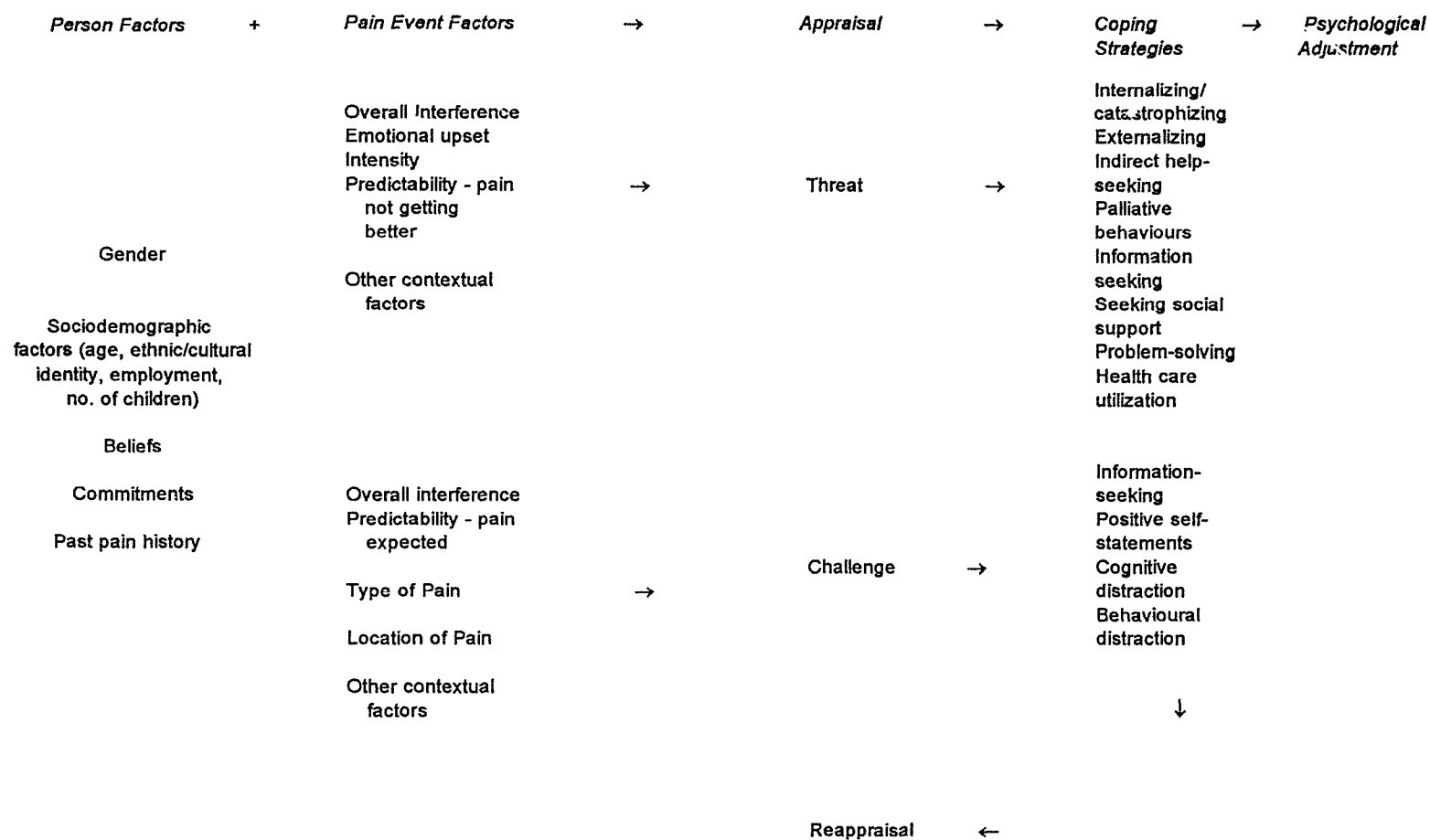
In this study, I was concerned with determining the overall relationship between specific pain event factors, appraisal and coping, and the way in which gender and age mediated this relationship. The outcomes of this study suggested that some pain event characteristics have little if any bearing on pain appraisal, while other factors affect threat appraisal but not challenge appraisal, or challenge appraisal but not threat.

Overall, the stress-appraisal-coping model of Lazarus and Folkman (1984) as applied to a pain event in this study, accounted for 54% of the variance in threat appraisal for women, but only 37% of the threat appraisal for men, and less than 25% of challenge appraisal for women and men. This outcome suggests that other person factors, as identified in Chapter 2, Figure 1, may play an important role in pain appraisal. In addition, other situation factors, that reflect the contextual nature in which a pain event may occur, may also significantly influence pain appraisal. For example, the pain appraisal of an injection may be influenced by whether the nurse seems friendly and nurturant, or hostile and bad-tempered as she or he prepares the needle and the injection site.

The study findings also suggested specific relationships between threat and/or challenge appraisal and coping strategies. However, while appraisal, and sometimes gender, accounted for a significant proportion of the variance in a coping strategy, the majority of the variance remained unexplained, demonstrating that additional factors, probably person factors

and contextual factors also have an impact on the use of coping strategies. Lastly, appraisal may have an impact not only on coping behaviours but on psychosocial adjustment to a problem such as chronic pain, either in combination with coping strategies, or possibly irrespective of coping strategies.

These study outcomes suggest that the pain appraisal model (Figure 1) could be redrawn for future pain appraisal and coping research (Figure 5).



**Figure 5.** Revised pain-appraisal-coping model .

### The Meaning of Challenge Appraisal

The outcomes of this study revealed more about threat appraisal than challenge appraisal of pain. Challenge appraisal was typically low but a small group of women and men (43) did report higher challenge appraisals of their pain. Twenty-two respondents of this group, appraised their pain as a high challenge and a high threat. Increasing challenge appraisal was associated with increasing interference and pain that was expected by the respondent. Challenge appraisal was also associated with the use of information-seeking, positive self-statements, cognitive distraction and behavioral distraction strategies.

The significant decrease in challenge appraisal if the pain was a recurrent/chronic pain and not associated with an underlying condition, and the significant increase in challenge appraisal when the pain was due to a health procedure suggests that knowing something about the reason for the pain may be an important aspect of challenge appraisals.

The small number of respondents who reported pain due to a health procedure permits more scrutiny of the nature of the particular pains and reveals some of the complexity in the factors that may precipitate challenge appraisals. Two of the three individuals reporting pain due to a health procedure and a high challenge score, had procedures with probable positive benefits (caesarian section, vasectomy). However, one woman with a high challenge appraisal reported leg pain due to an injury to her sciatic nerve as a result of a previous surgery. These three individuals agreed to some extent with the majority of all the challenge statements, but there may have been different reasons for this appraisal for the first two individuals and the third respondent. For the remaining four people, surgery appeared to be either related to an underlying progressive disorder (mastectomy, knee replacement due to arthritis, surgery of the scrotum), or involved more complications than may have been expected (wisdom teeth removal with a bone removed from the jaw). These respondents moderately or slightly agreed with only one or two of the challenge statements. Although the procedure may have been perceived to have some benefit to the respondent, other factors such as concern about the underlying



problem, or inadequate post-operative management of the pain may have limited challenge appraisals for these individuals.

Pain event factors contributed more to threat appraisal than to challenge appraisal suggesting that person factors, and possibly contextual factors, particularly those related to personal social support networks, may play a strong role in challenge appraisals. Early family influences, personality characteristics related to optimism or pessimism, and successful coping with other pain experiences, may also contribute to challenge appraisals.

### Limitations of the Study

#### Cross-Sectional Design

This study was a cross-sectional telephone survey about a troublesome pain in the two weeks preceding the interview. The primary difficulty in a cross-sectional survey is identifying causal relationships. Multiple regression analyses produce a mathematical equation in which the sum of a set of independent variables, a constant and an error term account for some portion of the key variable of interest giving the framework of a causal relationship between the independent variables and the dependent variable. Nevertheless, multiple regression is still based on the correlational relationships between independent variables and a dependent variable, and does not yield a causal outcome.

Conceptual arguments are a critical component of causal explanations between variables. However, many human phenomena resist linear causal explanations. As discussed in Chapter 2, pain appraisal is likely to have an initial linear process, but the relationships between person factors, situation factors, appraisal and coping quickly become circular. A prospective research design following appraisal of pain over time may reveal shifting relationships especially between pain characteristics, contextual factors, and pain appraisal that suggest predictive relationships. Experimental pain research presents an in vivo opportunity to examine pain and its appraisal as it occurs and to control contextual factors that may influence

appraisal. It is the strongest research design available to demonstrate predictive causal relationship. Such designs would be an important component of future pain appraisal research. Nevertheless, prospective and experimental studies do have limitations. Prospective designs are costly and involve more commitment on the behalf of respondents. They may reveal a series of correlational relationships that suggest predictive explanations, but prospective designs do not necessarily produce causal outcomes. Experimental research may identify causal relationships but the experimental context is only an approximation of the "real world". Most everyday pain experiences are not voluntary events precipitated by a noxious stimulus with a ceiling level. Outcomes in experimental pain research often can only yield models of relationships that need to be explored in community or clinical research.

#### Representativeness

As discussed in Chapter 3, the study sample differed somewhat from the general community population from which it was obtained, in that, the sample reflected higher full-time employment, lower unemployment, higher education levels and higher income levels for women and men than was reported for this community in the 1991 census (Statistics Canada, 1994a, b). All of the relationships in this study could have been altered in some way if the sample had reflected greater economic, employment and educational diversity. In addition, the majority of the respondents were white Anglo-Saxon. In this respect, the sample was similar to the population of Halifax-Bedford-Dartmouth. However, the observed relationships between gender, age, pain event factors, appraisal, and coping in this study could be different in a sample with greater ethnic/cultural diversity.

Socioeconomic status, especially the nature of employment, will have some bearing on risk for specific types and locations of pain, and potentially some of the characteristics associated with the pain. Socioeconomic status may also influence the impact of interviewer gender on respondents. Very little is known about the impact of ethnicity or culture but where

ethnicity may include specific spiritual beliefs that influence thoughts about pain and approaches to pain management, appraisal of pain may be altered.

Nevertheless, this study was not about the prevalence of pain or its appraisal in the population of Halifax, Dartmouth, and Bedford. Instead, the target population consisted of those individuals in this region who might experience a troublesome pain in a given two week period. The target population itself may have different socioeconomic characteristics than the general population. Back pain is likely to be affected by work characteristics (de Girolamo, 1991). For this reason, one would expect to see more reporting of back pain and possibly other muscle and joint pain in a two week period in an employed population as compared to a sampling of people who are unemployed.

Similarity between women and men in sociodemographic characteristics was important to ensure that any variation between women and men was due to their gender rather than to differences in sociodemographic characteristics. The only significant difference between women and men was in employment. More men than women were employed full-time. This difference in employment may have had some bearing on ratings of overall interference associated with pain if indeed for women multiple roles related to employment, childcare, and home management increased women's concern about the interference of problems such as pain. Mean threat appraisal for women and men was higher when respondents were employed part-time rather than full-time (for women, 3.5 vs. 3.0 respectively, for men, 3.7 vs. 3.0 respectively). The interaction of gender with overall interference on threat appraisal may be due to the higher number of women who reported part-time employment.

As in any community survey of this nature, the outcomes of this study may have been skewed towards women and men who were interested in talking about their pain because they were more distressed and/or more disabled by pain. More men than women refused to participate (49 vs. 32). Women may be more willing to participate in research. They may be more interested in talking about a health problem. Whether the pain was still present at the

time of the interview may also have influenced the willingness of men to participate. It is also possible that individuals with higher education levels are more willing to participate in research.

The most common reason given by respondents who did have a troublesome pain in the previous two weeks but chose not to participate was insufficient time or disinterest. These respondents may simply have been able to minimize the intrusiveness of the pain. Indeed, some respondents were interested in being interviewed but were always busy with other responsibilities when contacted and could not be interviewed. It is also possible that respondents, who had a troublesome pain but refused to be interviewed, had less severe pain and pain with less interference than that reported by respondents who were interviewed. Respondents with less severe or interfering pain may have decided their pain was not sufficiently "troublesome" to participate in the interview. Nevertheless, the opposing argument can also be made, that is, some respondents may have refused saying they did not have time or were disinterested because they were in too much pain. Three respondents did refuse to participate because they were too sick or in too much pain, and several other respondents refused to participate because they were too distressed about other circumstances, but not specifically about the pain (e.g. death in family, hospitalization of a partner).

### Age

Age was measured as a categorical variable in this study to ensure that this question would be answered by respondents during the telephone interview. However, this approach resulted in some loss of information from the variable as a person factor contributing to pain appraisal. The pattern of pain ratings when compared by age raised intriguing questions which need to be examined in future research.

In this study, age had a small main effect on threat appraisal of pain; there was no interaction effect of age with gender. However, further inspection of the means for appraisal and other pain characteristics by age and gender suggested that the overall pain experience for women, aged 26 to 35 years, may be somewhat different than for women in other age groups.

Women of this age are more likely to be concerned with childbearing, childrearing, and additional role responsibilities. Age may also have some effect on the pain experiences of men but there were was greater diversity in the distribution of men in the five age groups.

#### Measurement of Gender

As discussed in Chapter 1, biological factors that govern sex have some bearing on the nature of women's and men's pain experiences, but expectations that shape gender may affect how women or men appraise pain and respond to pain. In this study, the respondent's sex as female or male provided the only measurement of gender. Yet gender is more than biological sex. Measurement of gender by sex may be insufficient to identify all aspects of the relationships between gender, pain, appraisal and coping. In future pain appraisal research, more detailed consideration to the measurement of gender may be important to understand the social/cultural conditions that may affect gender variation in pain appraisal and coping. For example, Kaplan and Marks (1995) in a study of appraisal of health risks found that there were no significant sex differences in appraisal, but highly feminine men (Bem Sex Role Inventory, Bem, 1974) had the highest health concerns. Similarly, Hobfoll et al. (1994) found that gender-role orientation (Male-Female Relations Questionnaire, Spence, Helmreich, & Sawin, 1980) modified the effect of sex on coping in professional and interpersonal situations suggesting that gender differences were more distinct between traditional men and women than between less traditional women and men. Future research concerned with gender variation in pain experience will require careful attention to what we mean by gender to capture more than sex differences or similarities in pain research.

#### Interviewer Gender

The effect of the interviewer's gender has not been studied in pain research concerned with clinical practice, in epidemiological research, or in community surveys. The only existing research concerning experimenter gender comes from experimental pain research, and here the effect has been inconsistent. Levine and De Simone (1991) found an experimenter effect on

the response of male subjects, but the experimenters in this study were also selected for their attractiveness and dressed in what was considered by the researchers to be attractive clothing. Telephone interviews restrict the elements for potential impact of "experimenter gender" to the interviewer's name and her or his voice. Crook et al. (1984) used female and male interviewers asking respondents if they preferred one over the other to conduct the interview. In this study, we simply selected interviewers on the basis of their competence in conducting a telephone interview. However, inspection of the indirect helping-seeking scale, as discussed in Chapter 5, demonstrated that interviewer gender did have some bearing on male respondents' reports for the indirect help-seeking scale.

There was no significant effect for interviewer gender on the ratings of overall interference, emotional upset, intensity of pain, threat or challenge appraisal, externalizing, or internalizing/catastrophizing. The effect of interviewer gender was not examined for any other variables.

#### Temporal Nature of the Pain Report

Fifty-three percent of the respondents in this study had pain at the time of their interview. Supplementary analysis demonstrated that whether the pain was past or present significantly affected various ratings. For women and men, the difference between past ratings and present ratings was greatest for duration of pain. Pain that was present at the time of the interview had been present for longer periods of time.

When pain was present at the time of the interview, women tended to give higher ratings of most pain event factors as well as higher mean threat and challenge appraisals of pain, and they reported more frequent use of various coping strategies than did women who no longer had pain. Sixty-seven percent of pains, present at the time of the interview, were recurrent/chronic musculoskeletal pain whereas only 36% of the pains, that were no longer present at the time of the interview, were recurrent/chronic musculoskeletal pain. This difference in the type of pain is likely to have had an impact on pain ratings for pain present at the time of

the interview. Women may be more likely than men to diminish some aspects of a pain event once the pain has passed but such a relationship between gender and memory for pain would need to be examined in research with women and men with similar pains giving reports about the same pain event at two different time intervals.

Although this time factor was a potential confound in this study, overall interference and emotional upset, continued to be the most powerful variables associated with increasing threat appraisal when multiple regression analysis was restricted to respondents with pain present at the time of the interview.

#### Measurement of Pain Event Factors

Measurement of pain event factors consisted of single item rating scales. The reliability and validity of single item measures is always more difficult to determine. The single measure of overall interference correlated highly with a multiple item measure of interference (Pain Disability Index, Pollard et al., 1984). In addition, correlations for pain intensity, emotional upset, unusual severity of pain, unusual length of pain, and overall interference of pain with the total pain score of the McGill Pain Questionnaire (Melzack, 1987) ranged from .29 to .60 ( $p = .000$ ) (Appendix E, Table E4). Predictability (pain not getting better in an expected way) and controllability of pain were also correlated with this measure but the correlations were lower. The predictability variable, pain was unexpected, did not correlate at all with this measure. It may have been a meaningful question in only a few circumstances such as when pain was related to menstruation or childbirth.

The measurement for type of pain had good inter-rater agreement but the measure itself was highly subjective and may not have adequately determined whether the reported pain was an acute pain, or a recurrent/chronic pain, with or without an underlying condition.

### Implications for Future Research

The outcomes of this study have important implications for future research directions concerning pain appraisal. These issues have already been discussed and are briefly summarized.

#### 1. Relationship between age and gender

The relationship between age and gender warrants more attention since in this study there is some suggestion that women aged 26 to 35 years and men aged 55 to 65 years may be more troubled by pain.

#### 2. Impact of interviewer gender

Impact of interviewer gender should be given greater consideration in epidemiological, community, and clinical pain research.

#### 3. Pain report and memory

Very limited attention has been given to the temporal aspect of a pain event and its impact on women's or men's reports of the pain experience in community surveys. Outcomes from community based studies may be more meaningful if reporting of pains in cross-sectional studies was restricted to pain that is present at the time of contact.

#### 4. Other person factors and pain appraisal

Further research is needed to examine how other person factors, such as sociodemographic characteristics, multiple role responsibilities, and pain beliefs may interact with gender and age on pain appraisal.

#### 5. Contextual factors

Contextual factors may be idiosyncratic and variable from person to person, and from pain event to pain event. Understanding the impact of contextual factors may be best understood using prospective research designs and/or qualitative methodology.



#### 6. Variation in threat and challenge appraisal over time

Related to the previous comment, prospective research, would also permit us to examine the extent to which pain appraisal varies from one pain event to another, and whether shifts in appraisal hinder or benefit ability to cope with pain.

#### 7. Circumstances of challenge appraisal

Further research will be needed to determine if and how challenge appraisal is associated with overall health and well-being in the face of chronic health problems such as chronic pain.

#### 8. Relationship between appraisal and overall quality of health and well-being

Beyond the impact of pain appraisal on coping, appraisal may have an important bearing on perceptions of one's overall quality of health and well-being when one is experiencing chronic pain.

#### 9. Gender distribution within samples

Since the effect of gender may be small, unless equivalence in gender distribution is maintained, outcomes concerning gender variation may be easily distorted.

### Implications for Clinical Practice

As one of the few studies concerned with appraisal of pain in a community sample, this study has more implications for future research than for it does for clinical practice.

Nevertheless, this study draws attention to two important factors associated with threat appraisal of pain in a community sample that may have some bearing on the pain experience of people who seek health care services for persistent pain. Overall interference of pain on the activities and responsibilities of everyday life had the strongest relationship with threat appraisal.

There was a small but significant interaction effect for gender with overall interference; threat appraisal increased more steeply with increasing overall interference of pain for women.

Women with multiple role functions related to employment, childcare, household

management, and nurturance of relationships, may be particularly sensitive to interference of pain on daily life.

It is noteworthy that while emotional upset due to pain was important in the threat appraisal of pain, there was no gender difference in the degree of emotional upset reported, nor in the contribution of emotional upset to threat appraisal. In addition, even though women reported significantly more intense pain than men ( $p = .005$ ), there was no significant interaction of gender with pain intensity on threat appraisal. Further, the supplementary analysis, suggested that men may be reluctant to reveal the extent of their emotional distress to others especially to other men.

Gender-related biases in health care tend to place a disproportionate emphasis on psychological factors in women's pain experiences with a minimization of the role of psychological factors in men's pain experiences. Such biases about the impact of gender on pain, may have a substantial impact on the pharmacological, medical/surgical, rehabilitative, and psychological management of pain for women and men. Until more is known about the impact of gender on pain experience, health professionals should be attentive to possible biases in their expectations about the pain experiences of women and men.

Decreasing a threat appraisal may be difficult particularly for recurrent/chronic pains when there are no causal explanations, and if overall interference of pain can not be reduced. Assessment and modification of physical, environmental, psychological and social factors within workplace and home environments may be essential to ensure that chronic pain has a minimal impact on roles and responsibilities of everyday life. More attention should also be given directly to the interference of pain particularly in occupational responsibilities associated with paid and unpaid work, and in self-care activities such as dressing, bathing, and driving a vehicle. Attention to work place factors that may induce and perpetuate pain such as sitting positions, standing surfaces, lifting loads, excessive repetitive motions, productivity expectations, stress and fatigue may reduce risks for incurring pain and may reduce threat

appraisal of pain. Strategies to reduce the interference of pain such as pacing one's activities, incorporating appropriate rest periods, sleep management, and use of support groups, particularly for injured workers who are returning to employment, may have a positive impact on threat appraisal. Appropriate analgesia combined with other cognitive and behavioral pain management strategies may be an important means to reducing overall interference of pain and emotional upset due to pain, thereby also reducing the threat appraisal of the pain. Reduction of threat appraisal and shifting of appraisals from a threat to a challenge may be necessary to ensure overall health and well-being despite chronic or persistent pain.

#### Conclusion

Investigators who have been concerned with the management of illness and long term adjustment to health problems have long argued that greater attention should be given to the meaning attached to symptoms such as pain. In this study, I applied the stress-appraisal-coping model of Lazarus and Folkman (1984) as a framework to examine the relationships between gender, specific characteristics of pain, pain appraisal, and the relationship between appraisal and coping.

The sample for this study was drawn from the Halifax-Dartmouth-Bedford community. One thousand, four hundred and thirty households were entered into the study; 82% of these households were contacted over the study period. Eight percent of the individuals who were contacted refused to participate before their eligibility was determined. Three hundred and ninety people reported a troublesome pain in the previous two weeks and of this group, 309 respondents agreed to participate in the study resulting in a response rate of 79%. One hundred and fifty-seven women, and 152 men completed a telephone interview concerning their most troublesome pain in the previous two weeks. Fifty-three percent of respondents had pain at the time of the interview.

For women and men, the most important pain characteristics in appraisal of pain were overall interference of pain and emotional upset, accounting for 49% of the variance in threat appraisal for women, and 37% of the variance for men. Together, intensity of pain, "pain not getting better", and age of the respondent contributed approximately 3% to the variance in threat appraisal but in this study these variables were only important for women.

High threat appraisal was associated with approach coping strategies such as information-seeking, problem-solving, and seeking social support, as well as indirect help-seeking (e.g. crying, moaning, seeking comfort), palliative behaviours, and emotion-focused avoidance strategies (externalizing and internalizing/catastrophizing). High challenge appraisal was associated with information-seeking, positive self-statements, and problem-focused avoidance (cognitive and behavioural distraction). Overall, women used more coping strategies to manage pain than did men. Although threat appraisal, gender, and interaction of gender with threat contributed significantly to reported health care utilization, the model predicted only 10% of visits to health professionals in the previous two weeks.

In summary, this study demonstrated that when pain report was restricted to a short recall period, pain factors, such as duration of pain, its interference, emotional upset, uncontrollability, predictability, or unusualness, were very similar for women and men. And, although more aspects of pain were related to threat appraisal for women, the most important factors for women and men were the same. Women used significantly more coping strategies to manage their pain irrespective of their pain appraisals than did men, possibly in response to greater concern about the overall interference of pain on activities and responsibilities of everyday life.

The strongest link between appraisal and coping occurred between threat appraisal and internalizing/catastrophizing. Catastrophizing may have particularly negative consequences on the overall adjustment of people who experience chronic pain.

This study raised important supplementary questions about: (1) the relationship between gender, age, characteristics of pain, and pain appraisal; (2) the impact of the past/present nature of the pain on the pain report; (3) components of interference that are associated with threat appraisal; (4) the few differences between respondents with high threat appraisal and respondents with high challenge appraisal; (5) possible factors associated with health care utilization; and (6) the possible effect of interviewer gender on respondents.

Overall, this study conveyed more about threat appraisal of pain than about challenge appraisals. Moderate to high challenge appraisals were reported by only 14% of the sample. Challenge appraisals may be an underlying component of "resilience" or "hardiness", that elusive quality that enables some women and men to persevere in the face of persistent chronic health problems. If challenge appraisals are important in the overall health and well-being of people who experience chronic pain, then determining how threat appraisals can be lowered, and challenge appraisals fostered and supported will be critical in the overall management of chronic pain for women and men. The next challenge for pain appraisal research may be challenge itself.

## Appendix A - Procedure Booklet

(These procedural notes were based on Dillman, 1978,  
pg. 260-261, 265-267,  
with revisions as needed for this study.)

### A. Before you start, be sure:

1. To keep these Procedure Notes nearby.
2. To look through the highlighted names on the pages of the telephone book assigned to you. If you know any of these individuals, do not call this number. Let the supervisor know so that this individual can be assigned to someone else.
3. Make sure you have three sharpened pencils with erasers.
4. Begin using the Interview Protocol.

### B. Who to talk to:

Avoid interviewing children or young teenagers. Find out when the appropriate person will return and call back.

### C. The interview:

1. Mark down the time the interview starts.
2. Read the questions precisely as started.  
As you know even a single word can drastically change the meaning of the question for respondents. Attempts to interpret the question in response to a respondent's query frequently does the same thing. The following phrases can be used to respond to the question of "What do you mean?":

It's important that the question be answered as best as you can in terms of the way that it is stated, maybe I could read it again.

I'm sorry I don't have that information.

I will write down the concern (or qualification) you just mentioned so it will be taken into account in the analysis.

3. If the respondent wants more information than is provided in the Interview Protocol, see possible questions at the end of this booklet.
4. The respondent misunderstands a question.

It is very easy for respondents to miss a word or two that is crucial to the meaning of the question. Sometimes they are embarrassed to admit that they didn't quite understand. If you suspect a question has been misunderstood do not tell the respondent that you think she or he has misunderstood. This response may help:

I think I may not have read the question correctly, so, may I read it again to be sure.

#### 5. Use neutral probes as needed.

Most questions for this interview require the respondent to give a numerical rating. The provided script repeats the particular rating scale in several places. The rating scale can be repeated at the respondent's request. You can also repeat the rating more frequently if the respondent seems hesitant or unsure of what rating to give.

A few questions are open-ended. If you are in doubt about how to interpret the respondent's answer or what it means, use probes to be sure. For example, you might say.

Could you be a little more specific?

I'm not sure I am entirely clear about what you mean. Could you explain it a little more?

Could I read back what I have written down to be sure I have exactly what you wanted to say?

Before accepting an answer of "I don't know," be sure to probe. Respondents frequently use that phrase in a way that says, "I'm thinking." You may find it useful to gently repeat the question and/or the rating scale while the respondent is thinking.

#### 6. Write down everything.

If a respondent qualifies an answer, or if a comment stimulates a new response, write it down. Make sure that your handwriting is clear for another reader.

#### 7. If you need help excuse yourself and find the supervisor.

Sometimes a respondent wants to know more about the study or a particular question etc. then you may be able to tell them. If you think it is necessary, don't hesitate to ask the supervisor for help.

#### 8. If the respondent becomes angry or hostile, uses abusive language etc... Be nice! Keep calm and do not hang up!

This is not likely to happen. If it does, be patient, maybe the person had a bad day.

If the person is upset by an interview question, these responses may help:

I do understand that you feel quite strongly about this matter but this information will help us to understand how different factors affect pain experiences.

You do not have to answer any question that you would prefer not to.

If the respondent seems aggressive because she or he is recalling a bad pain experience, for example, the person may be angry about the attitude of other people or about having received inadequate care, you can try:

I think I can understand your feelings, and how difficult this experience has been. We hope very much that our research program will help us understand more about people's pains. I wonder if we can go on to the next question.

If all else fails, call for the supervisor or wait for an opportunity to say something to this effect: I think I can understand your feelings, and for not wanting to complete the interview. But thank you very much for the information anyway. Goodbye.

9. If the respondent goes off track and wants to talk about issues that are not directly related to the question.

It may be a challenge to keep someone on track. Try:

I would like to go on to the next question.

I would like to ask you about .....

10. If the respondent asks for advice about her or his pain.

Remember not to give any advice. Say:

I am not trained to give advice about someone's pain. If you are concerned about your pain you should speak to your family physician.

D. After you hang up:

1. Immediately record the time and calculate the time of the interview.

2. Check through the questionnaire.

Make sure ALL questions are answered, that the ratings are clearly marked and that any handwritten notes can be clearly read. Call the respondent back if you have missed anything.

3. Put a check mark beside the phone number on the telephone page assigned to you to indicate the interview was completed.

4. Give completed questionnaires to the supervisor.

E. When you are done for the evening/day:

1. Check out with the supervisor, explaining any call-backs that need special attention.

2. Do not take any questionnaires home with you. All study materials must remain on site.

F. After you have left:

We have an obligation to respondents to keep their interviews confidential. Breaches in confidentiality reflect badly on this study and all who are involved with it. Please do not tell anyone the substance of an interview or part of an interview no matter how fascinating or interesting it was. Also please avoid giving your own summary of findings. Although 90% of your respondents may report in one way, another interviewer may be having a very different experience. If you are interested in the results of this study, they can be made available to you when the study is completed.



## WHAT RESPONDENTS MIGHT LIKE TO KNOW ABOUT THIS STUDY

### **About the survey**

**Who is the person responsible for the survey?**

This person is Anita Unruh. Ms. Unruh is a registered occupational therapist and a registered social worker. This study is her doctoral thesis in the Interdisciplinary doctoral Program at Dalhousie University. Her thesis is supervised by Dr. Judith Ritchie from the School of Nursing at Dalhousie University. This study has been approved by the Ethics Committee of the Faculty of Graduate Studies. If you would like to talk to Ms. Unruh about this study, she can be reached at 494-1938.

**What is the Pain Research Program?**

The Pain Research Program consists of undergraduate and graduate students, and faculty, the majority from psychology but also individuals from nursing, occupational therapy and medicine. The Pain Research Program is committed to the study of pain and improving our care for people when they experience pain.

**What is the purpose of the survey?**

We really don't know very much about what people think and do when they have everyday kinds of pain problems. Studies such as this one help us to understand more about how we can help those people who may have pain over long periods of time.

### **About the respondent's role**

**How did you get my telephone number?**

All phone numbers were selected from this year's telephone book. We use a computer program to randomly selected numbers. This means that every telephone number has an equal chance of being selected, and it is strictly by chance that one of these phone numbers was yours.

**Why do you ask about "ethnic origin"?**

We realise that this is a multicultural community and that our survey may also reflect a multicultural perspective. We need to be able to describe the people of this survey. Ethnic origin will not be used to analyze any results of this study.

**Is this confidential?**

Yes. Confidentiality is very important. After the interview is completed, your answers are entered into the computer without your name, address or phone number. All information that we release is in the form of percentages. In no way do we identify any individual.

**Can I get a copy of the results?**

Yes, we would be glad to send it to you if you will give us your complete address. The results should be available in six months time.

Appendix B - Interview Protocol

**PAIN APPRAISAL AND COPING STUDY**  
Anita M. Unruh MSW, OT(C)  
Faculty of Graduate Studies  
Dalhousie University

**INTERVIEW PROTOCOL FOR TELEPHONE RECRUITMENT**

Step 1. Using the outlines procedure, select a highlighted telephone number from the section of the telephone book assigned to you.

Step 2. Record the telephone number and the name of the contact person on the Telephone Log Form and dial the number.

Possible Outcomes:

1. NO ANSWER - mark 'NA' under the "NA - Busy" column of your Call Record and record the time in the "Time" column. Try the number later.
2. BUSY SIGNAL - mark 'Busy' under the "NA - Busy" column of your Call Record and record the time in the "Time" column. Try the number later.
3. IF SOMEONE ANSWERS THE PHONE - **Hello, may I speak to person's name from the phone book** (i.e. M. Wilson, John Doe - do not use Miss, Ms. Mr., etc ...).

In cases of ...

CALL WAITING - If the person who answers says, "I'm on the other line, can I take a message" or "Can I get them to call you back" Reply, "No, thank you, I'll call back later. **When would be a good time to try again?**" Note suggested time to try again and 'call waiting' in the COMMENTS HEADING of the CALLBACK LIST.

WRONG NUMBER - Ask, "Is this (say the telephone number you just dialled)?". If it is the right number but the wrong name in the book, introduce the study as if you had reached the contact person. If you dialled the number incorrectly, apologize for disturbing the person, hang up and redial.

NOT HOME/UNAVAILABLE - If you have asked to speak to person's name from the phone book and this person is not at home or is unavailable but the person answering the phone is an adult, introduce the study as if you had reached the contact person. If the person answering the phone is a child, reply, "I'll call back later. **When do you think they will be home?**" or "**When would be a good time to try again?**" Note that the contact was NOT HOME in the COMMENTS HEADING of the CALLBACK LIST with the suggested time to call again.

WHEN THE CONTACT IS AT HOME

Hello, my name is give your first and last name. I am calling you from the Pain Research Program at Dalhousie University. I am part of a research team headed by an interdisciplinary doctoral student, Anita Unruh, under the supervision of Dr. Judith Ritchie, from the School of Nursing at Dalhousie University. We are conducting a community study about people's everyday pain experiences.

Your name was chosen at random from the telephone book. We are looking for men and women between the ages of 18 and 65 years who have had pain in the previous two weeks. The pain may have been a headache, migraine, back pain, muscle or joint pain, chest pain, menstrual pain, or some other type of pain. In the last two weeks, have you or any other member in your household had a troublesome pain? (If the respondent is unsure about the word 'troublesome' say a pain to which you had to pay attention. If the person has had several pains, ask for the most troublesome pain. If there is more than one available person, ask for the person who has had the most recent pain. If there is more than one person with pain at the time of the call and they would both be interested, choose the person with the next birthday.)

**IF NO ONE IN THE HOUSEHOLD BETWEEN THE AGES OF 18-65 YEARS HAD A TROUBLESOME PAIN IN THE PAST TWO WEEKS**

Say:

O.k. May I ask you two questions to help us compare people who have had a troublesome pain in the past two weeks from those who don't.

If YES

Q-1. Are you male or female? F FEMALE M MALE

Q-2. What is your age? 18-25 years? 36-45 years? 46-55 years or 56-65 years?

1. 18-25 years
2. 26-35 years
3. 36-45 years
4. 46-55 years
5. 56-65 years

Thank you for your time. Goodbye. On the TELEPHONE LOG FORM, go to the NO heading under ELIGIBILITY, record F or M and the number for the respondent's age group.

If NO

Thank you for your time. Goodbye. On the TELEPHONE LOG FORM, go to the NO heading under ELIGIBILITY and put a ? in the columns.

**WHEN YOU HAVE THE APPROPRIATE PERSON**

Say:

I would like to tell you a bit more about the study before you decide if you would like to participate. The Dalhousie Pain Research Program does many different types of studies about pain. This study is supported by scholarships to Anita Unruh from the Medical Research Council and the Canadian Occupational Therapy Foundation. The study has also been approved by the Dalhousie University Faculty of Graduate Studies Ethics Committee.

In this study, we are interested in the most troublesome pain you have had in the past two weeks. What you tell us about your pain experience will help us to know more about how people feel, how they think and what they do when they have pain.

If you wish to participate, the interview will take about 25 minutes. We can do the survey now or at a more convenient time for you. During the survey I will ask you about the pain, how it affected your everyday life if at all and what you did to manage the pain. You don't have to answer any questions with which you are uncomfortable and you may end the interview at any time. Any information you give will be confidential and will only be available to the research team. Also if you are interested in the results of this study, we will be pleased to mail them to you once the study has been completed. Are you interested in taking part in the study?"

IF IT IS NOT A GOOD TIME, ask when would be a better time to call back. Record the call on the CALLBACK LIST. In the "Comments" column note the time for the callback and be sure to call again at that time.

#### IF NOT INTERESTED

Say, "It would be helpful for the design of this study, if you could tell us whether you are a woman or a man, whether you are 18-25 years of age, 36-45 year, 46-55 years or 56-65 years, and why you are not interested." After the respondent has commented, say "Thank you for your time. Goodbye."

Include the SEX and AGE GROUP of the respondent under ELIGIBLE - NO and any reasons under the COMMENTS heading of the TELEPHONE LOG FORM.

#### IF THE PERSON DOES WANT TO PARTICIPATE

Say: "Okay. Thank you. Do you still have the pain?"

If the pain is not present go to the WHITE QUESTIONNAIRE. If it is PRESENT go to the WHITE QUESTIONNAIRE. Be sure you have the right form. Use the script as provided with the questions. The script is in **bold print**. Circle the number of the response choice as indicated by the respondent. Put open-ended responses on the lines provided. Any additional comments should be printed on the right hand side. Please do not put any marks in the left hand margins. The left margin is for coding only for data entry.

Record this call and its outcome on the TELEPHONE LOG FORM.

Remember when the call is completed to check the questionnaire over. Be sure you have asked all questions and recorded all responses before you go on to the next call. Call back if you have missed something.

Appendix C  
PAIN APPRAISAL AND COPING QUESTIONNAIRE - Anita M. Unruh MSW, OT(C)  
Faculty of Graduate Studies  
Dalhousie University

Blue Form - Respondent's pain is still PRESENT

The first questions are:

Q-1. Are you male or female?

1. FEMALE
2. MALE

Q-2. And what was your most troublesome pain in the past two weeks? Confirm that the pain is still present.

Note: The respondent may give you information here that answers Q-3 and/or Q-4. If this happens, mark the answers and then continue with Q-5.

---

If the respondent's pain is menstruation or childbirth, skip Q-3 and Q-4 and go to Q-5-5.

There will be 5 short sections to this interview. In this first part of the interview I will be asking you a number of questions about the (respondent's pain).

Q-3. Was the (respondent's pain) caused by an accident?

1. NO (Go to Q-4)
2. YES (Go to Q-5)

Q-4. Is the pain caused by an illness or a disease? We don't need to have personal details about the disease, just if your pain is related to an illness or disease.

Write down the illness or disease if given.

1. NO
2. YES

Q-5. How often in the your life have you had this pain? I will read a list of response choices. Tell me when I get to the one that fits how often you think you have had this pain.

0. NEVER
1. BETWEEN 1 AND 5 TIMES
2. BETWEEN 6 AND 10 TIMES
3. BETWEEN 11 AND 15 TIMES
4. BETWEEN 16 AND 20 TIMES
5. MORE THAN 20 TIMES

Q-6. On how many days altogether have you had this pain so far? Your pain may have been short or it may have come and gone over the past two weeks. Again, I will read a list. You can stop me when I get to the right answer for you. Ex. If the pain was short on one day but longer the next, mark "2" for about 2 days. If you are unsure about which number to circle, write the respondent's comments in the right hand margin.

0. LESS THAN ONE HOUR
1. 1 DAY OR LESS
2. ABOUT 2 DAYS
3. ABOUT 3 DAYS
4. ABOUT 4 DAYS
5. ABOUT 5 DAYS
6. ABOUT 6 DAYS
7. ABOUT 7 DAYS
8. ABOUT 8 DAYS
9. ABOUT 9 DAYS
10. ABOUT 10 DAYS OR MORE

Q-7. I am going to read to you a list of other problems that people sometimes have when they have a pain. Are you having any of these problems with the (respondent's pain). Read list, except "no other problems", and circle the number of any which the respondent identifies. Circle "0" if the respondent says she/he had no other problems.

0. NO OTHER PROBLEMS
1. DIZZINESS
2. DIARRHOEA
3. NAUSEA/VOMITING
4. BRUISING
5. SWELLING
6. BLEEDING
7. CUT
8. BROKEN BONE
9. BURN
10. ANYTHING ELSE THAT I HAVEN'T MENTIONED  
(Please describe \_\_\_\_\_)

Next, I will be reading a series of questions. For each question I will ask you to give me a rating from "0" to "10". "0" means "not at all" and "10" means "extremely".

Q-8. How intense is the (respondent's pain), on average?

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

\*  
Q-9. Did you expect to have the (respondent's pain) ?

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

**Q-10. How upset are you, emotionally, about the pain?**

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

**Q-11. Is the pain more severe than you might have expected?**

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

**Q-12. Is the pain lasting longer than you might have expected?**

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

\*

**Q-13. Is the pain getting better in a way you expected?**

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

\*

**Q-14. Are you able to control the pain by ignoring, using medication, rest or some other method?**

0 1 2 3 4 5 6 7 8 9 10

NOT AT ALL

EXTREMELY

Next, I will read a list of 15 words that are commonly used by people to describe their pain. For each word, think about whether your pain feels this way IF AT ALL.

First, I'll get you to write down the response choices for the words. Do you have a pen and paper there? The response choices are "not at all", "mildly", "moderately", or "severely". Again that's ... (read the response choices out again).

Now I will read the word, and you tell me which is the right response choice for your (respondent's pain) when you have been having this pain over the past two weeks.

Was the pain ...

	NOT AT ALL	MILDLY	MODERATELY	SEVERELY
Q-15. THROBBING	0) _____	1) _____	2) _____	3) _____
Q-16. SHOOTING	0) _____	1) _____	2) _____	3) _____
Q-17. STABBING	0) _____	1) _____	2) _____	3) _____
Q-18. SHARP	0) _____	1) _____	2) _____	3) _____
Q-19. CRAMPING	0) _____	1) _____	2) _____	3) _____
Q-20. GNAWING	0) _____	1) _____	2) _____	3) _____
Q-21. HOT-BURNING	0) _____	1) _____	2) _____	3) _____
Q-22. ACHING	0) _____	1) _____	2) _____	3) _____
Q-23. HEAVY	0) _____	1) _____	2) _____	3) _____
Q-24. TENDER	0) _____	1) _____	2) _____	3) _____
Q-25. SPLITTING	0) _____	1) _____	2) _____	3) _____
Q-26. TIRING-EXHAUSTING	0) _____	1) _____	2) _____	3) _____
Q-27. SICKENING	0) _____	1) _____	2) _____	3) _____
Q-28. FEARFUL	0) _____	1) _____	2) _____	3) _____
Q-29. PUNISHING-CRUEL	0) _____	1) _____	2) _____	3) _____

\_\_\_ Sensory Score

\_\_\_ Affective Score



The second part of the interview is about the effect of your (respondent's pain) on your everyday activities in the past two weeks. I will ask you to rate how much your pain is preventing you from doing what you would normally do, or from doing it as well as you normally would.

Think about the overall interference of the pain not just when the pain was at its worst. For these questions, we will again use the 0 to 10 scale. "0" means "no interference" and "10" means "total interference". Choose a number that tells me how much the pain interferes with your activities.

If the respondent has difficulty with the word "interference" - say again how much the pain prevented you from doing what you would normally do or from doing it as well as you normally would.

Q-30. Family/home responsibilities

The first question is about family/home responsibilities. This includes chores you do around the house/apartment such as yard work as well as errands or favours for the family/household members, such as getting groceries or driving the children to school. On a scale from 0 to 10, how much does the (respondent's pain) interfere with your family and home responsibilities?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

Q-31. Social activity

The next question is about those activities which involve friends and other people beside your family. It includes parties, movies, concerts, dining out, and other social activities.

How much does the (respondent's pain) interfere with your social activities?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

Q-32. Recreation

This question is about your hobbies, sports, crafts or other activities you do for fun and relaxation.

How much does the (respondent's pain) interfere with your recreational activities?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

## Q-33. Occupation

Next, I will ask you about activities that are a part of your work. This includes non-paying jobs such as being a homemaker, volunteer or a student.

How much does the (respondent's pain) interfere with your work?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

## Q-34. Self-care

I want to ask you about your self-care activities, activities which involve looking after yourself, for example taking a shower, driving, getting dressed and so on.

How much does the pain interfere with these activities?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

## Q-35. Life-support category

How much does the pain interfere with eating, sleeping, and breathing?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

\_\_\_ Total PDI Score

Q-36. Now the last question of this section. Overall, to what extent does the pain interfere in your activities and responsibilities?

0 1 2 3 4 5 6 7 8 9 10

NO INTERFERENCE

TOTAL INTERFERENCE

For the third section, I will read a series of sentences. Again, we are interested in the (respondent's pain) over the past two weeks. I will ask you whether you agree or disagree with the sentence. You may find it helpful to write the response choices down again. The response choices are "strongly disagree", "moderately disagree", "slightly disagree", "slightly agree", "moderately agree", "strongly agree". Again, that's ... (read the choices a second time). O.k., now listen to each sentence and tell me which response choice best fits how you would be thinking about your (respondent's pain). If the respondent says "Well I haven't been thinking about that", say "When you think about your pain now, do you think you would agree or disagree?" When the respondent identifies one or the other, ask "Do you think this would be strongly? moderately, or slightly?"

Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
SD	MD	SLD	SLA	MA	SA

- Q-37. I am concerned that the pain might mean something is wrong with me. . . . . SD MD SLD SLA MA SA
- q-38. I think the pain is a chance to prove myself. . . . . SD MD SLD SLA MA SA
- Q-39. I am concerned that the pain might become more than I can manage. . . . . SD MD SLD SLA MA SA
- q-40. I think the pain is a test of my strength and ability. . . . . SD MD SLD SLA MA SA
- q-41. I think something good might come out of having the pain. . . . . SD MD SLD SLA MA SA
- Q-42. I am worried about getting things done. . . . . SD MD SLD SLA MA SA
- q-43. I think the pain makes me a stronger person. . . . . SD MD SLD SLA MA SA
- Q-44. I am concerned about how much more pain I can take. . . . . SD MD SLD SLA MA SA
- q-45. I think the pain is a chance to learn more about myself. . . . . SD MD SLD SLA MA SA
- Q-46. The pain seems threatening. . . . . SD MD SLD SLA MA SA
- q-47. I think without this pain, there is no gain. . . . . SD MD SLD SLA MA SA
- Q-48. I am worried about being depressed or discouraged because of the pain. . . . . SD MD SLD SLA MA SA
- q-49. I think of this pain as a challenge. . . . . SD MD SLD SLA MA SA
- Q-50. I feel controlled by the pain. . . . . SD MD SLD SLA MA SA
- Q-51. I think the pain tests how well I can manage. . . . . SD MD SLD SLA MA SA
- Q-52. I think of this pain as a threat. . . . . SD MD SLD SLA MA SA

The fourth part of this interview is about the many things that people might say, do, or think when they have pain. You may find it helpful to write the response options down again. I would like to know what you have been doing over these days when you are having (respondent's pain) ? I will be asking you how often you did each thing. Choose one of the following responses: "NEVER" "HARDLY EVER" "SOMETIMES" "OFTEN" "VERY OFTEN".

NEVER    HARDLY EVER    SOMETIMES    OFTEN    VERY OFTEN  
N                    HE                    S                    O                    VO

When I am having the pain, I ....

- Q-53. Ask questions about the pain. . . . . N HE S O VO  
 Q-54. Focus on the pain and see how I can make it better. . . . . N HE S O VO  
 Q-55. Talk to a friend about how I feel. . . . . N HE S O VO  
 Q-56. Tell myself don't worry, everything will be ok. . . . . N HE S O VO  
 Q-57. Go and work or play. . . . . N HE S O VO  
 Q-58. Forget the whole thing. . . . . N HE S O VO  
 Q-59. Say mean things to people. . . . . N HE S O VO  
 Q-60. Worry that I will always be in pain. . . . . N HE S O VO

When I am having the pain, I ....

- Q-61. Ask for or take medicine. . . . . N HE S O VO  
 Q-62. Cry so someone will help me . . . . . N HE S O VO  
 Q-63. Ask a health professional questions . . . . . N HE S O VO  
 Q-64. Think about what needs to be done to make the pain better. . . . . N HE S O VO  
 Q-65. Talk to someone about how I am feeling. . . . . N HE S O VO  
 Q-66. Say to myself, be strong. . . . . N HE S O VO  
 Q-67. Do something fun. . . . . N HE S O VO  
 Q-68. Ignore the pain. . . . . N HE S O VO

When I am having the pain, I ....

- Q-69. Argue or fight. . . . . N HE S O VO  
 Q-70. Keep thinking about how much it hurts . . . . . N HE S O VO  
 Q-71. Put heat or ice on the sore spot. . . . . N HE S O VO  
 Q-72. Moan or groan so someone will help me. . . . . N HE S O VO  
 Q-73. Find out more information. . . . . N HE S O VO  
 Q-74. Think of different ways to deal with the pain. . . . . N HE S O VO  
 Q-75. Tell someone how I feel. . . . . N HE S O VO  
 Q-76. Tell myself, it's not so bad. . . . . N HE S O VO

NEVER HARDLY EVER SOMETIMES OFTEN VERY OFTEN  
 N HE S O VO

When I am having the pain, I ....

- Q-77. Do something I enjoy. . . . . N HE S O VO  
 Q-78. Try to forget the pain. . . . . N HE S O VO  
 Q-79. Yell to let off steam. . . . . N HE S O VO  
 Q-80. Think that nothing helps. . . . . N HE S O VO  
 Q-81. Rub the part of me that is sore. . . . . N HE S O VO  
 Q-82. Ask someone to hold my hand. . . . . N HE S O VO  
 Q-83. Learn more about how my body works . . . . . N HE S O VO  
 Q-84. Figure out what I can do about the pain. . . . . N HE S O VO

When I am having the pain, I ...

- Q-85. Talk to a family member about how I feel. . . . . N HE S O VO  
 Q-86. Say to myself, things will be OK. . . . . N HE S O VO  
 Q-87. Do something active. . . . . N HE S O VO  
 Q-88. Put the pain out of my mind . . . . . N HE S O VO  
 Q-89. Get mad and throw or hit something. . . . . N HE S O VO  
 Q-90. Think that the pain will never stop. . . . . N HE S O VO  
 Q-91. Rest or stay still. . . . . N HE S O VO  
 Q-92. Cry to let my feelings out. . . . . N HE S O VO  
 Q-93. Try different ways to make the pain better  
 until I find one that works . . . . . N HE S O VO

When I am having the pain, I ...

- Q-94. Let my feelings out to a friend. . . . . N HE S O VO  
 Q-95. Tell myself, I can handle anything that happens. . . . . N HE S O VO  
 Q-96. Do something to take my mind off the pain. . . . . N HE S O VO  
 Q-97. Don't think about the pain. . . . . N HE S O VO  
 Q-98. Curse or swear out loud. . . . . N HE S O VO  
 Q-99. Worry too much about the pain. . . . . N HE S O VO  
 Q-100. Try to relax. . . . . N HE S O VO  
 Q-101. Cry about it. . . . . N HE S O VO  
 Q-102. Try to sleep. . . . . N HE S O VO  
 Q-103. Protect the part of me that is sore . . . . . N HE S O VO

In this study, we are also interested in when people use health professionals for pain. The health professional may be a family doctor, a medical specialist, a chiropractor, a physical therapist, an occupational therapist, a dentist, a nurse, or a homeopathic healer.

Q-104. In the past two weeks, have you been thinking about seeing a health professional for your (respondent's pain) ? Circle the appropriate number.

1. NO
2. YES

Q-105. In the past two weeks, anyone suggested to you that you should see a health professional about the pain?

1. NO
2. YES

Q-106. In the past two weeks, did you make an appointment to see a health professional about the pain?

1. NO
2. YES

Q-107. Have you seen a health professional in the past two weeks for the pain? This doesn't include going to a hospital emergency department.

1. NO
2. YES

Q-108. Now, in the past two weeks, did you visit a hospital emergency department because of this pain?

1. NO
2. YES

Q-109. Have you ever in your life seen a health professional for the (respondent's pain)?

1. NO
2. YES

This is the fifth and last section of the interview. I have just a few background questions. This information helps us to know a bit more about the people we interview and how pain may affect everyday life. I'll just remind you that you don't have to give any information if you're not comfortable. I'll just ask the question and then list some choices. Stop me when I reach the right response for you.

Q-110. Over the past year have you been often troubled by persistent or on-going pain?

1. NO
  2. YES (If YES, please describe type of pain \_\_\_\_\_)
-

**Q-111. What is your age? 18-25 years? 26-35 years? 36-45 years? 46-55 years or 56-65 years?**

1. 18-25 YEARS
2. 26-35 YEARS
3. 36-45 YEARS
4. 46-55 YEARS
5. 56-65 YEARS

**Q-112. Are you single, separated or divorced, widowed or widower, married or common-law?**

1. SINGLE?
2. SEPARATED OR DIVORCED?
3. WIDOWED OR WIDOWER?
4. MARRIED OR COMMON LAW?

**Q-113. Do you have any children?**

1. NO
2. YES

**Q-114. How many children do you have living at home? Number of children at home \_\_\_\_\_**

**Q-115. Do you look after a disabled person in your home? This person may be your partner, an elderly parent, or a child.**

1. NO
2. YES

**Q-116. What is your employment status? I will read several categories. Please indicate which ones apply to you.**

1. WORK FULL-TIME
2. WORK PART-TIME
3. UNEMPLOYED
4. FULL-TIME HOMEMAKER
5. STUDENT
6. RETIRED
7. OTHER (Please describe \_\_\_\_\_)

**Q-117. The next question is about your ethnic or cultural identity. Some people think of themselves as Canadian, or Canadian together with some other ethnic or cultural backgrounds such as British, French, Irish, Jewish, African, Jamaican, Acadian, North American Indian, East Indian, Chinese/Japanese, American, or an ethnic/cultural group that I haven't yet mentioned. What is your ethnic or cultural identity?**

---

Q-118. Is your yearly household income... (Read the list.)

1. LESS THAN \$20,000
2. \$21,000 TO \$40,000
3. \$41,000 TO \$60,000
4. \$61,000 TO \$80,000
5. \$81,000 TO \$100,000
6. MORE THAN \$100,000?

Q-119. What is your highest level of education?

1. SOME OR ALL OF ELEMENTARY SCHOOL
2. SOME OR ALL OF JUNIOR HIGH
3. SOME HIGH SCHOOL
4. COMPLETED HIGH SCHOOL
5. SOME COLLEGE, VOCATIONAL, OR UNIVERSITY COURSES
6. COMPLETED COLLEGE OR VOCATIONAL SCHOOL
10. COMPLETED UNDERGRADUATE UNIVERSITY DEGREE
11. SOME GRADUATE COURSES OR COMPLETED GRADUATE DEGREE

Okay, Mr./Ms. \_\_\_\_\_, that's all the questions I have. Are you interested in receiving the results of the study? If YES, I'll take your name and your address and we will mail them to you as soon as possible. Do you have any questions or comments about the survey?

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
(House or apt. no., street, city, postal code)

Thank you very much for your time and cooperation.



## Appendix D - Scoring Scheme for Type of Pain

### TYPE OF PAIN (based on Q-2, Q-3, Q-4, and Q-5)

The type of pain is used to distinguish 4 types of pain:

#### **1. Acute pain not associated with recent injury, illness, disease or health procedure**

- pain has occurred 5 times or less (answered 0 or 1 for Q-5)
- pain does not seem to be identified with a recent injury, illness or health procedure or any chronic disease, condition, disability or problem (no for Q-3 and Q-4)
- pain may be associated with activity

#### **2. Acute associated with injury, illness, or health procedure**

- pain has occurred 5 times or less (answered 0 or 1 for Q-5)
- pain is due to recent injury, illness or health procedure (yes for Q-3 and/or Q-4)

#### **3. Recurrent or chronic pain not associated with disease, disability or prior health procedure**

- pain occurred 6 times or more (answered 2,3,4, or 5 to Q-5)
- pain was identified with an underlying chronic problem or behaviour such as posture, digestion, stress, wearing bad shoes etc. (this information will be written in response to Q-2, Q-3 or Q-4)
- menstrual pain is coded here
- recurrent headaches due to colds or flues are coded here

#### **4. Recurrent or chronic pain associated with disease/disability or a prior health procedure**

- pain has occurred 6 times or more (answered 2,3,4, or 5 to Q-5)
- pain is identified with an underlying chronic disease, condition, disability, injury, or a previous health procedure (yes response given to Q-3 and/or Q-4).

#### **Directions**

First, look at the response for Q-5 and determine whether the respondent has had this pain 5 times or less, or 6 times or more.

If the pain has occurred 5 times or less, determine whether a recent injury or illness was associated with the pain. This type of pain should be coded as 1 or 2.

If the pain has occurred 6 times or more, the pain is considered as recurrent as chronic. Now determine whether the pain is related to activity, disease etc. This type of pain should be coded as 3 or 4.

## Appendix E - Correlation Matrices

Table E1

Correlation Matrix of the Pain Appraisal Inventory, MPQ Sensory and Affective Scores, Pain Disability Index, and Pain Coping Questionnaire Factor Scores

	Threat	Challenge	MPQ Sensory Score	MPQ Affective Score	Pain Disability Index	PCQ - Approach	PCQ - Problem - Focused
Challenge	.21****						
MPQ Sensory Score	.40****	.16***					
MPQ Affective Score	.55****	.19****	.60****				
Pain Disability Index	.51****	.19****	.49****	.54****			
PCQ- Approach	.40****	.27****	.27****	.30****	.28****		
PCQ - Problem- Focused	-.23****	.11*	-.16***	-.22****	-.39****	.02 ns	
PCQ- Emotion- Focused	.62****	.17***	.41****	.51****	.46****	.30****	-.21****

Note. \*p < .05, \*\*p < .01, \*\*\*p < .005, \*\*\*\*p < .001.

Table E2

Correlation Matrix of the Pain Appraisal Inventory, and Pain Coping Questionnaire Scale Scores

Item	Information Seeking	Seeking Social Support	Problem-Solving	Positive Self Statements	Behavioural Distraction	Cognitive Distraction
Seeking Social Support	.46****					
Problem-Solving	.26****	.41****				
Positive Self Statements	.31****	.27****	.41****			
Behavioural Distraction	-.03ns	.04ns	-.01ns	.21****		
Cognitive Distraction	-.10ns	-.12*	-.13*	.23****	.60****	
Threat	.41****	.28****	.34****	.13ns	-.21****	-.20****
Challenge	.26****	.14**	.16**	.23****	.10ns	.09ns

Note. \*p < .05, \*\*p < .01, \*\*\*p < .005, \*\*\*\*p < .001.

Table E3

Correlation Matrix of the Pain Appraisal Inventory, and Pain Coping Questionnaire Scale Scores

Items	Externalizing	Internalizing/Catastrophizing	Indirect Help-Seeking	Palliative Behaviours
Internalizing/Catastrophizing	.40***			
Indirect Help-Seeking	.46****	.35****		
Palliative Behaviours	.25****	.40****	.39****	
Threat	.31****	.69****	.35****	.44****
Challenge	.12ns	.16***	.19****	.12*

Note. \*p < .05, \*\*p < .01, \*\*\*p < .005, \*\*\*\*p < .001.

Table E4

Correlation Matrix of Pain Event Factors with Pain Appraisal and Total MPQ Score

	Overall Inter-ference	Emotional Upset	Intensity	Unusual Severity	Unusual Length	Pain Not Getting Better	Pain Unexpected	Uncontrol-ability	Duration	Age	Threat	Challenge
Emotional Upset	.44****											
Intensity	.51****	.33****										
Unusual Severity	.38****	.40****	.36****									
Unusual Length	.33****	.31****	.24****	.50****								
Pain Not Getting Better	.15**	.16***	.04 ns	.10 ns	.19****							
Pain Unexpected	.05 ns	-.03 ns	.0009 ns	.20****	.18***	-.06 ns						
Uncontrol-ability	.16***	.11*	.06 ns	.05 ns	.12*	.29****	.15**					
Duration	.12*	.10 ns	.03 ns	.11*	.27****	.36****	-.20****	.11*				
Age	.01 ns	-.12*	-.04 ns	-.07 ns	-.07 ns	.06 ns	-.09 ns	.03 ns	.33***			
Threat	.55****	.56****	.39****	.36****	.25****	.21****	-.05 ns	.15**	.15**	.07 ns		
Challenge	.23***	.12*	.10 ns	.18****	.12*	.02 ns	-.13**	-.04 ns	.13*	-.003 ns	.21****	
MPQ	.55****	.47****	.60****	.39****	.29****	.16**	-.07 ns	.12*	.13*	-.03 ns	.49****	

Note. \* p < .05, \*\* p < .01, \*\*\* p < .005, \*\*\*\* p < .001.

**Appendix F - Multiple Regression Analyses of Threat, Challenge and Gender  
for PCQ Subscale Scores**

**Table F1**

**Hierarchical Multiple Regression Analysis of Gender and Appraisal on Information-Seeking**

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat	.27	.04	.37	p = .000
Challenge	.19	.05	.19	p = .000
Gender*	-.14	.10	-.08	ns
<b>Step 2 - Interaction Model</b>				
Threat	.32	.05	.43	p = .000
Challenge	.18	.07	.18	p = .014
Gender*	.15	.29	.08	ns
Gender x threat**	-.10	.08	-.19	ns
Gender x challenge**	.01	.02	.02	ns

Note . \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .21$  for Step 1,  $F(3, 305) = 27.01$ ,  $p = .000$ ;  $\Delta R^2 = .21 = .005$  (ns), partial  $F(2, 303) = .922$  (ns).

**Table F2**

**Hierarchical Multiple Regression Analysis of Gender and Appraisal on Problem-Solving**

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat	.17	.03	.31	p = .000
Challenge	.08	.04	.10	ns
Gender*	-.22	.08	-.15	p = .005
<b>Step 2 - Interaction Model</b>				
Threat	.19	.04	.35	p = .000
Challenge	.02	.06	.03	ns
Gender*	-.31	.23	-.21	ns
Gender x threat**	-.04	.06	-.10	ns
Gender x challenge**	.11	.08	.18	ns

Note . \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .15$  for Step 1,  $F(3, 305) = 17.50$ ,  $p = .000$ ;  $\Delta R^2 = .006$  (ns), partial  $F(2, 303) = 1.12$  (ns).

Table F3

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Seeking Social Support

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat score	.18	.04	.25	p = .000
Challenge score	.10	.05	.10	p = .058
Gender*	-.36	.10	-.20	p = .000
<b>Step 2 - Interaction Model</b>				
Threat	.21	.06	.29	p = .000
Challenge	.04	.08	.05	ns
Gender	-.39	.30	-.21	ns
Gender x threat**	-.06	.08	-.12	ns
Gender x challenge	.11	.11	.15	ns

Note . \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .12$  for Step 1,  $F(3, 305) = 14.29$ ,  $p = .000$ ;  $\Delta R^2 = .004$  (ns). Partial F (2, 303) = .715 (ns).

Table F4

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Positive Self-Statements

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat score	.04	.04	.07	ns
Challenge score	.20	.05	.23	p = .000
Gender*	-.29	.09	-.18	p = .001
<b>Step 2 - Interaction Model</b>				
Threat	.11	.05	.17	p = .026
Challenge	.18	.07	.21	p = .009
Gender*	.08	.08	.05	ns
Gender x threat**	-.14	.08	-.30	p = .052
Gender x challenge**	.03	.10	.05	ns

Note . \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .09$  for Step 1;  $\Delta R^2 = .01$  (ns). Partial F (2, 303) = 1.91 (ns).

Table F5

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Behavioral Distraction

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat	-.16	.04	-.25	p = .000
Challenge	.14	.05	.16	p = .006
Gender*	-.13	.09	-.07	ns
<b>Step 2 - Interaction Model</b>				
Threat	-.17	.05	-.26	p = .001
Challenge	.10	.07	.11	ns
Gender*	-.36	.29	-.21	ns
Gender x threat**	.02	.07	.05	ns
Gender x challenge**	.08	.10	.12	ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .07$  for Step 1,  $F(3, 305) = 7.72$ ,  $p = .000$ ;  $\Delta R^2 = .003$  (ns). Partial  $F(2, 303) = .91$  (ns).

Table F6

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Cognitive Distraction

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat score	-.15	.04	-.23	p = .000
Challenge score	.12	.05	.14	p = .016
Gender*	.10	.09	.06	ns
<b>Step 2 - Interaction Model</b>				
Threat	-.13	.05	-.20	p = .011
Challenge	.07	.07	.07	ns
Gender*	.01	.29	.008	ns
Gender x threat**	-.04	.07	-.09	ns
Gender x challenge**	.11	.20	.16	ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .06$  for Step 1,  $F(3, 305) = 6.88$ ,  $p = .000$ ;  $\Delta R^2 = .004$  (ns). Partial  $F(2, 303) = 1.28$  (ns).

Table F7

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Externalizing

Variables	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat score	.15	.03	.29	p = .000
Challenge score	.04	.04	.07	ns
Gender*	-.11	.08	-.09	ns
<b>Step 2 - Interaction Model</b>				
Threat	.19	.04	.36	p = .000
Challenge	-.01	.06	-.02	ns
Gender*	-.09	.23	-.06	ns
Gender x threat**	-.08	.06	-.21	ns
Gender x challenge**	.12	.08	.21	ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .10$  for Step 1,  $F(3, 305) = 11.79$ ,  $p = .000$ ;  $\Delta R^2 = .01$  (ns). Partial  $F(2, 303) = 1.66$ (ns).

Table F8

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Internalizing/Catastrophizing

Variable	B	SE B	$\beta$	p value
<b>Step 1 -Main Effect Model</b>				
Threat	.44	.03	.69	p = .000
Challenge	.02	.04	.02	ns
Gender*	.02	.07	.01	ns
<b>Step 2 - Interaction Model</b>				
Threat	.43	.04	.66	p = .000
Challenge	.04	.05	.04	ns
Gender*	-.04	.21	-.02	ns
Gender x threat**	.04	.05	.09	ns
Gender x challenge**	-.04	.07	-.06	ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .49$  for Step 1,  $F(3, 305) = 95.98$ ,  $p = .000$ ;  $\Delta R^2 = .001$  (ns). Partial  $F(2, 303) = 0.356$  (ns)



Table F9

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Palliative Behaviours

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat	.21	.03	.42	p = .000
Challenge	.33	.04	.05	ns
Gender*	-.20	.07	-.15	p = .004
<b>Step 2 - Interaction Model</b>				
Threat	.26	.04	.52	p = .000
Challenge	-.03	.05	-.04	ns
Gender*	-.09	.21	-.07	ns
Gender x threat**	-.11	.05	-.29	ns
Gender x challenge**	.11	.07	.21	ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .21$  for Step 1,  $F(3, 305) = 27.69$ ,  $p = .000$ ;  $\Delta R^2 = .01$  (ns). Partial  $F(2, 303) = 2.81$  (ns).

Table F10

Hierarchical Multiple Regression Analysis of Gender and Appraisal on Indirect Help-Seeking

Variable	B	SE B	$\beta$	p value
<b>Step 1 - Main Effect Model</b>				
Threat score	.14	.02	.31	p = .000
Challenge score	.09	.03	.14	p = .007
Gender*	-.28	.06	-.24	p = .000
<b>Step 2 - Interaction Model</b>				
Threat Score	.20	.03	.44	p = .000
Challenge score	.03	.05	.04	ns
Gender*	-.09	.10	-.08	ns
Gender x threat**	-.13	.05	-.41	p = .004
Gender x challenge**	.12	.06	.25	p = .061ns

Note. \*Women = 0, men = 1. \*\*Interaction = 0 for all women.

$R^2 = .20$  for Step 1,  $F(3, 305) = 24.66$ ,  $p = .000$ ;  $\Delta R^2 = .03$  ( $p < .01$ ). Partial  $F(2, 303) = 5.02$  ( $p < .01$ ).

Appendix G - Comparison of Ratings of Pain Event Factors, Appraisal, MPQ scores, and PDI scores by Age, and Gender

Table G1

Means and Standard Deviations of Pain Event Factors, Appraisal, MPQ scores, and PDI Scores by Age for Women

Variable	18-25 years (n =28)	26-35 years (n = 45)	36 -45 years (n = 39)	46-55 years (n = 32)	56-65years (n =13)
Overall interference					
M	4.9	5.0	4.3	4.8	4.4
SD	2.5	2.6	3.2	2.5	2.9
Emotional Upset					
M	5.0	5.5	4.2	3.1	2.0
SD	2.9	2.8	3.2	2.6	2.5
Intensity					
M	6.0	6.7	6.3	6.1	5.5
SD	1.7	1.9	1.9	1.9	1.7
Unusual severity					
M	4.1	5.2	4.8	4.0	3.4
SD	3.1	3.2	3.1	3.5	3.1
Unusual length					
M	5.4	6.0	5.6	4.8	3.7
SD	2.8	3.3	3.4	3.5	3.7
Predictability - pain not getting better					
M	5.2	4.2	4.5	5.7	3.8
SD	4.0	3.7	3.4	4.1	3.9
Predictability - pain unexpected					
M	6.8	5.2	6.2	5.6	5.7
SD	3.8	4.1	3.8	4.3	3.9
Uncontrollability					
M	3.8	3.6	4.4	4.5	2.6
SD	3.5	3.1	3.4	3.1	2.7
Duration					
M	4.3	5.9	5.9	7.7	8.4
SD	3.1	3.5	3.7	3.3	3.2
Threat Score					
M	2.9	3.4	3.1	3.2	3.0
SD	1.2	1.3	1.4	1.4	1.6
Challenge Score					
M	1.8	2.1	1.7	1.8	2.0
SD	.9	1.0	.8	.8	1.0
MPQ Sensory Score					
M	12.4	14.7	13.2	12.2	10.9
SD	5.7	6.4	6.1	5.2	5.1
MPQ Affective Score					
M	3.4	4.2	3.7	3.6	2.9
SD	2.5	2.7	2.9	2.7	2.4
Pain Disability Index					
M	26.4	27.7	25.1	23.4	20.0
SD	13.7	14.5	17.1	13.2	15.9

Table G2

Means and Standard Deviations of Pain Event Factors, Appraisal, MPQ scores, and PDI Scores by Age for Men

Variable	18-25 years (n = 18)	26-35 years (n = 49)	36-45 years (n = 48)	46-55 years (n = 23)	56-65years (n = 14)
Overall interference					
M	4.8	3.2	4.6	4.3	5.1
SD	2.5	2.5	2.9	2.6	2.5
Emotional Upset					
M	2.9	3.6	4.0	4.2	4.4
SD	2.8	2.9	2.8	3.2	2.9
Intensity					
M	6.4	5.2	5.8	5.3	6.4
SD	1.7	2.1	2.0	1.5	1.9
Unusual severity					
M	5.2	5.0	4.6	4.1	5.4
SD	3.5	3.3	3.2	3.3	3.2
Unusual length					
M	5.1	5.8	5.5	5.1	6.0
SD	4.1	3.5	3.4	3.6	3.4
Predictability - pain not getting better					
M	5.2	5.1	5.1	7.0	5.6
SD	3.1	3.7	3.8	3.0	3.5
Predictability - pain unexpected					
M	6.2	7.0	5.6	5.4	4.9
SD	4.0	3.4	4.5	4.2	4.3
Controllability					
M	4.1	4.1	3.8	4.1	5.0
SD	3.8	3.3	3.3	3.2	3.3
Duration					
M	4.7	5.3	6.4	7.5	9.0
SD	3.1	3.5	3.8	3.6	2.3
Threat Score					
M	2.8	2.8	3.1	3.2	3.5
SD	1.2	1.3	1.1	1.4	1.1
Challenge Score					
M	2.2	1.9	2.1	1.9	2.3
SD	1.1	.99	.93	.75	1.2
MPQ Sensory Score					
M	13.1	12.1	12.5	10.7	14.6
SD	5.6	5.5	5.4	6.2	5.7
MPQ Affective Score					
M	3.2	2.6	2.9	2.6	4.9
SD	2.4	2.6	2.7	1.9	3.1
Pain Disability Index					
M	25.3	17.6	25.5	19.5	24.6
SD	13.9	13.8	16.0	13.1	13.7

Appendix H - Comparison of Ratings of Pain Event Factors, Appraisal, MPQ scores, and PDI scores for Threat Appraisal >3 and Challenge Appraisal > 3

Table H1

Means and Standard Deviations of Pain Event Factors, Appraisal, MPQ scores, and PDI Scores for Respondents with Threat Appraisal > 3 and Respondents with Challenge Appraisal >3

Variable	Threat > 3 (n = 158)	Challenge > 3 (n = 43)
Overall interference		
M	5.6	5.4
SD	2.5	2.6
Emotional Upset		
M	5.5	4.9
SD	2.8	3.3
Intensity		
M	6.6	6.4
SD	1.9	1.9
Unusual severity		
M	5.7	5.6
SD	2.9	3.2
Unusual length		
M	6.2	6.2
SD	3.3	3.3
Predictability - pain not getting better		
M	5.7	4.5
SD	3.7	3.7
Predictability - pain unexpected		
M	5.5	5.0
SD	4.1	4.1
Uncontrollability		
M	4.5	3.5
SD	3.4	3.0
Duration		
M	6.6	6.9
SD	3.5	3.5
Threat Score		
M	4.2	3.4
SD	.72	1.4
Challenge Score		
M	2.1	3.8
SD	.94	.56
MPQ Sensory Score		
M	14.6	14.5
SD	6.0	6.1
MPQ Affective Score		
M	4.6	4.6
SD	2.7	3.5
Pain Disability Index		
M	30.0	27.1
SD	13.8	15.0

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