BIOPSYCHOSOCIAL FACTORS INFLUENCING PHYSICAL ACTIVITY PARTICIPATION AMONG OLDER ADULTS WITH CHRONIC PAIN

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Abstract

This mixed methods study examined biopsychosocial factors (pain, stress, and exercise self-efficacy) associated with physical activity participation among older adults with chronic pain (CP). A two phase sequential design was implemented through a cross-sectional self-administered survey collected from adults ranging in age from 19-79 years (*N* = 99), and one-on-one interviews with six female survey respondents. Interview questions were aimed at exploring study variables and survey responses in greater depth. Mediation analyses in Phase One confirmed the buffer effect of physical activity participation on the association between stress and pain among the oldest adults (i.e. 70+ years). Phase Two found evidence for a theme labeled "self-kinesis", defined as an individual's self-chosen movement dependent upon internal and external stimuli. The focus of kinesiology was expanded in this study, to include a biopsychosocial understanding of the way people with CP move in their lives.

KEYWORDS: Buffer hypothesis of leisure, Coping, Psychological stress, Self-efficacy

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Chapter 1: Introduction

1.1 Background of Study

Pain is both a symptom and a disease. It is a multifactorial phenomenon defined by the International Association for the Study of Pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merksey & Bogduk, 1994, p. 211). Acute pain can serve as the body's protective mechanism by limiting movement in injured parts (Melzack, 2003). On the other hand, chronic pain (CP) does not seem to have a useful protective purpose and persists beyond the normal tissue healing time. It is evident that CP differs greatly from acute pain and its impact on society and the individual are also quite different. People who live with CP experience physical, social, emotional, and occupational conflicts which may affect their daily lives. In Atlantic Canada, it is estimated that 20-25% of adults 18 years of age and older experience CP. Due to work loss and reduced job responsibilities, workplace costs of CP in Canada amount to approximately $37 billion per year (Action Atlantic, 2008). Despite the individual and economic burden of CP, it remains one of the least understood occurrences in health practice.

Chronic pain is a complex and multidimensional occurrence. Classification and diagnostic guidelines have been established for the identification of CP. However, similarities among conditions complicate diagnosis, and consequently, it is difficult to isolate factors associated with the experience (Thienhaus & Cole, 2002). Chronic pain is often classified as either cancer pain or non-cancer pain. Examples of non-cancer pain conditions include osteoarthritis, neuropathic pain, fibromyalgia, irritable bowel syndrome, tension-type headache, and temporomandibular joint disorders. Pain is experienced by males and females of all ages and socioeconomic status. Due to its complexity, CP may be most thoroughly investigated from multiple perspectives.

Historically, the study of pain has revolved around the biomedical model, which focuses solely on physical abnormalities of disease. However, this model has been increasingly replaced with the biopsychosocial model of pain and disability which emphasizes the relationship between biological, psychological, and social factors (Gatchel, Peng, Peters, Fuch, & Turk, 2007). The biopsychosocial approach to CP may allow for a better understanding of the factors involved in the onset and experience of pain. It is well-supported that psychosocial factors are particularly important predictors of the persistence of pain (McBeth, Macfarlane, Sidney, & Silman, 2001) and many CP conditions share common factors which are thought to contribute to, or trigger, symptoms of pain. For example, people with CP often present with anxiety, stress, depression, and other psychological problems (Yunus, 1994). Yet, researchers have also discovered that people employ strategies to cope with problems related to their experience (Lazarus & Folkman, 1984). Physical activity may be a means by which individuals with CP can positively cope with their lives. In fact, a recent study assessed the effect of physical activity within biofeedback-based cognitive behavioral therapy for individuals experiencing both posttraumatic stress disorder and CP. Liedl, Muller, Morina, Karl, Denke et al. (2011) reported that improved coping strategies were found among the group of active participants compared to the non-active group. From a kinesiology perspective, I ask, can physical activity help people with CP to manage pain through its influence on stress? How can we encourage and motivate people with pain to be active? There is a need for research which explores the factors associated with CP and physical activity participation among people with CP. From a biopsychosocial perspective, it could be inferred that stress is associated with physical activity and pain in this population. With that in mind, the purpose of this study was to investigate the biopsychosocial factors associated with physical activity participation among people with CP.

Understanding physical activity participation among people with CP has proven to be quite complex. Researchers and other people working in health promotion have sought to understand the factors associated with participation in regular physical activity among people with CP because physical activity is recognized as being beneficial for individuals with CP (Jones, Adams, Winters-Stone, & Burckhardt, 2006). Unfortunately, pain may interfere with physical activity (Bryan, Grigsby, Swenson, Scarbro, & Baxter, 2007), particularly among older adults (Sawatzky, Liu-Ambrose, Miller, & Marra, 2007). Despite scientific evidence supporting the positive outcomes of physical activity on CP, it appears that people with CP need more than physical activity education—they need assistance overcoming barriers to exercise.

While it may be challenging to understand how experiences and beliefs about exercise translate to behaviours and actions, those with CP are of particular interest because of the physical barriers and beliefs associated with pain. Throughout the literature, there are many theories surrounding adherence to exercise. Which factors or experiences determine whether a person will exercise and whether they will maintain a certain level of activity? Early in leisure research, barriers or constraints, were thought to determine participation (Crawford, 1987). It was assumed that if a person did not participate in an activity then a barrier existed. Research has progressed and constraints and barriers are no longer seen as insurmountable obstacles. Now, the more pertinent questions are: why are some people with CP active, why are others with CP inactive, and how do people come to participate in physical activity? There are more specific questions which remain unanswered such as, how does self-efficacy influence physical activity, and how do these notions impact a person with CP? The concept of self-efficacy is one of the main foci of this study as it can help to explain the experience of CP in terms of physical activity participation.

A person's self-efficacy beliefs determine whether or not they engage in a particular behaviour. Albert Bandura's (1977) self-efficacy theory posits that self-efficacy is an individual's belief that he or she will be able to successfully perform the behaviour required to produce desired outcomes. Throughout the literature, it is consistently shown that higher self-efficacy is associated with higher levels of physical activity (Jensen, Moore, Bockow, Ehde, & Engel, 2011). Self-efficacy can be developed or determined by a number of factors, including mastery experiences, modeling, social persuasion, and physiological feedback. In terms of exercise self-efficacy, a person who achieves a set goal may begin to develop mastery through repetition of exercises or practicing a sport. In addition, modeling and social persuasion may be provided through support groups which relay information about pain management and physically active lifestyles, while also providing support and positive feedback. Physiological feedback is an important consideration in people experiencing CP because negative judgments of one's capabilities may be more likely to occur in this population. Many people with CP interpret symptoms such as anxiety, pain, and fatigue as a worsening of their condition, leading to fear-avoidance behaviour, and lower levels of physical activity (Burckhardt, 2002). In this study, exercise self-efficacy will be applied to help explain, in part, physical activity participation among people with CP.

1.2 Statement of the Problem

Limited research has been conducted on the interplay of factors associated with physical activity participation among people with CP. While physical activity may be beneficial for those with CP, it is also critical to understand how stress and exercise self-efficacy influences one's level of physical activity participation. This study will focus on physical activity participation among older adults living in Newfoundland, Canada. Newfoundland (NL) has the most rapidly aging population in Canada, as residents over age 50 are expected to comprise 22.5% of NL's total population by 2021 (Public Health Agency of Canada [PHAC], 2009). Furthermore, older adults in NL are among the least active in Canada. Less than 50% of adults age 65 and older are moderately active in leisure time physical activities (Stats Canada, 2008). It is estimated that 64% of seniors in NL are inactive as compared to the population as a whole. Therefore, the purpose of this study was three-fold: (1) to clarify the relationships between stress, pain, physical activity participation, and exercise self-efficacy among older adults with CP; (2) to discover why people with CP participate or do not participate in physical activity; and (3) to identify factors that facilitate and enable people with CP to participate in physical activity.

The research questions that provided the framework for the quantitative phase of this study include:

1. What are the associations between pain, stress, physical activity participation, and exercise self-efficacy among people with chronic pain?
2. What are the differences between older adults (50 years and older), and younger adults (under 50 years) in terms of these relations?
3. What are the differences between more active and less active participants in terms of the study variables?
4. Does physical activity participation buffer the relation between stress and pain?

The hypotheses that provided the framework for the quantitative phase of this study include:

1. Greater stress prompts people to be more physically active because it helps them to cope with stress, and people who are more physically active experience less pain.
2. Older adults are less active than younger adults, and experience higher pain and higher levels of stress.

The research questions that provided the framework for the qualitative phase of this study include:

1. What factors influences physical activity participation among people with CP?
2. What does physical activity mean to people with CP?

3. Why are some people with CP more active while others are less active?

1.3 Significance of the Study

Due to its multidimensionality, as well as the ambiguity in defining and classifying CP, it has been uncertainly defined as a variable in the literature. Much of the research on pain, physical activity participation, and exercise self-efficacy, as well as psychological distress and physical activity, has focused on pain which is attributed to a particular disease or condition. For example, several studies have examined physical activity participation among people with arthritis or fibromyalgia separately, but no studies to my knowledge have examined physical activity participation, stress, exercise self-efficacy, and CP as a symptom of various conditions in the same study. The current study took another approach by investigating CP as it presents in a wide range of conditions, or merely as a symptom, while also taking a step towards investigating CP and physical activity participation through a biopsychosocial lens.

The results of this study will provide further conceptualization of how pain, stress, and exercise self-efficacy influence physical activity participation. An understanding of physical activity participation will be further enriched through the employment of qualitative methods. Thus, while examining the associations between the above-named factors is one aim of the study, the other objective is to comprehend the meanings associated with these factors by talking to participants about their beliefs and experiences in regards to pain and physical activity. In order to explore CP through a biopsychosocial perspective, participants will be asked questions about factors which influence their pain and level of physical activity participation. Few studies have examined physical activity participation among older adults with CP qualitatively, and there are no studies to my knowledge which have employed both quantitative and qualitative methods in the same study to research exercise adherence among people with CP.

Chapter 2: Review of the Literature

This chapter provides a review of the pain literature in terms of its study and classification. It also presents stress-coping theory and Bandura's self-efficacy theory in reference to physical activity participation. Finally, it outlines the literature relevant to this investigation of the biopsychosocial factors associated with physical activity participation among people with CP.

2.1 Chronic Pain

Chronic pain is defined in this study as ongoing or intermittent pain which has persisted for at least six months. Although there have been numerous studies and classifications aiming to identify the cause and understand the manifestation of CP, the pathology often remains ambiguous. Yet, it is known that a diagnosis often gives meaning to the illness experience which can be uncertain and confusing. Gaining a diagnosis is considered to legitimatize the illness -- to both the ill person and to the people around them. One of the major issues with many CP conditions is that there is no pathophysiological explanation and as a result, the individual's experience is often referred to as 'medically unexplained'. Madden and Sim (2006) conducted interviews with people living with CP, and reported that seeking information to resolve the meaninglessness of pain is often difficult due to the ambiguity of the definition, and the nature of the illness (Madden & Sim, 2006).

Further complicating the issue lies in defining CP. For example, there are a large number of health conditions that present CP as a symptom (e.g., arthritis, chronic fatigue syndrome, inflammatory bowel disease, and tendinopathies). In addition, defining CP is ambiguous because pain often presents in multiple sites of the body. In fact, multi-site pain-reporting is more common than single site (Davies, Crombie, & Macrae, 1998; Haukka, Leino-Arjas, Solovieva, Ranta, Viikari-Juntura, et al., 2006; Picavet & Schouten, 2003). In one study, multi-site CP was reported in 73% of subjects, while only 27% reported single site pain (Carnes, Parsons, Ashby, Breen, Foster, et al., 2007). Furthermore, this study showed that the majority of subjects with multi-site CP did not meet the current criteria for 'chronic widespread pain', where pain must be present in both the upper and lower quadrants, and on both the right and left sides of the body. This suggests that many people may have pain which is present in the upper and lower body independently, without meeting current classification criteria. Similarly, the definition for 'chronic idiopathic pain' is problematic, because it is defined as pain which is present for at least three months in three areas of the body with no identifiable cause and the exclusion of disorders that would reasonably explain the symptoms (Sen & Christie, 2006). This definition excludes the presence of pain in less than three sites of the body, even though pain is quite variable in terms of location of number of sites.

Pain is often difficult to isolate as it may be an overlapping symptom in several conditions (Aaron, Burke, & Buchwald, 2000; Wolfe & Michaud, 2004). For example, one study found that fibromyalgia exists in a substantial number of patients who had also been diagnosed with rheumatoid arthritis (Wolfe & Michaud, 2004). A prevalence study among people with irritable bowel syndrome (IBS) found that those with IBS were 40% to 80% more likely to also have migraine headaches, fibromyalgia, and depression. New diagnostic guidelines for CP conditions have been discussed, yet despite efforts to alter existing classification, CP remains a common symptom in many conditions (Bennett, 2009). Meanwhile in clinical practice, diagnosis is difficult because the identification of a CP condition is often dependent on the chief symptom as well as the clinician's specialty (Wessely, Nimnuan, & Sharpe, 1999). Thus, while many classification criteria exist, none of them seem to provide a full explanation for all people who experience CP.

In summary, it seems that CP presents in a wide range of conditions and body sites, both diagnosed and undiagnosed. Therefore, it is important to study CP irrespective of the condition or disorder which is thought to explain the symptoms. The evidence also lends to the study of pain through a biopsychosocial perspective as a complex and multifactorial occurrence.

Two opposing views present and continue to influence research and practice in the study of pain. On one hand, researchers have sought to understand CP in terms of its physical and biological etiology. This traditional biomedical approach embraces a dualistic viewpoint that the mind and body function separately and independently. Yet there is growing recognition of the role of psychosocial factors in CP. The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey & Bogduk, 1994, p. 211). This definition includes a psychological dimension, and the possibility that pain may not always directly be accompanied by tissue damage, thus supporting the development of the biopscyhosocial model of pain.

Chronic pain presents as an obstacle unmet by interventions for acute pain (Duncan, 2000), and many researchers and practitioners have sought alternative perspectives.

George Engel (1977) was one of the first to acknowledge the need for a new approach to the traditional biomedical philosophy. The biopsychosocial model he proposed evolved and it is now especially influential in the study of CP. This model acknowledges that a combination of biological, psychological and sociological factors result in a complex manifestation of symptoms (Engel, 1977; Gatchel et al., 2007). Many biopsychosocial theorists have rejected the biomedical model of pain as the only explanation for CP.

> Mind and body processes are separate entities, each exerting influence on the other. However, it has long been recognized that mind and body processes inseparably influence function. One does not 'cause' the other or direct it. Instead, they interact in a dynamic and often proactive way. Body defects or aberrations influence the mind and the person's interpretation of and anticipations about the environment in which he or she is functioning. Conversely, personal attitudes and expectations as well as environmental influences help to shape and modulate the impact of body processes on functioning. This interaction is more than the simple sum of its parts" (Fordyce, 1995, p. 27).

Currently, psychological, sociological, and behavioural factors are theorized to be integral to the study of pain. This model allows for an examination of the complexity of emotions and behaviours, which may coincide with physiological processes. Anxiety, stress, depression, and other psychological problems are significantly more common in CP conditions (Yunus, 1994). As a result of the supporting literature, the biomedical model of pain has been increasingly replaced by the biopsychosocial model of pain, with overwhelming evidence that psychosocial factors interact with biological factors.

Stress has received much attention in the study of CP. Yunus (2007) proposed that people with CP may have common neurological mechanisms which are responsible for stress-related pain. These proposed pathophysiological links are thought to exist among many CP conditions, such as fibromyalgia, irritable bowel syndrome, tension-type headache, temporomandibular disorders, myofascial pain syndrome, regional soft-tissue pain syndrome, periodic limb movements in sleep, multiple chemical sensitivity, female urethral syndrome, interstitial cystitis, and posttraumatic stress disorder (Yunus, 2008). Individuals with these conditions share many key symptoms, including pain, and it is thought that a common mechanism called central sensitization is involved. Sensitization involves a dysfunctional stress response as a result of a hyperactive nervous system. While many researchers have studied the role of stress in terms of the body's physical response, others have focused on the psychological aspects of the stress response.

Social science researchers have found that stress, such as mental demands at work, are related to pain (Janwantanakul, Pensri, Jaiamjarasrangsi, & Sinsongsook, 2009). In addition, daily hassles related to finance, interpersonal relations, social and environmental factors, time pressures, and health also predict pain (Cathcart & Pritchard, 2008). The relation between stress and CP conditions is of particular interest because the research supports that there are differences among CP conditions. Davis, Zautra, and Reich (2005) found that the women with fibromyalgia experience stress-related increases in pain that were exacerbated by negative mood, while this relation was not found in women with osteoarthritis. While every human being faces stressful events in life, stress perception varies. While some stress can provide positive functioning of the body, many individuals struggle to manage daily hassles, chronic illnesses, and life transitions. In this way, the mere presence of stress does not always result in the same level of distress from person to person. In fact, stress is only produced when the individual anticipates that they will not be able to cope with it effectively, or that it will inhibit their goals. Perhaps the more pertinent question lies in how individuals manage to cope with stress in their lives. In turn, how does this affect bodily pain?

2.2 Psychological Stress

The role of stress in relation to health and illness has long been recognized. Hans Seyle (1956) is considered the 'father' of stress research in relation to health. He claimed that stress plays some role in the development of every disease, pioneering the idea that stressors cause adaptation and leads to bodily tension and increased risk of illness (Seyle, 1974). It has been said that acute pain can be protective and beneficial to the body, while CP serves no useful purpose. Similarly, acute stress may be beneficial, but experiencing chronic stressors without adaptation are negative in terms of the body's functioning. Stress is also thought to be nonspecific, occurring anytime there is an imbalance between an objective demand and the individual's response to that demand. Due to the presence of pain, life circumstances such as walking up a flight of stairs, dealing with a viral infection, doing household chores, or caring for family members, may present unique demands. However, a heightened stress response may result if the individual does not respond appropriately to meet the demand. Seyle proposed that this adjustment occurs in a series of three stages called the general adaptation syndrome. The first stage (alarm reaction) may be triggered by psychological or physical trauma in which the body responds with certain chemical and structural changes. Stage two (resistance) is characterized by the disappearance of the initial symptoms, or an adaptation to the stressor. Stage three (exhaustion), is when the body fails to cope and is unable to resist the stressor. The literature supports Seyle's theory, as outlined by these stages. It is firmly established that pain and stress act in a vicious cycle, where stress may precede, perpetuate, or subsequently follow symptoms of pain (Sauro & Becker, 2009). Many studies have examined the relation between stress and CP in the case of post-traumatic stress disorder (Wuest, Ford-Gilboe, Merrit-Gray, Varcoe, Lent et al., 2009), and childhood abuse (Davis, Luecken, & Zautra, 2005; Green, Flowe-Valenci, Rosenblum, & Tait, 1999; Walsh, Jamieson, Macmillan, & Boyle, 2007). In these studies, a traumatic physical event is thought to perpetuate psychological distress and subsequent pain. In essence, if stress is experienced early in human development, the stress response system is thought to be altered. Croft (2003) reported in a 25-year follow-up study that episodes of early psychological illness were associated with CP later in life. Another prospective study demonstrated that psychosocial factors, including adverse life events, increased the likelihood of the onset of CP (Gupta, 2007). Pain is related to marital functioning (Cano, Gillis, Heniz, Geisser, & Foran, 2004), employment status (Jackson, Iezzi, Lafreniere, & Narduzzi, 1998), and occupational stress (Munce, Weller, Blackmore, Heinmaa, Katz, et al., 2006), and people with CP also experience longer stress-related increases in pain (Davis et al., 2001). Although, despite the fact that pain has been found to predict daily stress and disability among those who experience CP (Tsai, Tak, Moore, & Palencia, 2003), pain-related coping also explains a significant amount of the variance in distress and disability (Wells, 1994). Thus, while stress in unavoidable, it is apparent that the stress response and one's ability to avoid the negative impact of stressors is important in the adaptation process.

Many individuals seem to withstand psychological stress and avoid detrimental effects, while others are not as resistant. It is clear that stress and pain are related, as stress presents in 30-45% of patients with CP (Yunus, 2007), but it is less known which factors may influence this relationship. Overall, it seems that the question does not lie in whether stress and CP are related, but rather on which factors contribute to the ability to cope with stress and the complex manifestation of pain. In accordance with Seyle's conceptualization that external stressors are assumed to disrupt a person's psychological state and induce both physiological and psychological responses in the form of distress, the theory of stress-coping includes other variables which may intervene this process. It has been widely demonstrated that psychosocial and lifestyle factors play an important role in the response to stress and subsequent illness or CP (Ensel & Lin, 1991). In terms of influential factors, it is thought that individuals may use resources to intervene in the process so as to eliminate or modify the conditions leading to distress. Those with CP may also have the ability to alter the meaning of the stressor so as to modify its stressfulness, and manage the level of response to the stressor.

Coping responses have been defined as "constantly changing cognitive and behavioural effects to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). While the theory of stress-coping conceptualizes psychosocial variables as intervening variables in the stressor-well-being relationship (Lazarus & Folkman, 1984), research has shown that there is variability among people with CP in terms of interpersonal stress (Zautra, Hamilton, & Burke, 1999). Furthermore, people with CP may also be more vulnerable to the negative effects of social stress and have less effective coping strategies. It has been reported that older adults cope with pain effectively when they feel independent and in control of their lives (Sofaer, Moore Holloway, Lamberty, Thorp, et al., 2005). Additionally, some people are successful in managing pain through the use of various strategies and the ability to adopt positive meanings to pain (Van Huet, Innes, & Whiteford, 2009). Experiencing life stress is inevitable and is likely to influence one's health, but it may be even more insightful to know which factors influence one's ability to cope with stress.

Stress-coping theory has guided explorations of psychosocial variables as resources to cope with and 'buffer' stress. Buffers are personal and environmental characteristics which are thought to protect people against an inflated acute arousal as well as facilitate recovery during stress (Linden, 2005). These buffers are brought by individuals to the situation, and are considered mediators of the process as they influence the relationship between the stressor and outcome. Coping mechanisms such as social and psychological resources are thought to influence physiological stressors (Ensel & Lin 1991). However, researchers have also explored the role of physical resources which may serve as coping mechanisms in the stress-coping relationship. The buffer hypothesis of leisure posits that leisure-generated dispositions or beliefs act as a buffer against the negative impact of stress to maintain good health (Coleman & Iso-Ahola 1993; Iso-Ahola & St Clair 2000; Iwasaki & Mannell 2000; Zuzanek, Robinson, & Iwasaki, 1998). In terms of physically active leisure, exercise has been shown to buffer both psychological and physical distress (Brown & Siegel 1988). The buffer model assumes that physical activity provides health and adaptation benefits when people experience high stress. Davis et al. (2001) found that individuals with CP may be particularly vulnerable to the negative effect of life stressors and use less effective coping strategies. Therefore, among people with CP, the influence of physical activity may be one way people cope with stress and pain.

2.3 Physical Activity Participation

Physical activity is any bodily movement caused by muscle contraction and characterized by the level of physical effort (Centers for Disease Control and Prevention [CDC], 2011). Exercise is often employed as a non-pharmacologic treatment for people with CP because it has been shown to be beneficial. A recent review of exercise among CP conditions concluded that aerobic capacity and physical function may improve with exercise (Mannerkorpi & Iversen, 2003). Furthermore, pain levels diminish with moderate intensity exercise twice a week. While aerobic exercise improves aerobic capacity, weight training exercises also result in increased muscular strength (Mannerkorpi, 2009) and diminished muscle tenderness (Busch, Barber, Overend, Peloso, & Schachter, 2007). Similar gains are seen among older populations, with strength gains from a strength training program attenuating pain (Valkeinen, Hakkinen, Hannonen, Hakkinen, & Alen, 2006). While the physical benefits of physical activity are well-recognized as beneficial for people with CP (Jones et al., 2006), exercise has also been shown to assist with other symptoms such as psychological distress (Cedraschi, Desmeules, Rapiti, Baumgartner, Cohen, et al., 2004). Aerobic exercise has been found to be more effective than other stress management treatments for its effects on disturbed sleep, energy levels, depression, aerobic capacity, and pain (Wigers, 1996). Thus, there is evidence that increased physical activity participation is associated with a reduction in the influence of stress. However, few studies have examined the associations between stress, pain, and physical activity participation among people with CP.

Research suggests that the maintenance of an exercise program may be contingent upon one's ability to cope with stress, pain, disability, and other barriers to exercise (Dobkin, Abrahamowicz, Fitzcharles, Drista, Da Costa, 2005). The exercise adherence literature places a strong emphasis on the role of psychosocial variables; these resources seem to be likely determinants of physical activity participation. However, clarification is still lacking and many people with CP remain inactive. Despite the knowledge that physical activity is likely to positively influence CP and its accompanying symptoms, the fear of pain results in a reduced level of physical activity (Loucks-Atkinson & Mannell, 2007). Most of the studies assessing physical activities of patients with CP versus asymptomatic controls report that patients with CP participate in less physical activity (van Weering, Vollenbroek-Hutten, Kotte, & Hermens, 2007). Consequently, reduced levels of overall physical activity can lead to muscle weakness and impaired aerobic capacity (Bryan et al., 2007). A negative cycle of muscle deconditioning may occur due to pain which limits exercise tolerance which in turn may also increase pain. Low exercise tolerance has been identified in people with CP (Maquet, Croisier, Renard, & Crielaard, 2002). In fact, one study found that individuals with fibromyalgia and myofascial pain syndrome had lower physical fitness than healthy subjects (Alkan, Daskapan, Tuzun, & Akman, 2008). Therefore, despite the prevalence of scientific evidence supporting the benefits of exercise for people who live with CP, it appears that they need more than education about how physical activity can reduce their pain -- they need knowledge about the factors which inhibit and prevent physical activity in order to address, cope with, and overcome these elements.

2.4 Exercise Self-efficacy

Given the supporting research that physical activity is beneficial in coping with CP, it is critical to understand how people with CP experience physical activity in order to help them achieve a level of exercise which is optimal for them. Physical activity participation is particularly complex among this population and involves multivariate predictors and influences. Exercise self-efficacy is one such factor which has been found to influence one's exercise behaviours. Self-efficacy was a concept proposed by Albert Bandura (1977), and is defined as an individual's beliefs that he or she will be able to successfully perform the behaviour required to produce desired outcomes (Bandura 1977). The strength of an individual's self-efficacy will influence whether they will attempt to cope with particular situations, how much effort they will expend, and how long they will persist in their efforts. The concept of self-efficacy has received attention in the literature on physical activity participation because of its impact on behaviour, motivation, thoughts, and emotions. Reviews by McAuley, Courneya, Rudolph, and Lox (1994), Rejeski, Craven, Ettinger, McFarlane, and Shumaker (1996), and Rejeski and Mihalko (2001) support that higher exercise self-efficacy is associated with higher levels of physical activity participation and adherence. Among older adults, daily activity and leisure physical activity participation may decrease, but exercise self-efficacy still predicts a person's daily physical activity levels (Harris, Owen, Victor, Adams, & Cook, 2009). While many studies have explored exercise self-efficacy among people with CP (i.e. Arnold, Crofford, Mease, Burgess, Palmer, et al., 2008; Medina-Mirapeix, Escolar-Reina, Gascon-Canovas, Montilla-Herrador, & Collins, 2009), pain management self-efficacy has also received attention in the CP literature. People with CP often employ many strategies to cope with pain, with exercise being only one approach within a wide range of management tactics.

Pain management self-efficacy is one's belief in their ability to cope with pain. The literature shows that a lack of confidence in one's ability to manage pain, cope with life, and function despite persistent pain predicts the extent to which individuals with CP became disabled and depressed. Furthermore, pain management self-efficacy has been found to mediate the relation between disability and CP (Arnstein, Caudill, Mandle, Norris, Beasley, 1999). Interestingly, pain management self-efficacy beliefs determine pain behaviours and disability associated with pain. Pain behaviours are conceptualized as overt expressions of pain, and may include avoidance of certain activities, resting, or limping (Asghari & Nicholas, 2001). Avoidance of certain activities, specifically physical activities, can influence a person's experience with CP. Patients attribute exacerbations of symptoms to a wide range of factors, including exercise. Therefore, fear or avoidance of increased activity and exercise may occur and further reinforce inactivity. Although it is well-established that pain management self-efficacy is influential in physical activity participation, there is a need for more studies which examine exercise self-efficacy and its influence on participation. Furthermore, while it can be theorized that physical activity may positively influence stress and pain in some populations, fewer people with CP obtain the benefits of physical activity because they are inactive.

2.4.1 Pain and Exercise Beliefs

Individuals with CP have reported that daily living and leisure activities are reduced because of pain. In a focus group study of 48 people with CP, participants reported avoiding physical activity, and also believed their social and occupational functioning were negatively affected by their condition (Arnold et al., 2008). Beliefs about pain and treatment might influence beliefs about physical activity and subsequent levels of participation. People with CP seem to have more negative beliefs about illness and treatment regarding exercise when pain is present (Medina-Mirapeix et al., 2009). There have been many qualitative studies conducted on peoples' beliefs about physical activity (e.g., Jancey, Clark, Howal, Maycock, & Lee, 2009; Mannerkorpi, 2009), yet the meanings people with CP attribute to pain, stress, and physical activity participation requires further inquiry. To my knowledge, there are no studies examining how one's perception of stressful life events influences physical activity participation as well as the complex presence of pain.

Stressors which are identical in nature may be perceived differently by people with CP. However, it is repeated throughout the pain literature that the social stigma associated with CP is a stressor to many individuals. People with CP have expressed overt frustration in not being understood, not being provided adequate explanations, and not being given credit for knowing their own bodies (Slade, Molloy, Keating, 2009). Furthermore, it has been identified that assuming control over one's body and managing pain is often unlikely among people with CP because questioning health care providers and assuming control over the management of their care may not be well-accepted (Levinson, Kao, Kuby, & Thisted, 2005). In addition, people have a desire for an active role in planning their physical activities. It is likely that people with CP have beliefs, motivations, and barriers which are not always understood by researchers and kinesiologists, and the general public. Imperative to our understanding of CP is the valuable insight of those who live with CP on a daily basis. One of the aims of this study was to trace out the meanings that people with CP attend to their experience with physical activity and pain by listening to their narratives. I am interested in understanding ways to optimize physical activity participation in this population. The supporting literature and biopsychosocial model of pain suggest that it is a multifactorial experience, thereby raising several questions regarding physical activity participation: (1) What are the differences between pain, stress, physical activity participation, and exercise self-efficacy among more active and less active participants?; (2) What are the differences between older adults and younger adults in terms of these associations?; (3) Does physical activity participation mediate the relation between stress and pain?; (4) What factors influence physical activity participation among people with CP? (5) What does physical activity mean to people with CP?; and (6) Why are some people with CP more active while others are less active?

2.5 Biopsychosocial Interactions of Pain and Physical Activity

Physical activity participation and exercise adherence studies among people with CP are widespread throughout the literature. Additionally, there are several studies which have explored the role of self-efficacy related to pain management and physical activity among older adults with CP conditions (i.e. Arnstein et al., 1999; Buckelew, Murray, & Hewett, Johnson, & Huyser, 1995; Leveille, Cohen-Mansfield, & Guralnik, 2003). Remarkably, there are only two studies to my knowledge which have examined the associations between physical activity, pain, and stress among people with CP (i.e., Hurwitz, Morgenstern, Chiao, 2005; Wigers et al., 1996).

Investigations examining the relationships between musculoskeletal pain, self-efficacy and physical activity have concluded that higher pain is associated with lower self-efficacy and lower levels of physical activity participation (Buckelew et al., 1995; Leveille et al., 2003). Another study reported that pain management self-efficacy mediated the relationship between pain intensity and pain-related disability (Arnstein et al., 1999). It was also discovered that pain intensity contributed more to the explained variance of disability and depression than other psychological factors. As previously-mentioned, only two studies have reported on the effects of exercise on stress and pain. Hurwitz et al., (2005) concluded that individuals with CP may benefit from recreational exercises, which were inversely associated with psychological distress in their study. Similarly, Wigers et al., (1996) found that aerobic exercise and stress management treatment both elicited short- term improvements in symptoms among people with CP. However, no long-term group differences were found in terms of symptom severity.

The aim of this study was to explore the relations between pain, stress, physical activity participation, and exercise self-efficacy – research which has not fully been carried out in one quantitative, qualitative, or mixed methods study. The following sections will provide a detailed summary of these investigations which employed quantitative methods and qualitative methods through separate studies, identifying the gaps and questions which still remain in the literature on biopsychosocial factors influencing physical activity participation among people with CP.

2.5.1 Review of Quantitative Research

Leveille et al. (2003) recruited older adult participants ($N = 325$) to complete self-administered surveys in order to examine the relationships between musculoskeletal pain, self-efficacy and physical activity. Musculoskeletal pain was assessed in only four sites (back, hip, knees, and feet) -- a limitation which will be addressed in the current study, as CP in any condition or body site will be included. Exercise self-efficacy was measured using a three-item scale developed for use among people with CP, and intended to assess self-confidence in one's ability to participate in exercise. Physical activity was measured using the Physical Activity Scale for the Elderly ([PASE]; Washburn, Smith, Jette, Janney, 1993). Most respondents in this study had a physician's diagnosis of arthritis (90% with three or four pain sites). Compared to those without pain, participants with one or more pain sites were more likely to report walking less than one mile per week, and only 3.5% of those with pain in three or four pain sites reported walking more than four miles per week. As predicted, this study showed that older adults with musculoskeletal pain are more likely to have lower self-efficacy for exercise than older adults without pain. This study is one of few which examined exercise self-efficacy and physical activity participation among older adults with CP. The authors noted that their results cannot be generalized to all older adults because the participants were volunteers recruited from senior housing and the general community in suburban Maryland, U.S.A., and study volunteers are typically healthier than those in the community. My research differs from Leveille et al.'s study in a number of ways. The participants were recruited not only from the general community and senior housing, but through CP support groups, physicians' offices, community events, and the websites of chronic pain organizations. In addition, my study focused on older adults living in the Atlantic provinces of Canada, and included those living in both urban and rural areas of NL which provided a broader range of participants in terms of cultural and demographic characteristics. The authors of the reviewed study indicated that future research is needed to better understand the role of self-efficacy in the pathway from pain to sedentary behaviour. Participation in physical activity might lessen CP and increase exercise self-efficacy. At the same time, pain relief might be critical before initiating exercise. Pain reduction occurring with exercise might be part of the "spiral process" in which exercise leads to better self-efficacy about exercise, and consequently, more exercise and better control of pain. My study addressed a gap in the literature as it quantitatively examined the role of stress and its associations with pain, physical activity, and exercise self-efficacy. Also, by employing qualitative methods, it offered an understanding of the factors which play a role in the pathways between the study variables.

A mixed methods design allowed for a unique investigation of the relations between pain and exercise self-efficacy. Researchers have also examined self-efficacy related to pain management, function, and symptoms to understand exercise participation. Similar to Leveille et al. (2003), Buckelew et al. (1995) found that higher pain management self-efficacy was associated with less pain and less impairment on physical activities among a group of people with fibromyalgia. Survey measures included a visual analog scale (VAS) for assessing pain, the Arthritis Impact Measurement Scale (AIMS) for assessing stress, and the Arthritis Self-Efficacy Scale, which assessed three forms of self-efficacy: self-efficacy for managing painful symptoms, self-efficacy for function, and self-efficacy for other symptoms. Seventy-nine subjects (96.2% females) meeting the American College of Rheumatology 1990 classification criteria for fibromyalgia were included, and a number of exclusion measures were considered in this study. For example, subjects were excluded from the study if they were currently participating in a regular aerobic exercise program, had a pain rating of less than 4 on a 10-point VAS scale, or had been diagnosed with rheumatoid arthritis or other rheumatic diseases. The mean age of the participants was 44 years (SD = 9.6), and the sample reflected a predominantly economically lower middle-class sample. In this study, psychological distress was measured using the AIMS which measured one's psychological status based on depression and anxiety scales. My study differs because stress was measured using the Perceived Stress Scale, which assessed the individual's perception of the stressfulness of varying life events within the past month (PSS; Cohen, Kamarck, and Mermelstein, 1983). Using hierarchical regression analysis, the authors found that self-efficacy predicted pain and physical activity scores better than demographic variables, disease severity, or psychological distress. Demographic variables, psychological status, and pain management self-efficacy accounted for a range of 13% to 26% of the variance when predicting pain and physical activity measures. Thus, there are other variables not addressed in their study which may be important in the study of CP and physical activity.

Exercise self-efficacy and psychological factors, such as depression and anxiety, have a distinguished relationship with exercise participation, as noted in the aforementioned study (Buckelew et al., 1995). Additional work in this area would add to our current understanding of the relationships between physical and psychosocial variables related to CP. Arnstein et al. (1999) analyzed self-report data from 126 questionnaires completed by a convenience sample of pain clinic CP patients in order to test self-efficacy as a mediator of disability. The sample in their study was primarily Caucasian (91%) and female (66%), with an average age of 44 years (*SD* = 12.5). Regression and path analysis of the study variables (i.e. pain intensity, chronic pain self-efficacy, pain disability, and depression) showed that pain intensity contributed more to the explained variance of disability and depression than any other factor. In addition, chronic pain self-efficacy mediated the relationship between pain intensity and pain related disability. While their findings suggest that individuals with CP may become less active due to low self-efficacy beliefs, the current study addresses how one's perception of stress in their life influences the relation between pain and physical activity. I hypothesized that higher exercise self-efficacy was associated with higher levels of physical activity participation. In turn, higher levels of physical activity lessen pain by reducing stress, and therefore mediate the relationship between stress and pain.

The influence of engagement in physical activity on the association between stress and pain has been assessed in few studies. Hurwitz et al. (2005) divided 682 low back pain patients into four groups: chiropractic care without physical modalities, chiropractic care with physical modalities, medical care with physical therapy, and medical care without physical therapy. This was a longitudinal study using follow-up questionnaires and physical examinations to assess participants' health and functional status, low back pain intensity and related disability, physical activity levels, and use of back exercises. In addition, physical activity was measured by asking participants how many hours per week, on average, they engaged in walking and one or more light, moderate, and strenuous sport or recreational activities. Metabolic equivalent task

(MET) values were assigned to each activity, and MET scores were calculated for each subject. A similar assessment was used in the current study – the Baecke Questionnaire also measures physical activity by calculating MET scores based on duration, frequency, and type of activity. Hurwitz et al. concluded that individuals with CP may benefit from recreational exercises, which was inversely associated with psychological distress. Interestingly, the study group consisted of patients with low back pain, and back exercises were positively associated with low back pain and related disability. Thus, non-specific exercises (i.e. recreational activities not associated with back exercises) are recommended to reduce pain and improve psychological health. The fact that higher levels of participation in recreational physical activities were associated with lower stress levels suggests that physical activity associated with leisure and enjoyment may be important in coping with CP. A second study exploring stress-coping and exercise among people with CP was conducted by Wigers et al., (1996) who compared stress management and aerobic exercise in two test groups of patients with fibromyalgia, with a mean age of 44 years. Their study showed that both stress management and exercise showed positive short-term effects. However, at follow-up, there were no obvious group differences in symptom severity. A lack of compliance in the aerobic exercise group may have been the reason for these findings. This study supports the significant role which stress has in the experience of CP, yet it does not provide information regarding the buffer effect of being physically active.

The current study adds to the literature, as it tested the buffer effect of physical activity on the relation between stress and pain. In addition, older adults were the focus -- a population which has received less attention in regards to stress, pain, and physical activity. There are no studies to my knowledge which have examined different types of physical activity. My study addressed a gap in the literature as it examined sport and exercise-related, work-related, and leisure-related physical activities alongside the variables stress, pain, and exercise self-efficacy among older adults with CP. It is apparent from the current literature that stress, pain, and physical activity participation are certainly influenced by a multitude of factors within a person's life. Thus, the employment of mixed methods is a beneficial means of studying biopsychosocial factors influencing exercise and pain.

2.5.2 Review of Qualitative Research

Beliefs and motivations behind the experience of those we study are often preeminently understood through their own words. There are several qualitative studies which focus on the experiences of people with CP such as fibromyalgia, chronic low back pain, and arthritis within the context of exercise (Mannerkorpi, Kroksmark, & Ekdahl, 1999; Slade et al., 2009; Wilcox, Ananian, Abbott, Vrazel, Ramsey et al., 2006). Furthermore, there is one study (Steihaug, Ahlsen, & Malterud, 2001) which explored exercise among people with CP with a unique perspective on movement and physical activity. The following paragraphs will highlight the findings of these inquires, and identify areas warranting further investigation.

Slade et al. (2009) recruited individuals with chronic low back pain to participate in focus groups to answer the research question: What factors do participants in exercise programs for chronic low back pain perceive to be important for engagement and participation? Participants discussed the importance of family and financial support in their adherence to the program. Of the 18 participants in their study, 11 were older adults over age 50. This study is noteworthy because it provides information regarding exercise motivations of older adults who have participated in an exercise program. However, an advantage of the current mixed methods study is that participants were recruited from the community, including those who had not necessarily been actively engaging in an exercise program. The acknowledgement of psychosocial factors (e.g. family support) in Slade et al.'s study is also a focus which was addressed in more detail through mixed methods in this study. Quantitative and qualitative data from this study added to the confirmation of previous theory, while also expanding upon the available knowledge base with one-on-one interviews. Furthermore, qualitative inquiry is important because it helps to describe the meanings of terminology used within theorized frameworks.

From the epistemological approach taken in this study, knowledge is believed to be socially constructed and deeply reflected through one's life experiences. Qualitative research on people with CP has identified themes such as, struggling, adapting, being in despair, and giving up to describe their everyday experiences (Mannerkorpi et al., 1999). People living with CP face unique stressors, but it is less clear how the relation between stress, pain, and physical activity works in their lives. A focus group study of exercising and non-exercising men and women over 18 years of age with arthritis reported that exercisers experienced benefits of exercise through adaptation and accommodations to pain (Wilcox et al., 2006). This study highlighted the difference between those who are active and those are not active, a topic which was also explored in the current study. However, the qualitative phase of my study differed as it addressed the beliefs of older adult women with CP, and many of whom had been diagnosed with more than one condition. Older adults' beliefs about exercise have been examined in other qualitative studies. Jancey et al., (2009) reported that older adult participants identified pain as a major barrier to physical activity, even though they believed physical activity provided health benefits and had mostly positive experiences with exercise from the past. In Jancey et al.'s study, participants described both positive and negative examples related to society's support of physical activity, thus reiterating the need for a combined biological, psychological, and sociological approach to the experience of pain and physical activity.

There is one study identified in a review of the literature which presented CP and exercise from a holistic perspective on kinesiology -- the study of movement. Steihaug et al. (2001) conducted a study on women aged 30-61 with chronic muscle pain who were placed within a group-based treatment plan to promote exercise and movement education. Their experiences were systematized by means of pragmatic analysis of qualitative data from field notes, tape recordings of focus group interviews, and video recordings of training and discussion groups. While the initial training program aimed at increasing physical fitness and decreasing pain, it developed into activity which was based on movement emphasizing more than just exercise. Movement associated with one's body awareness, such as noticing breathing and muscle tension were included in the activities. In addition, group participation was an important component, characterized by security and a sense of belonging. In the end, an extended concept of physical activity and movement was developed. The women talked about the biological body of pain, but later, pain as an experience was reflected in the forefront of their discussions. In this way, Steihaug et al.'s research provided a means of understanding the experience of pain encompassing a broadened context. Their study included women ages 30-61. Still, older adults, women, and people with CP are three groups which have traditionally been less studied in research and are quite often marginalized in society. Further studies are needed to emphasize the voices of those who have been less recognized within the literature.

2.6 Significance of this Study

Studies exploring the interactions of biological, psychological, and sociological factors in the context of pain and physical activity participation are lacking but necessary. Three studies in this review have made explicitly known, the influence of psychosocial factors in pain and physical activity participation (Jancey et al., 2009; Slade et al., 2009; Steihaug et al., 2001). Mixed methods are a less popular approach within the literature on physical activity participation and CP, yet the variables measured in quantitative studies (i.e. demographic information, psychological status, and self-efficacy) still only account for a small percentage of the explained variance in predicting pain and physical activity participation (Buckelew et al., 1995). With the exception of one study (Leveille et al., 2003), none of the studies reviewed in this chapter focused on the experiences of older adults. In fact, the mean age of the participants in the quantitative studies was 44 years. This trend continued within the qualitative research, with only one study having explicitly recruited older adult participants (Jancey et al., 2009). The other studies did not specifically focus on older adults, but many of the qualitative inquiries did gravitate towards exploring the experiences of women. The current research study recruited older adult female participants, and thus had the opportunity to focus on their experience. In terms of physical activity, an assessment of different types of participation is important, especially among older adults because this population may accumulate a significant amount of physical activity through activities other than sport or exercise engagements. The current study assessed levels of participation in work physical activity, leisure physical activity, and physical activity associated with sport and exercise. The studies reviewed in this chapter consisted of participants with low back pain, fibromyalgia, musculoskeletal pain, and convenience samples of patients with CP. None of the studies mentioned have explored biopsychosocial factors influencing physical activity participation among a purposeful sample of individuals with a wide range of CP conditions in Canada. There is evidence that physical activity participation exerts a health enhancing effect on distress, and there is support for the association between physical activity and psychosocial resources such as self-efficacy. However, to my knowledge, there is no research in the CP literature which examines the buffer effect of physical activity participation on the association between stress and pain in older adults. This mixed methods study will be the first to quantitatively examine the associations between pain, stress, physical activity participation, and exercise self-efficacy, while sequentially exploring how people with CP experience exercise and other factors related to their experiences.

Chapter 3: Methodology

3.1 Introduction

This chapter provides a methodological overview summarizing the logic and procedures used in the design of this research. A sequential, explanatory mixed methods approach was implemented in this two-phase study. Sequential mixed methods data collection strategies involve collecting data in an iterative process in which the data collection of one phase contributes to the data collection in the next. Phase One consisted of quantitative data collection and analyses, while Phase Two of the study consisted of qualitative methods. The two phases were connected in the intermediate stage of the study, as the first quantitative survey phase guided the specific interview questions of the second phase. Explanatory research seeks to examine the reasons and associations between what exists (Ritchie & Lewis, 2003). The rationale for this approach is that quantitative data and subsequent analysis provided a general understanding of the associations between stress, pain, physical activity participation, and exercise self-efficacy among people with CP in NL. Qualitative data and analyses expanded upon the statistical results by offering participants' views and experiences (Creswell, 2009; Tashakkori & Teddlie, 1998). Overall, the aims of this study were to provide knowledge regarding the factors contributing to physical activity participation, and individuals' beliefs about physical activity within the context of CP. The primary research questions to be explored through quantitative methods were: (1) What are the associations between stress, pain, physical activity participation, and exercise self-efficacy among people with chronic pain?; (2) What are the differences between older adults (50 years and older), and younger adults (under 50 years) in terms of these relations?; (3) What are the differences between more active and less active participants in terms of the study variables?; and (4) Does physical activity participation buffer the relation between stress and pain? It was hypothesized that higher levels of stress lead to higher levels of physical activity participation, resulting in lower levels of pain. It was also hypothesized that older adults are less active and experience higher levels of pain and stress than younger adults. The research questions to be answered through qualitative means were: (1) What factors influences physical activity participation among people with CP?; (2) What does physical activity mean to people with CP?; and (3) Why are some people with CP more active while others are less active?

3.2 Overview of Research Design

Based on theoretical literature and a review of 57 empirical studies, Caracelli and Greene (1993) identified several purposes of mixed methods research, including development and initiation. In terms of development, utilizing a mixed methods sequential design allows the results of the first phase to inform the development of the second phase. A second purpose in this design is to uncover contradictions and expand upon the findings from one method through data collection and analyses of another method (Creswell, 2009). In the first phase of this study, quantitative methods were employed through a cross-sectional, self-administered survey design examining the relations between psychosocial variables and physical activity participation among people with CP. Hierarchical regression analyses were carried out to examine the associations between stress, pain, physical activity participation, and exercise self-efficacy. Tests for mediation were conducted to examine the buffer effect of physical activity participation on the relation between stress and pain. A series of *t*-tests were used to determine group differences between more active and less active participants. In Phase Two, one-on-one semi-structured interviews were conducted with six older adult women from the total sample of Phase One participants. By using both methods of inquiry, the aim was to understand the associations between biopsychosocial factors and physical activity participation, based on stress-coping theory and self-efficacy theory. At the same time, the design of the research was meant to explore the context and meanings of physical activity and factors related to living with CP. It is rationalized that a mixed methods approach offers a stronger perspective than one derived from a single type of research design (Caracelli & Greene, 1993; Creswell, 2009).

3.2.1 Mixed Methods

Paradigms are worldviews and beliefs that are ultimately reflected in the decisions made in research (Tashakkori & Teddlie, 1998). The focus of this mixed methods study originated from pragmatism with the epistemological approach of postpositivism. A researcher defines the study through a set of beliefs regarding: reality (i.e. ontology), the relationship between the knower and the known (i.e. epistemology), and the way which knowledge is discovered (i.e. methodology; Guba & Lincoln, 1994). On one hand, positivism holds the belief that an objective and measurable reality exists. Positivism informs most quantitative research methods that involve testing a hypothesis, under the notion that the researcher is an objective and non-influential observer of the study (Johnson & Onwuegbuzie, 2007). Quantitative research implies the application of a numerical approach to the issue under examination as well as the gathering and analysis of data (Ridenour & Newman, 2008). In contrast, interpretivism holds the belief that reality is constructed from multiple meanings; in other words, the source of reality lies within the subjective account of the individual (Guba, 1990). A qualitative approach to research implies that the researcher holds beliefs associated with the interpretivist paradigm. In using qualitative methods, an intensive perspective relies on evidence gathered from individuals or particular situations to explore the meaning and context of individuals' behaviours (Ridenour & Newman, 2008). Traditionally, these two paradigms are viewed as oppositional, and researchers commonly make claims to one or the other (Tashakkori & Teddlie, 1998). However, others who are unable to fully agree with either paradigm view have emerged with new ideas and responses to studying human behaviour. The current study was based on assumptions of both pragmatism and postpositivism. In the following paragraphs, I will discuss these paradigms in relation to the methodological approach of the current study.

Pragmatism is based on the notion that the purpose of the study is more important than a paradigm underlying the methods (Tashakkori & Teddlie, 1998). Research from any epistemological perspective aims to answer a research question. Therefore, pragmatists believe that the research question should define the methodology, epistemology, and ontology of any particular study. The purpose is initiated through the researcher, who experiences the world through unique values, beliefs, and experiences. Thus, the perspective of the researcher is responsible for their navigation through theoretical frameworks that relate to the purpose of the study. The question and purpose are considered iteratively throughout the planning process. One defined purpose leads to a question, which may generate another potential purpose. In addition, the researcher may begin a study with a certain purpose or rationale, but conclude the study with newly found meanings and implications. From pragmatic assumptions, I view paradigms as tools that researchers employ in designing a study. Based on this belief, research questions are limited if the researcher only has one tool to utilize. Despite the traditional view that using several tools through mixed methods is paradigmatically and philosophically oppositional, the pragmatic approach of mixing methods of data collection and data analysis procedures within the research process were based on the research questions and objectives of this study (Creswell, 2009).

Mixed methods also coincide with postpositivist assumptions, a paradigm which originated to challenge the assumptions and research methods imposed by positivism (Guba & Lincoln, 1994; Johnson & Onwuegbuzie, 2004). Postpositivists differ from positivists in a number of ontological, methodological, and epistemological views. The epistemological views of postpositivism influenced the methodology of the current study in several ways. Postpositivism maintains that the researcher and subject are inseparable. By simply observing the phenomenon being studied, the nature of the outcome may change. Observations are inductive, as they are formed by the research process and interactions with subjects. Inductive research maintains that conclusions are only probable because they are based on a particular population within a particular context. Therefore, generalization is not supported and purposive sampling is often the method employed. Purposive sampling negates the idea that research is context-free, supporting a focused inquiry and the importance of multiple constructed realities.

Postpositivism also shares many of the philosophical assumptions of pragmatism, including the support of mixed methods. In this study, both deductive and inductive methods were utilized in order to capture as much of reality as possible because the purpose of the study was the underlying reason for the methodology. Based on the purposes of this investigation, it was thought that combining quantitative and qualitative approaches would improve the quality of conceptualization and overall findings of the study. The aim was to gain an in-depth understanding from multiple perspectives, in which deductive and inductive methods were the most appropriate means to study physical activity participation among people with CP. Deduction was accepted because it is believed that all researchers begin an investigation with an underlying view of the world based on their perceptions. On the other hand, inductive methods were also supported because reality is assumed to be constructed from multiple individuals and knowledge is associated with their experiences. In this way, the research process is adaptive. New information often emerges from interactions with study participants, resulting in new conclusions and theories (Guba & Lincoln, 1994). Furthermore, the researcher shapes the process of inquiry as an inseparable influence of the investigation. In pragmatism and postpositivism, reality is constructed based on the researcher's own background and knowledge, and a case is developed with the underlying notion that other relevant evidence or criticisms might later compel the researcher to change his or her mind (Phillips & Burbules, 2000). Therefore, I rationalized a mixed methods study design based on the premise that a combined approach would provide a more thorough understanding of the research problem than one approach alone.

I was interested in a deductive description of physical activity participation among people with CP by measuring levels of pain, stress, physical activity participation, and exercise self-efficacy. However, I also wanted to inductively understand meanings which people associate with physical activity participation amidst living with pain. For this reason, two assumptions were be made in this study. I assumed that it is possible to collect data to quantitatively measure the levels of pain, stress, physical activity participation, and exercise self-efficacy among people with CP. I also presumed that because humans are conscious and reflective, it is possible to ask people how they describe their own lives in terms of physical activity participation and living with CP in order to discover the meanings they formulate from their experiences. Thus, this study was concerned with physical activity behaviours and beliefs of people with CP, where subjective input was one source of inquiry. The advantage of multiple methods is that this approach accentuates the verification of theories as well as the importance of discovery (Denzin & Lincoln, 2000).

3.3 Phase One: Quantitative

The quantitative and qualitative data collection for this study occurred sequentially. The quantitative data were derived from questionnaires completed by older adults with CP, with the aim of exploring the factors related to physical activity participation. In addition, these surveys guided the sampling and construction of questions for the qualitative research phase.

3.3.1 Participants and Sampling

The Interdisciplinary Committee on Ethics in Human Research at Memorial University of Newfoundland approved this study (Appendix A: Ethics Forms). A cross-sectional self-administered web-based and paper survey (Appendix B: Questionnaire) was distributed amongst a purposive sample of Atlantic Canadian adult residents (i.e. age 19 or older) with CP from April 2010 to January 2011. The questionnaire was extended to people living in Newfoundland (NL), New Brunswick (NB), Nova Scotia (NS), and Prince Edward Island (PEI). However, no completed questionnaires were received from individuals residing in NB or PEI. Participants recruited to complete the web-based survey (Appendix C: Web Survey Script; Appendix D: Web Survey Consent Form) included email registry members of the Arthritis Society and visitors to the Action Atlantic website, a volunteer advocacy group for patients with CP and health care professionals in Atlantic Canada (www.paincantwait.ca). Participants recruited to complete self-administered paper surveys included members of CP support groups in NL (Appendix E: Organization Recruitment Letter), patients of St. John's, NL physicians and health care practitioners (rheumatologists, physiotherapists, registered massage therapists, chiropractors, and naturopathic physicians), members of The Works, Memorial University of Newfoundland's fitness facility, and other referrals through snowball sampling (Appendix F: Poster Recruitment).

3.3.2 Variables and Operational Definitions

The questionnaire was designed to answer the following questions regarding participants' stress, pain, physical activity participation, and exercise self-efficacy:

(1) What are the associations between stress, pain, physical activity participation, and exercise self-efficacy?; (2) What are the differences between older adults (50 years and older), and younger adults (under 50 years) in terms of these associations?; (3) What are the differences between more active and less active participants in terms of the study variables?; and (4) Does physical activity participation mediate the relation between stress and pain? Respondents completed a survey instrument that included questions pertaining to socio-demographic information, pain, stress, participation in work, leisure, and sport or exercise-related physical activities, and exercise self-efficacy.

3.3.3 Socio-demographics

Socio-demographic information obtained included age, gender, marital status, employment status, education level, income level, and diagnosed pain conditions. The following operational definitions describe the variables used in this study:

1. *Gender* - female or male;
2. *Age* - date of birth;
3. *Education* - Each participant marked the highest level of education obtained: (a) no schooling (b) elementary school; (c) some secondary school; (d) secondary school graduation; (e) some trade school; (f) some university; (g) certificate or diploma from a trade school; (h) Bachelor degree; (i) Master/Medicine/Doctorate;
4. *Marital status* - Each participant marked one of the following: (a) single, never married; (b) married/common-law living in same residence; (c) significant other/partner not living in same residence; (d) separated/divorced; (e) widowed;

5. *Annual household income* - Participants marked one of the following indicating their annual household income: (a) no income (b) less than \$5,000; (c) \$5,000 to \$9,999; (d) \$10,000 to \$14,999; (e) \$15,000 to 19,999; (f) \$20,000 to \$29,999; (g) \$30,000 to \$39,999; (h) \$40,000 to \$49,999; (i) \$50,000 to \$59,999; (j) \$60,000 to \$79,999; (k) \$80,000 and more;
6. *Current employment status* - Each participant marked one of the following: (a) full-time; (b) part-time; (c) unemployed; (d) retired; and
7. *Pain Diagnosis* – Each participant indicated which of the following pain conditions they had been diagnosed with: arthritis, AIDS, cancer, chronic abdominal pain, chronic fatigue syndrome, chronic neck/shoulder pain, chronic low back pain, chronic pelvic pain, irritable bowel syndrome, fibromyalgia, nerve injury pain, peripheral neuralgia, phantom limb pain, post-surgical pain, Raynaud's disease, spinal injury, sport-related injury, work-related injury, other, and/or unknown.

3.3.4 Pain

This variable was defined using the International Association of Pain's definition of pain "an unpleasant subjective, sensory, and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey and Bogduk, 1994, p. 211). Chronic pain was defined as intermittent or ongoing pain which has persisted for at least six months. The study participation criterion was outlined in the consent form of the questionnaire. In this study, pain was measured using a widely used multidimensional pain survey - the Brief Pain Inventory (BPI; Cleeland & Ryan, 1994).

This measure was developed to measure the extent to which pain interferes in the lives of people with pain. Respondents were asked to rate their worst, least, average, and current pain intensity in the last 24 hours on a scale from 0 to 10 anchored by "no pain" and "pain as bad as you can imagine." A pain severity score was computed by averaging the score from these four items. Respondents were also asked to rate the degree to which pain interferes with seven domains of functioning (i.e. general activity, mood, walking ability, normal work, relations with other people, sleep, and enjoyment of life) using a similar scale of 0 to 10 anchored by the words "does not interfere" and "interferes completely." A pain interference score was computed as an average of these seven item scores. A few studies have examined the psychometric properties of the BPI among CP subjects, finding it to be a valid and reliable measure of pain intensity and interference (Keller, Bann, Dodd, Schein, Mendoza, et al., 2004; Tan, Jensen, Thornby, & Shanti, 2004). The scale showed that both BPI severity and interference scales showed significant changes in the expected direction, thereby confirming the predictive validity, and thus responsivity of the instrument for detecting improvement with pain treatment. Factor analysis indicated two independent factors of severity and interference (Tan et al., 2004), while zero-order correlations with another measure of disability (the Roland-Morris Disability Questionnaire), indicated a significantly higher correlation with BPI interference ($r = .57$) than with BPI severity ($r = .40$, $t = 5.71$, $p < .01$). The correlation with BPI interference was < .80, thus supporting the conclusion that the scales are related but also distinct measures. In terms of construct validity, moderately strong relationships ($r > .50$) were found between BPI scale scores and other well-validated generic measures of pain such as the Short-Form Health Survey (SF-36). Furthermore, the relationship between the BPI scores and general health measures were similar to the associations found between well-validated generic measures of bodily pain and general health measures (Keller et al., 2004).

3.3.5 Stress

Stress can be measured objectively or subjectively. However, based on the notion that people actively interact with their environments, stress was defined as an individual's appraisal of the stressfulness of a number of events within the last month. Cohen et al. (1983) developed the Perceived Stress Scale (PSS), which measures one's perception of the extent to which he or she finds their lives unpredictable, uncontrollable, and overloading. Ten items asked participants to rate each item using a five-point Likert scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often) based on their experience in the last month (e.g., "In the last month, how often have you been upset because of something that happened unexpectedly?" ; "In the last month, how often have you felt nervous and 'stressed'?"; and "In the last month, how often have you felt that things were going your way?"). A total stress score was calculated as a mean score of all ten items, with total scores ranging from 0 to 40 (0 = low stress, 40 = high stress). The items on the scale are factors which have been found to be central components to the experience of stress (Lazarus, 1966). Rather than objectively imply that stressful events are always responsible for an outcome such as CP, this scale is based on the notion that the experience of stress among older adults with CP is based, not only on the event, but also on personal and contextual factors as perceived by the individual. The PSS was designed for use with community samples with at least a junior high school level education, and the questions are free of content specific to any sub-population group. The scale has been studied with a national probability sample, suggesting generalizability of the data (Cohen & Williamson, 1988). Additionally, the psychometric qualities have been measured in three subgroup samples, with acceptable internal consistency (Cronbach $\alpha > .80$) and test-retest reliability ($r < .80$). The PSS has been found to be correlated with life event scores, depressive and physical symptomatology, utilization of health services, and society anxiety (Cohen et al., 1983). Furthermore, the scale has been used in studies on older adults (Trouillet, Gana, Lourell, & Fort, 2009), proving to be a reliable tool to measure perceived stress among this particular population. Therefore, the PSS provided information about the process through which stressful experiences influence CP, assessing whether a factor known to moderate stress-illness relations (i.e. physical activity), operates through its influences on stress appraisal or through some other pathway.

3.3.6 Physical Activity Participation

The Baecke Questionnaire of physical activity is a survey tool that estimates physical activity for the past 12 months, and was originally developed for young people (Baecke, Burema, Fritjers, 1982). However, the modified version was developed for use among elderly people with and without chronic diseases (Voorrips, Ravelli, Dongelmans, Deurenberg, & Van Staveren, 1991) . This measure has been used in other studies assessing physical activity among people with CP (e.g., Smeets, van Geel, & Verbundt, 2009). It has also been shown to be a reliable measure, correlating significantly with step counts ($r = .49$, $p < .05$) among women with hip disorders (Ono, Hirata, Yamada, Nishiyama, Kurosaka, et al., 2007). The construct validity of the questionnaire has been assessed in comparison to doubly labeled water, which is considered the gold standard measure in terms of energy expenditure; the total activity index of the Baecke yielded correlation coefficients of .68 against the doubly labeled water technique (Philippaerts, Westerterp, &, Lefevre, 2001). Other investigators have also found good construct validity for the Baecke when compared to the doubly labeled water technique ($\rho = .54$; [Hertogh, Monninkhof, Schouten, Peeters, & Schuit, 2008]. The scale has proven to have good test-retest reliability; indicating good repeatability after 5 and 11 months among men and women aged 20-70 years (Pols, Peeters, Buenodemoesquita, Ocke, Wentink, et al., 1995). Test-retest correlation coefficients ranged between .65 and .89, and relative validity was tested by comparing the questionnaire to a four times repeated three day activity diary with correlations of .56 among men and .44 among women (Pols et al., 1995). A comparison of the Baecke and other physical activity questionnaires revealed that the former yielded superior results because it was simpler (Philippaerts et al., 2001), thus proving the Baecke is easy for participants to understand.

Physical activity was broadly defined as any bodily movement caused by muscle contraction and characterized by the level of physical effort (CDC, 1996). In this study, physical activity participation was categorized into three distinct domains from the Baecke Questionnaire of Physical Activity (Baecke et al., 1982): (1) Work Physical Activity (Work PA); (2) Sport Physical Activity (Sport PA); and (3) Non-sport Leisure Activity (Leisure PA). Participants are asked to respond to statements using a 5-point Likert-type scale, with the exception of a few statements related to their sport, exercise, or physical activity participation. The Work PA domain consisted of eight statements:

(1) main occupation, categorized by the intensity of physical activity associated with the occupation (1 = low intensity work physical activity, such as studying and office work; 3 = moderate intensity work physical activity, such as factory work or farming; 5 = high intensity work physical activity, such as construction work or dock work); and (2) seven statements related to frequency of sitting, standing, walking, lifting and sweating during hours of work. A Work PA index was calculated as a mean score among these eight items with total scores ranging from 1 to 5.

The Sport PA domain consisted of four sets of questions related to participation in sport, physical activity, or exercise. One change that was made to the original questionnaire was the substitute of "sport, physical activity, or exercise" for the word "sport" in order to make the questionnaire easier for respondents to understand. Participants were first asked open-ended questions to indicate which two sports, exercises, or physical activity they engage in most often followed by close-ended questions related to (1) the amount of time per week that the activities are participated in (<1 hour (weighted score of 0.5), 1-2 hours (weighted score of 1.5), 2-3 hours (weighted score of 2.5), 3-4 hours (weighted score of 3.5), >4 hours (weighted score of 4.5) and, (2) the proportion of the year in which the sports are played regularly (< 1 month [weighted score of 0.04], 1-3 months [weighted score of 0.17], 4-6 months [weighted score of 0.42], 7-9 months [weighted score of 0.67], >9 months [weighted score of 0.92]. Based on the type of sport, exercise, or physical activity indicated, the intensity was determined by the average energy expenditure (Baecke et al., 1982): (1) low intensity physical activities were defined as having an average energy expenditure of 0.76 MJ/h (e.g., bowling, golf); 2) middle intensity physical activities were defined as having an average energy expenditure of 1.26 MJ/h (e.g., dancing, badminton, swimming, tennis); and 3) high intensity physical activities were defined as having an average energy expenditure of 1.76 MJ/h (e.g., basketball, rowing, rugby). A sport intensity item was calculated based on summing the product of the intensity, time, and proportion questions for the two sports, exercises, or physical activities. Subsequently, this was translated into a 5-point Likert score ($\geq 12 = 5$; 8 to $< 12 = 4$; 4 to $< 8 = 3$, 0.01 to $< 4 = 2$; $0 = 1$). Participants were also asked to respond to three statements regarding their leisure physical activity: (1) "In comparison to others my own age I think my physical activity during leisure is…" (1 = Much less; 5 = Much more); (2) "During leisure time I sweat" (1 = never, 5 = very often); and (3) "During leisure time I play sports" (1 = never, 5 = very often). Finally, a Sport PA was calculated as a mean score among these four items, with scores ranging from 1 to 5.

Leisure PA questions asked respondents about frequency of television watching, walking, and cycling. A Leisure PA index is calculated as a mean score among these 3 items and thus scores can range from 1 to 5. A Leisure PA was calculated as a mean score of three items, with total scores ranging from 1 to 5. Total PA was calculated as the sum score of the three indices (i.e. Work PA, Sport PA, and Leisure PA), thus allowing a total score ranging from three to fifteen.

3.3.7 Exercise Self-Efficacy

Exercise self-efficacy was defined as an individual's belief that they will be able to successfully exercise and produce desired outcomes. This variable was measured using the Exercise Self-Efficacy Scale (McAuley, 1993). High internal consistency has been established for this measure (Cronbach's $\alpha = .90$). The scale has also been shown to predict exercise adherence (McAuley, 1993; McAuley and Jacobsen, 1991) as it was designed to measure participants' exercise self-efficacy with regards to continued exercise participation (at least 3 times per week for at least 30 minutes at moderate intensity) over incremental week periods for 8 weeks. In this study, respondents were asked to indicate their degree of confidence to participate in moderate-intensity exercise, for at least 30 minutes per day, 3 times per week for the next 8 weeks, on a scale ranging from 0% (no confidence at all) to 100% (completely confident). The confidence scores were summed and divided by the total number of items (eight) with a possible range of 0% (low exercise self-efficacy) to 100% (high exercise self-efficacy).

3.4 Pilot Study

Pilot questionnaires were administered to two women in NL (ages 57 and 77) in order to improve its reliability and validate the wording of the questions and items with the older adult population. The time taken to complete the questionnaire (25-45 minutes) was recorded to test the practicality of completing the questionnaire. Based on the feedback from the respondents, the following revisions were made.

Initial Survey	*Revised Survey*
1) Page 10	"Fibromyalgia" was added to the list of conditions. Participants were prompted to fill in a blank line if they selected "Other", to specify their diagnosed condition.
2) Physical Activity Section	From the Baecke Physical Activity Questionnaire, "physical activity, sport, or exercise " was substituted for "sport".
3) Demographics	"Widowed" was added to the list of items.

3.5 Data Collection

The quantitative data collection phase of this study lasted from April 2010 to January 2011. Self-administered surveys were collected from a cross-sectional non-probability sample of adults over the age of 19 in Atlantic Canada. The sample was largely represented by residents of NL, as only two of the respondents were from NS. Several different methods of recruitment were employed. I attended community events (Torbay Walking for Wellness, Senior Resource Centre's Friday Friendship Club, and Café Scientifique for Chronic Pain in St. John's), where I gave oral and poster presentations on physical activity adherence and/or led group exercise classes. I also distributed surveys to fitness class participants at The Works, the fitness facility at Memorial University of Newfoundland. Additionally, I made contacts in rural areas outside the primary urban centre of NL (St. John's), by sending surveys via postal mail to seniors' retirement homes and CP support groups throughout the province. Posters were distributed to local health practitioners' offices (e.g. chiropractors, massage therapists, naturopaths, physiotherapists, and rheumatologists) in order to recruit patients willing to participate. I received support in terms of survey distribution through The Arthritis Society in St. John's, as they disseminated surveys at CP self-management workshops between the months of April 2010 and August 2010. In addition to the paper survey, I designed a web-based survey using Survey Monkey. The pain advocacy organization, Action Atlantic, posted an announcement about my study on their website. I accessed contact information for CP support groups through the Chronic Pain Association of Canada website, and proceeded to make initial contacts via telephone or email to various support groups in NB, NS, and PEI. Group contacts were directed to the website to participate in the study. All survey participants were asked if they would be willing to be contacted in order to participate in Phase Two of the study which involved a one-on-one interview.

3.6 Data Analysis

The purpose of the quantitative phase was to evaluate the associations between pain, stress, physical activity participation, and exercise self-efficacy. All paper and web surveys were number coded, and participants' responses to the survey items were entered and analyzed in SPSS 16.0. Statistical significance was set at the .05 alpha level. First, the data were screened for missing and invalid data points. Composite scores were computed for the BPI, PSS, Baecke, and Exercise Self-efficacy scales. Next, descriptive statistics on demographic variables (e.g. age, gender, marital status, income, and education) were computed and frequencies and percentages were generated in order to provide a summary of responses to items regarding pain, stress, physical activity participation, and exercise self-efficacy. Bivariate correlations were generated in order to explore the relations between socio-demographic information and the study variables (i.e. pain, stress, physical activity participation, and exercise self-efficacy). Hierarchical linear regressions were conducted to determine associations between biopsychosocial factors and physical activity participation and multiple regression analysis was used to test the buffer hypothesis. Finally, group differences were assessed using a series of *t*-tests.

3.7 Phase Two: Qualitative

Qualitative research is often undertaken when a particular topic of study is complex, ill-defined, and deeply rooted within a person's beliefs. The aim of the qualitative inquiry was to examine the meaning of physical activity and other factors in relation to CP among older adults. The specific research questions to be answered through in-depth interviews were: (1) What factors influence physical activity participation among people with CP?; (2) What is the meaning of physical activity among people with CP?; and (3) Why are some people with CP more active while others are less active? It was believed that many variables comprise meaning and formulate a person's experience with physical activity and CP. The qualitative data were collected after participants completed the questionnaire regarding the theorized factors, in order to further expand upon the quantitative findings. At the end of the self-administered paper survey, I asked each participant if they would be willing to participate in an interview. I included my phone number and email address so the participants could contact me with questions. If they were willing to be interviewed, they included their contact information in this section of the survey.

3.7.1 Role of the Researcher

Qualitative research is interpretive in nature, as the investigator is the primary instrument for data collection and analysis. The aim of the study was not to force the participants into their response based on my presumptions, but rely on their own thoughts and insight. Still, it is impossible to set aside prejudgments and experiences; therefore, my personal characteristics bring importance to this study. Rather than eliminate my influence on the study and its participants, my goal was to initially understand my presence and position through self-reflection (Ritchie & Lewis, 2003). I did not introduce myself to any of the participants as someone who experiences CP related to sports injuries because I did not want their stories to take root from my own background or experiences with physical activity and pain. Furthermore, I did not want interviewees to withhold details under the assumption that I already knew about certain aspects of their experience. I introduced myself to the participants in this study as a graduate student in kinesiology. In my educational and work experience as a fitness trainer, I entered the interviews with the notion that people often speak about exercise as a desirable activity, even if this ideal does not align with actual habits. Knowing my educational background and area of research interest, it is possible that the participants' dialogues about health and physical activity reflected those which were more socially acceptable. However, I reassured the women I interviewed that there were no right or wrong answers to the questions. The six women interviewed in this study were all over age 50 and were born in NL, Canada. As a 24- year old woman born in the United States of America, I foresaw that certain ambiguities might arise from the interviews, specifically those related to cultural and generational differences. A semi-structured interview format allowed me to intervene when I did not understand the dialect, or when their narratives seemed to align with social ideals rather than actual practice. The social issues which arose during the interviews surrounding these discrepancies are discussed in the final chapter of this thesis. Data collection through in-depth interviews requires reflexivity, and I became a part of the experiences under examination.

According to Creswell (2009), researchers should consider their own biases, values, reactivity, and judgments which influence the validity of the data collection and conclusions. As a mixed methods study, the quantitative phase was designed with certain hypotheses regarding CP, stress, physical activity participation, and exercise self-efficacy. However, I designed Phase Two to allow for expansion of the quantitative findings, as well as for expansion of my own assumptions and hypotheses. In this way, I deliberately conducted the qualitative portion of the study with flexibility and open-mindedness, entering with the belief that interviews with study participants might introduce other factors which had not been previously thought of or discovered through the quantitative analysis. Through self-reflection of my own presumptions, reflexivity was used as a method of establishing credibility.

3.7.2 Participants

Extreme case analysis is a strong analytic strategy which is often used in sequential explanatory research designs (Greene & Caracelli, 1993). In this type of study, outliers or extreme cases are identified through analysis of one data type and then further investigated through collection and analysis of the other data type (Greene & Caracelli, 1993). Extreme case analysis is also used when the purpose of the study is to initiate learning about phenomena because knowledge about the topic may be heightened by looking at exceptions or extremes (Fry, Chantavanich, &Chantavanich, 1981). I rationalized that this approach provided an enhanced understanding of cases, contributing to clarification and refinement of conclusions and interpretations. Therefore, the interviews were conducted with outliers or extreme cases, with the aim of providing additional information regarding physical activity participation in this particular population. Six participants were chosen for one-on-one semi-structured interviews. First, I selected female participants who were over the age of 50 in order to focus on the unique experiences of women and older adults, as CP is more common among women, and there are fewer studies on older adults' beliefs in regards to physical activity participation within the context of CP. Second, participants were selected based on their area of residence. In order to gather a wide range of experiences, I chose three participants from a rural part of NL, and three who resided in or near to the province's main urban centre, the city of St. John's. Finally, I chose extreme cases based on the participants' questionnaire responses. For example, I chose one participant who reported high levels of pain intensity and interference, low physical activity participation, and moderate self-efficacy. I also chose to interview a woman who reported the same levels of pain intensity as the participant mentioned above, but lower pain interference, higher physical activity participation, and higher exercise self-efficacy. It was presumed that talking with both women would help clarify the differences in their experiences with pain interference and physical activity. The other participants were selected through similar rationale, as I attempted to hear from six women with varying survey responses and inevitably, unique experiences.

3.7.3 Data Collection

Older adults with CP were interviewed following a semi-structured format. Interviews have been defined as a conversation with a purpose, providing an open-ended, subjective account of an area which the interviewee has considerable insight (Kvale, 1996). These in-depth conversations elicit a holistic account of the experience of CP as it relates to physical activity participation. Each interview was "structured" with the format and wording of questions. However, flexibility was included by probing and exploring issues raised unexpectedly by the interviewee. Content mining questions, such as amplificatory, exploratory, and explanatory probes were used to obtain a full description of the interviewees' accounts (Ritchie & Lewis, 2003).

The qualitative data collection was carried out in January 2011 following completion of Phase One data collection and preliminary data analyses. Participants were six female residents of NL ranging in age from 50 to 64. The interviewees were purposefully selected to represent various socioeconomic backgrounds and geographical regions (rural and urban) as determined by the criteria used by Census Canada (2006). I also looked for extreme cases (e.g. participants who reported very high or low stress, very high or low physical activity). The primary purpose of the interviews was to gather additional information regarding the participant's responses on the questionnaire. Because extreme cases may be especially enlightening (Patton, 2002), this sampling technique was used to add depth and detail regarding attitudes and beliefs that individuals attribute to their unique experience with CP, and provide further explanation for the findings of the quantitative analysis.

Participants were initially contacted by phone or email to establish eligibility and informed consent. Three of the one-on-one interviews were conducted face-to-face at Memorial University of Newfoundland and at a restaurant in St. John's. The other three were conducted via telephone, as the participants lived in Lewisporte, NL, a town of about 4,000 residents located approximately 390 kilometers from the city of St. John's. Interviews lasted for approximately 60 minutes. All interviews were tape-recorded with the permission of the interviewee and then transcribed verbatim as soon as possible following the interview in order to preserve the speech, emotion, and conversation. In addition to tape-recorded interviews, I kept field notes and memos during and immediately following each interview. "Memoing" is a method of recording what the researcher sees, experiences, and thinks in the course of collecting and reflecting on the process (Miles & Huberman, 1994). In addition, field notes are critical in qualitative research because one may forget the data retained from the interview relatively quickly. As recommended, field notes were written no later than the day after the interview. The field notes in this study included observational memos, (i.e. description of what happened), theoretical memos, (i.e. attempts to derive meaning), methodological memos (i.e. reminders and critique to oneself on the process), and analytical memos (i.e. summary of the day and a progress review).

3.7.4 Interview Guide

The semi-structured interviews were conducted with the use of an interview guide (Appendix H: Interview Guide). The first draft of the interview guide was developed from my prior knowledge and areas of interest given the focus of physical activity participation. The interview guide was adapted and changed after the Phase One data collection and preliminary analyses had concluded. Questions were designed to explore the issues which emerged from the quantitative data in more detail. The interview guide consisted of seven questions divided into four sections: pain, stress, physical activity, and exercise self-efficacy. In the opening part of the interview, I asked participants if the questionnaire had provoked any thoughts or reflections about their experience. The next sections included questions regarding pain interference with activities and about factors which motivate participants to exercise. The exercise self-efficacy and stress sections included items which referred back to the participant's survey responses. These sections prompted participants to talk more about their beliefs about exercises or experiences in which they felt out of control, stressed, on top of things, etc. The aim was to ask broad questions, allowing the respondent to expand upon the questionnaire items. I followed up with probing questions for further clarification. The guide was adapted between interviews based on the individual's questionnaire responses, as well as other topics which unfolded from the data collection and analysis.

3.7.5 Data Analysis

I analyzed the qualitative data using a thematic content analysis approach, a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). This method assumes that content is the unit of study and corresponds to the intended meanings of the communicator. Content analysis also assumes that the frequency of occurrence of various themes and qualities of the content is important in the process, emphasizing the quantitative importance of the content (Hsieh & Shannon, 2005). At the same time, the analysis is characterized by more than merely counting the frequency of words. The content was studied with the intention of providing knowledge regarding physical activity participation within the lives of women with CP, representing the meanings ascribed to physical activity.

In accordance with the recommendations by Hsieh and Shannon (2005), the transcripts were read to identify emerging codes and categories. Text which appeared to represent the initial variables examined in the quantitative analysis (pain, stress, physical activity, and exercise self-efficacy) was highlighted. This initial coding scheme was used to organize the text according to these categories. It is acknowledged that the categories identified did not just stem from the data, but were influenced by the literature, background reading, and my experience within the exercise culture. While it is recognized that these factors contributed to conceptualizing themes, additional codes were derived to ensure that the categories fit the data, rather than forcing the data to fit within the categories. Thus, flexibility in the coding process allowed for the initial coding scheme to be revised and refined to effectively expand the findings with the discovery of newly identified categories. The second step involved the process of refining all categories into broader themes. The purpose was to detect similarities, to refine the differences between categories, and to discover patterns. Broader themes linked to the categories were established from the data. The analysis resulted in findings composed from the accounts of the women's' experiences with physical activity and CP, drawing on the recurrent themes found across the categories.

Chapter 4: Results

The following chapter will discuss the results of Phase One and Phase Two of this study. Phase One quantitatively explored the associations between pain, stress, physical activity participation, and exercise self-efficacy. Hierarchical linear regressions were conducted to determine associations between biopsychosocial factors and physical activity participation and multiple regression analysis was used to test the buffer hypothesis. Finally, group differences were assessed using a series of *t*-tests. Phase Two qualitatively studied participants' beliefs about physical activity participation and the experiences of their lives within the context of CP. Semi-structured one-on-one interviews were transcribed and coded using a thematic content analysis approach in order to discover common themes within the participants' narratives.

4.1 Phase One: Quantitative Results

The following results from Phase One will be discussed: (1) sample descriptives; (2) correlations between pain, stress, physical activity, exercise self-efficacy, and sociodemographic variables; (3) hierarchical linear regression of the associations between study variables while controlling for sociodemographic variables; (4) mediation of physical activity participation between the predictor (stress) and outcome (pain) variables; and (5) series of *t*-tests assessing group differences. Bivariate correlations were computed to determine the correlations between the variables. The Kolmogorov-Smirnov test was applied to test for normal distribution, and Pearson, Spearman, and Kendall's correlation coefficients are reported accordingly. Hierarchical linear regressions determined the associations between pain, stress, physical activity participation, and exercise self-efficacy, while controlling for socio-demographic variables. Standardized beta values are reported to represent the importance of each predictor. Tests for mediation were also conducted to determine whether physical activity participation influenced the association between stress and pain. Mediation analysis was selected because previous research suggests that physical activity may account for all, or some, of the relationship between stress and pain. In addition, a series of independent *t*-tests were computed to determine differences between more active and less active respondents. For all of the above-named analyses, the *alpha* level was set at .05.

4.2 Sample Descriptives

The population of this study included adults with CP ($\geq$ 19 years of age) residing in the Atlantic provinces of Canada. However, most of the participants (98%) were from NL, and only two of the participants were from NS. In Phase One, participants completed paper ($n = 92$) and Internet surveys ($n = 8$). Of the 480 surveys distributed, 105 were returned, resulting in a 22% response rate overall. Five surveys were not included because the subjects reported cancer pain. One case was excluded from the analysis because of missing data. Therefore, 99 usable surveys were used. Of the 99 surveys, 42% were recruited through snowball sampling, 14% through the Arthritis Society's Pain Management workshops, 10% through community events, and 10% were recruited through poster advertisements in physician's offices.

The sample was 71% female and the mean age was 57.6 (*SD* = 15.43). Sixty-nine percent of the respondents were 50 years of age or older. Of the participants age 50 and older, 25% were age 70 or older. The majority of the sample was married or common-law living in the same residence (59%), 13% were single and never married, 12% were separated or divorced, and 9% were widowed. Thirty-five percent of the sample reported an annual household income of $60,000 (CAD) or more per year. The median annual household income was $40,000-$49,999. According to Stats Canada (2008), the median total household income in NL is $59,320. Participants were highly educated, as over half (65%) had attained a certificate or diploma from a trade school, or a college or university graduate degree. Fifty-three percent of the sample was retired, 23% worked full-time, 9% part-time, and 11% reported unemployment or disability.

Over half (57.6%) of the participants reported they were diagnosed with arthritis, 52.5% reported chronic low back pain, 33.3% reported chronic neck or shoulder pain, 25.5% had been diagnosed with Fibromyalgia, and 12.1% reported pain from a work-related injury. Only 4.0% indicated that their CP was "unknown". The Brief Pain Inventory (BPI; Cleeland & Ryan, 1994) was used to assess pain severity and pain interference amongst the participants. Pain severity scores ranged from 0 ("no pain") to 10 ("pain as bad as you can imagine"). Mean pain severity, as indicated by the subscale of the BPI was 4.82 (*SD* = 2.12), indicating that, on average, participants reported moderate levels of pain. Participants also reported moderate pain interference, with a mean pain interference score of 4.77 (*SD* = 2.63) out of 10 (0 = "no interference", 10 = "complete interference"). On average, participants' scores indicated that pain interfered slightly more with activities (*M* = 5.16, *SD* = 2.75) than affect (*M* = 4.27, *SD* = 2.71; Table 4.1).

Table 4.1: Descriptive Statistics for Pain

		M (SD)	Z_{Skew}	Z_{Kurt}
Total Pain Severity		4.9 (2.15)	1.78	.65
Rate your pain in the last 24 hours…				
Pain Worst[a]		6.2 (.66)	-1.81	.21
Pain Least[a]		3.3 (2.39)	4.19	2.07
Pain Right Now[a]		4.8 (2.80)	.82	-1.63
Pain Average[a]		5.2 (2.19)	1.05	.66
	Ranking	***M (SD)***	Z_{Skew}	Z_{Kurt}
Total Pain Interference		4.8 (2.59)	-.48	-2.17
In the last 24 hours, rate how pain has interfered with…				
General activity[b]	4	4.9 (3.34)	-.59	-2.66
Mood[b]	6	4.4 (3.05)	.74	-2.19
Walking ability[b]	3	5.1 (3.40)	-.14	-2.92
Normal work[b]	1	5.3 (3.08)	-.63	-2.37
Relations with others[b]	7	3.6 (3.05)	1.04	-2.59
Sleep[b]	2	5.3 (2.95)	-.21	-2.04
Enjoyment of life[b]	5	4.8 (3.09)	.58	-1.84

[a] 0 = no pain; 10 = pain as bad as you can imagine

[b] 0 = does not interfere; 10 = completely interferes

4.2.1 Physical Activity

Physical activity participation was assessed using the Baecke Questionnaire of Physical Activity (Baecke et al., 1982). This questionnaire consisted of 16 questions regarding three domains of physical activity: (1) work physical activity (Work PA), (2) sport physical activity (Sport PA) and (3) non-sport leisure activity (Leisure PA). The Work PA domain consisted of eight statements. One statement was related to the person's main occupation, which was further categorized as low, middle, or high physical activity occupations (1 = low intensity work physical activity occupations such as driving, studying, and clerical work; 3 = moderate activity such as factory work or farming; and, 5 = high activity occupations such as construction work). Many participants reported that they were retired, and consequently did not complete the Work PA questions on the survey. Participants who were retired and did not indicate their primary work activity were assigned to the category of low intensity physical activity. The majority of the sample (91%) reported occupations that were classified as low intensity work physical activity, with a mean Work PA score of 2.4 (*SD* = 1.08; Table 4.2).

In terms of Sport PA, subjects were asked which physical activity, sport, or exercise they engaged in most often. According to the Baecke questionnaire participants' activities were classified in terms of average energy expenditure (1 = low intensity, 2 = middle intensity, 3 = high intensity). The majority of the sample (74%) reported participation in low intensity sport or exercise physical activities (e.g. walking, billiards, bowling). Approximately half (55.1%) of the sample reported "walking" as their primary activity. Only 14% of the sample reported activities of moderate intensity (e.g. cycling, dancing, swimming), and 4% reported high intensity physical activities such a running, basketball, and rowing. Participants were also asked how often they engaged in the sport, exercise, or physical activity. Twenty-nine percent indicated that they participated in the activity more than four hours per week and 20% engaged in the activity three hours per week. Only 9% reported that they participated in the activity less than one hour per week. Fifty-seven percent of the sample indicated that they participated in their primary physical activity, sport, or exercise more than nine months of the year, while only 7% participated in the activity less than one month of the year. Participants were also asked to indicate which sport, exercise, or physical activity they participated in second most often. Similar to respondents primary sport activities, 56% reported activities of low intensity, 23.2% reported moderate intensity physical activities, 5.1% reported high intensity activities, and 16.2% reported "none." Walking was also the most commonly reported secondary physical activity or exercise (29%), while 11% of the sample reported housework, 10% gardening or yard work, 9% aerobics and 9% reported dancing as their secondary physical activity. The majority of the sample (58.4%) reported participating in this second activity three hours per week or less, and only 21.3% reported participating in the activity for more than four hours per week. However, nearly half (45.5%) of the participants indicated engaging in the activity more than nine months of the year, 19.3% participated four to six months of the year, 13.6% percent participated one to three months, and 9.1% participated less than one month of the year. A sport intensity item (Sport PA) was then calculated based on summing the product of the intensity, time, and proportion questions for both sports, exercises, or physical activities and translated into a 5-point Likert score. Participants were also asked to respond to three statements regarding their physical activity during leisure time. The majority of participants (48.4%) said their physical activity during leisure time was "less" or "much less" than others their own age. On a scale of 0 ("never") to 5 ("very often"), respondents indicated the frequency of their participation in sport during leisure time ($M = 2.7$; $SD = 1.31$), and how often they sweat during leisure time (*M* = 3.3; *SD* = 1.15*).* On average, participants participated in sport, and sweat during leisure time "sometimes." Finally, a Sport PA was calculated as a mean score among these four domains, with scores ranging from 1 to 5. On average, the total Sport PA score was 2.8 (*SD* = .64) classifying their physical activity through sport and exercise as low to moderate.

Non-sport leisure physical activity asked participants about activities such as television watching, walking, and cycling. Participants responded to three statements related to frequency of watching television and walking and cycling during leisure time. A Leisure PA index (Leisure PA) was calculated as a mean score of three items, with scores ranging from 1 to 5. The majority of participants (53.6%) indicated that during leisure time they watched television "often" or "very often", 14.2% indicated they watched television "never" or "seldom". This sample had a mean Leisure PA score of 0.6 (*SD* = .55; Table 4.3) indicating that, on average, the respondents were not very physically active during their leisure time.

A total physical activity score (Total PA) was calculated as the sum score of the three indices (i.e. Work PA, Sport PA, and Leisure PA), with total scores ranging from three (minimum) to fifteen (maximum). On average, participants had a mean Total PA of 5.4 (*SD* =1.09). Total activity scores for this sample ranged from 2.6 (minimum) to 7.6 (maximum), indicating that even those with higher levels of physical activity relative to the sample were not highly active. There was one outlier who had a very high total PA score (13.1).

Table 4.2: Descriptive Statistics for Work Physical Activity

	Ranking	*M* (*SD*)	Z_{Skew}	Z_{Kurt}
At work I sit[a]	2	3.9 (1.13)	-3.05	-1.13
At work I stand[a]	3	3.7 (1.09)	-2.88	-.27
At work I walk[a]	4	3.5 (1.23)	-2.13	-1.09
At work I lift heavy loads[a]	6	2.8 (1.52)	1.15	-2.83
After work I am tired[a]	1	4.4 (5.25)	38.44	189.18
At work I sweat[a]	5	3.1 (1.42)	.47	-2.52
In comparison of others of my own age I think my work physical activity is…[b]		2.9 (1.29)	.74	-2.11

[a] 1 = never; 5 = always

[b] 1 = much lighter; 5 = much heavier

Table 4.3: Descriptive Statistics for Leisure Physical Activity

	Ranking	*M* (*SD*)	Z_{Skew}	Z_{Kurt}
During leisure time I watch television[a]	1	3.5 (1.02)	-2.22	.14
During leisure time I walk[a]	2	3.0 (1.13)	-.79	-1.16
During leisure time I cycle[a]	3	1.3 (.79)	11.71	16.29

[a] 1 = never; 5 = very often

4.2.2 Stress

The Perceived Stress Scale (PSS; Cohen et al.,, 1983) is a five-point Likert scale (1 = never, 5 = very often), which measures one's perception of the extent to which they find their lives unpredictable, uncontrollable, and overloading. Ten items asked participants to rate each item based on their experience in the last month The mean stress score was 16.56 out of a possible score of 40 (*SD* = 7.31, Table 4.4). The highest score was 35 out of 40 (*n* = 2), and 72% (*n* = 99) of participants had a score of 20 or lower, suggesting that most of the participants perceived low to moderate stress.

Table 4.4: Descriptive Statistics of Perceived Stress Scale

	Ranking	*M* (*SD*)	Z_{Skew}	Z_{Kurt}
In the last month how often have you…				
Been upset because of something that happened unexpectedly[a]	4	1.8 (.98)	.47	.09
Felt that you were unable to control the important things in your life[a]	5	1.7 (1.12)	.83	-1.71
Felt nervous or "stressed"[a]	1	2.1 (.99)	-.68	-.87
Felt confident about your ability to handle your personal problems[a]	9	1.1 (.92)	1.17	-1.72
Felt that things were going your way[a]	6	1.5 (.95)	1.31	-.59
Found that you could not cope with all the things you had to do[a]	2	1.9 (.95)	1.66	-.06
Been able to control irritations in your life[a]	8	1.4 (.89)	2.03	.74
Felt that you were on top of things[a]	7	1.5 (1.07)	2.53	.10
Angered because of things that were outside of your control[a]	3	1.8 (1.06)	.14	-.52
Felt difficulties were piling up so high that you could not overcome them[a]	6	1.6 (1.09)	.79	-1.24

[a] 1 = never; 5 = very often

4.2.3 Exercise Self-Efficacy

Exercise self-efficacy was measured using the Exercise Self-Efficacy Scale (McAuley, 1993). This scale was designed to measure participants' exercise self-efficacy with regards to continued exercise participation (at least three times per week for at least 30 minutes at moderate intensity) over incremental week periods for eight weeks. Respondents were asked to indicate their degree of confidence for each item on a scale ranging from 0% ("no confidence at all") to 100% ("completely confident"). The confidence scores were summed and divided by the total number of items with a possible range of 0-100%. The mean exercise self-efficacy score amongst participants was 56.8% (*SD* = 37.53), indicating that on average, participants' had moderate levels of confidence to continue physical activity 30 minutes per day, three times per week, over increments of the next eight weeks.

4.3 Bivariate Correlation Analysis

A series of bivariate correlations, reported using Pearson, Spearman, and Kendall coefficients, determined associations between socio-demographic variables (gender, age, income, education, and employment status), pain (pain interference and pain severity), stress, physical activity (Work PA, Sport PA, and Leisure PA, Total PA), and exercise self-efficacy. As shown in Table 4.5, gender was significantly positively correlated with Sport PA ($\rho = .201$, $p < .05$) meaning that males had higher levels of sport physical activity. Age was negatively correlated to stress ($\rho = -.265$, $p < .01$); so as age increased, stress levels decreased. Age was also significantly positively correlated with Work PA (ρ

$= .233, p < .05$), Sport PA ($\rho = .216, p < .05$), and Total PA ($r = .202, p < .05$). This suggests that as age increases, Work PA, Sport PA, and Total PA also increases. Annual household income was significantly negatively associated with Leisure PA ($\rho = .228, p < .01$) which suggests that as income increases, leisure activities decreases.

Pain interference was significantly positively correlated to pain severity ($r = .598$, $p < .01$) and stress ($r = .514, p < .01$). Pain interference was also significantly negatively correlated with exercise self-efficacy ($\rho = -.504, p < .01$), Total PA ($r = -.285, p < .01$), and Sport PA ($\rho = -.691, p < .01$). Therefore, higher pain interference was associated with lower exercise self-efficacy, Total PA, and Sport PA. Stress was also positively associated with pain interference ($\rho = .514, p < .01$). Pain severity was negatively associated with exercise self-efficacy ($\rho = -.306, p < .01$), Sport PA ($\rho = -.444, p < .01$), Leisure PA ($\rho = -.224, p < .01$), and Total PA ($r = -.360, p < .01$). Pain severity was positively correlated with stress ($r = .261, p < .01$). Sport PA was significantly negatively correlated with stress ($\rho = -.324, p < .01$), meaning that higher levels of Sport PA were associated with lower levels of stress.

Table 4.5: Intercorrelations between demographics and study variables.

Variables	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	.035	-.089	-.135	.138	-.057	-.048	.151	.114	.201*	.088	-.146	-.030
2. Age		-.028	-.135	.138	-.129[a]	-.061[a]	-.049	.202*[a]	.216*	.233*	-.045	-.265**
3. Education			.279**[b]	-.222**[b]	-.127	-.010	.040	-.085	-.034	-.097	.010	.080
4. Income				-.126	-.114	-.176	.177	.151	.143	.053	.228**	-.073
5. Marital status					-.234*	-.042	-.015	-.035	.150	.219*	.075	-.291*
6. Pain interference						.598**[a]	-.504**	-.285**[a]	-.691**	.163	-.134	.514**[a]
7. Pain severity							-.306**	-.360**[a]	-.444**	.043	-.224**	.261**[a]
8. Exercise self-efficacy								.389**	.611**	.092	.126	-.140
9. Total PA									.588***[a]	.655***	.542***[a]	-.086[a]
10. Sport PA										.090	.297**	-.324**
11. Work PA											.126	.141
12. Leisure PA												.044
13. Stress												

Note: All correlations are presented as Spearman correlation coefficients (ρ) unless otherwise noted.

[a] Pearson correlation coefficient(r)

[b] Kendall correlation coefficient (T)

*$p < .05$

**$p < .01$

4.4 Regression Analysis

Regression analyses were conducted to determine the associations between biopsychosocial factors (pain, stress, exercise self-efficacy) and physical activity participation. Previous studies have found that variables such as stress, pain, and exercise self-efficacy influence physical activity participation (Arnstein et al., 1999; Coleman & Iso-Ahola, 1999; Leveille et al., 2003) Research also suggests that stress is associated with pain (Hurwitz et al., 2005). Although no predictions were made about associations between socio-demographic variables of interest in this study, age and gender were included in the regression models based on the bivariate correlation analysis results and previous research. Other studies have found that older adults with CP have lower self-efficacy for exercise (Leveille et al., 2003). In addition, CP is more common among females (Yunus, 2008). Prior to conducting analyses, assumptions of normality were determined with the Kolmogorov-Smirnov test (Field, 2005). Additionally, all summed variables were transformed into standardized *z* scores to remove concerns about scale of measurement. According to the Kolmogorov-Smirnov normality test, the following variables were not normally distributed: pain severity ($D(98) = .096, p < .05$), exercise self-efficacy ($D(98) = .157, p < .001$), Sport PA ($D(98) = .092, p < .05$), Leisure PA ($D(98) = .166, p < .001$), Work PA ($D(98) = .185, p < .001$, and stress ($D(98) = .090, p < .05$). Pain interference ($D(180) = 0.105, p < .05$) and Total PA were normally distributed.

To determine the associations between biopsychosocial factors (i.e. pain, stress, and exercise self-efficacy) and physical activity participation, while controlling for age and gender, a series of hierarchical linear regressions were conducted. For each of the four physical activity variables (Sport PA, Work PA, Leisure PA, and Total PA), age and gender were entered in the regression models first, and then the predictor variables (stress, pain interference, pain severity, and exercise self-efficacy) were entered separately in the second step. Thus, age and gender were controlled for in the models. Similar analyses were conducted to determine the association between stress and pain (pain interference and pain severity), while controlling for age and gender.

Sport PA was not associated with age, but was positively associated with gender meaning that males participated in Sport PA more than females ($\beta = .207$, $p \leq .05$). Socio-demographic variables explained 5.3% of the variance in Sport PA. Sport PA was negatively associated with stress ($\beta = -.356$, $p \leq .001$, Table 4.6), pain severity ($\beta = -.416$, $p \leq .001$, Table 4.7), and pain interference ($\beta = -.681$, $p \leq .001$, Table 4.8), which respectively accounted for an additional 12.1%, 17%, and 44.5% of the variance in Sport PA beyond sociodemographic variables. The standardized beta weights indicated that Sport PA had a stronger association with pain interference than Work PA or Total PA. Exercise self-efficacy was a significant predictor of Sport PA ($\beta = .584$, $p \leq .001$, Table 4.9), accounting for 33.5% of the variance.

Work PA was not significantly associated with gender but was positively associated with age meaning that as age increased ($\beta = .223$, $p \leq .05$), participation in Work PA increased. Pain interference, pain severity, exercise self-efficacy, and stress were not found to predict Work PA. Leisure PA was not significantly associated with gender or age. After controlling for the gender and age, stress, pain interference, and exercise self-efficacy did not predict Leisure PA. Pain severity was the only variable negatively associated with Leisure PA in this sample ($\beta = -.281, p \leq .05$, Table 4.10). Less than 8% of the variance within Leisure PA was explained by pain severity.

Total PA was not significantly associated with gender but was positively associated with age meaning that as age increased ($\beta = .220, p \leq .05$), participation in Total PA increased. After controlling for gender and age, stress did not predict Total PA. Similar to Sport PA, Total PA was negatively associated with pain severity ($\beta = -.322, p \leq .05$, Table 4.11) and pain interference ($\beta = -.249, p \leq .05$, Table 4.12), and positively associated with exercise self-efficacy ($\beta = .344, p \leq .01$, Table 4.13), which respectively accounted for an additional 10.2%, 6.1%, and 11.6% of the variance in Total PA beyond socio-demographic.

To determine associations between stress and pain after controlling for age and gender, a series of hierarchical regression analyses were computed. Results from Step 1 indicated that stress was not significantly associated with gender or age. Step 2 of this model revealed that higher stress was related to higher pain severity ($\beta = .269, p \leq .01$, Table 4.14) and pain interference ($\beta = .515, p \leq .001$; Table 4.15), which respectively accounted for an additional 7.1% and 26% of the variance in stress beyond socio-demographic. The standardized beta weights indicated that stress had a stronger association with pain interference than pain severity.

Table 4.6: Hierarchical regression analysis of stress and Sport PA controlling for gender and age

Variable	Beta	β	F	df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			3.686*	2,94	.073	.053	.073
Gender[a]	.439*	.207*					
Age	.089	.093					
Step 2			7.463	3,93	.194	.168	.121
Stress[b]	-.346***	-.356***					

$*p \leq .05$, $***p \leq .001$
[a] 0 = female, 1 = male
[b] 0 = low stress, 40 = high stress

Table 4.7: Hierarchical regression analysis of pain severity and Sport PA controlling for gender and age

Variable	Beta	β	F	df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			3.69*	2,94	.073	.053	.073
Gender[a]	.400*	.118					
Age	.115	.188					
Step 2			9.95	3,93	.243	.219	.170
Pain severity[b]	-.413***	-.416***					

$*p \leq .05$, $***p \leq .001$
[a] 0 = female, 1 = male
[b] 0 = "no pain", 10 = "pain as bad as you can imagine"

Table 4.8: Hierarchical regression analysis of pain interference and Sport PA controlling for gender and age

Variable	Beta	β	F	df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			3.69*	2,94	.073	.053	.073
Gender [a]	.377*	.178					
Age	.075	.077					
Step 2			34.68	3,93	.528	.513	.455
Pain interference [b]	-.665***	-.681***					

*$p \leq .05$, *$p \leq .001$

[a] 0 = female, 1 = male

[b] 0 = "does not interfere", 10 = "completely interferes"

Table 4.9: Hierarchical regression analysis of exercise self-efficacy and Sport PA controlling for gender and age

Variable	Beta	β	F	Df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			3.69*	2,94	.073	.053	.073
Gender [a]	.311	.147					
Age	.203**	.208**					
Step 2			21.35***	3,93	.408	.389	.335
Exercise self-efficacy [b]	.575***	.584***					

*$p \leq .05$, **$p \leq .01$, ***$p \leq .001$

[a] 0 = female, 1 = male

[b] 0% = no confidence, 100% = complete confidence

Table 4.10: Hierarchical regression analysis of pain severity and Leisure PA controlling for gender and age

Variable	Beta	β	F	Df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			.772	2,93	.016	-.005	.016
Gender [a]	-.271	-.143					
Age	.025	-.006					
Step 2			3.176*	3,92	.094	.064	.078
Pain Severity [b]	-.284**	-.281**					

$*p \leq .05$, $**p \leq .01$

[a] 0 = female, 1 = male

[b] 0 = "no pain", 10 = "pain as bad as you can imagine"

Table 4.11: Hierarchical regression analysis of pain severity and Total PA controlling for gender and age

Variable	Beta	β	F	Df	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			2.58	2,93	.053	.032	.053
Gender [a]	.089	.041					
Age	.188	.184					
Step 2			5.60	3,92	.155	.127	.102
Pain severity [b]	-.325*	-.322*					

$*p \leq .05$, $**p \leq .01$, $***p \leq .001$

[a] 0 = female, 1 = male

[b] 0 = "no pain", 10 = "pain as bad as you can imagine"

Table 4.12: Hierarchical regression analysis of pain interference and Total PA controlling for gender and age

Variable	Beta	*β*	*F*	*Df*	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			2.580	2,93	.053	.052	.053
Gender [a]	.132	.061					
Age	.224*	.220*					
Step 2			3.60**	3,60	.114	.085	.061
Pain interference [b]	-.248*	-.249*					

*$p \leq .05$, **$p \leq .01$

[a] 0 = female, 1 = male

[b] 0 = "no interference", 10 = "completely interferes"

Table 4.13: Hierarchical regression analysis of exercise self-efficacy and Total PA controlling for gender and age

Variable	Beta	*B*	*F*	*Df*	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			2.58	2,93	.053	.032	.053
Gender [a]	.132	.061					
Age	.224*	.220*					
Step 2			6.21**	3,92	.168	.141	.116
Exercise self-efficacy[b]	.346**	.344**					

*$p \leq .05$, **$p \leq .01$

[a] 0 = female, 1 = male

[b] 0%= no confidence, 100% = complete confidence

Table 4.14: Hierarchical regression analysis of stress and pain severity controlling for gender and age

Variable	Beta	*B*	*F*	*df*	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			2.135	2,94	.043	.023	.043
Gender [a]	-.010	.214					
Age	-.178	.099					
Step 2			4.012**	3,93	.115	.086	.071
Pain severity [b]	.274**	.269**					

$*p \le .05$, $**p \le .01$

[a] 0 = female, 1 = male

[b] 0 = "no pain", 10 = "pain as bad as you can imagine"

Table 4.15: Hierarchical regression analysis of stress and pain interference controlling for gender and age

Variable	Beta	β	*F*	*df*	R^2	R^2_{adjust}	$R^2\Delta$
Step 1			2.135	2,94	.043	.023	.043
Gender [a]	.014	.006					
Age	-.142	-.141					
Step 2			13.514***	3,93	.304	.281	.260
Pain interference [b]	0.517***	.515***					

$***p \le .001$

[a] 0 = female, 1 = male

[b] 0 = "no interference", 10 = "completely interferes"

4.5 Mediation Analysis

Tests for mediation were conducted to answer the research question: Does physical activity mediate the relation between stress and pain? Mediation analyses were conducted to test the study hypothesis: Greater stress prompts people to be more physically active because it helps them to cope with stress, and people who are more physically active experience less pain. Tests for mediation were conducted among participants by selecting cases according to age groups (i.e. < 50, 50-59, 60-69, and 70-79). Bivariate associations in the linear regression analyses suggested the presence of the hypothesized mediating effect of physical activity participation (Sport PA) on the association between stress and CP (pain interference). Accordingly, tests for mediation were conducted as recommended by Baron and Kenny (1986). Three conditions were established through linear regressions to determine whether mediation occurred. First, stress was found to predict pain interference. Second, stress was found to predict Sport PA. Third, Sport PA was found to predict pain interference. The purpose of these steps was to establish relationships between stress and pain, stress and physical activity participation, and physical activity participation and pain. Finally, stress and Sport PA were entered as predictors and pain interference was entered as the outcome, thus examining the association between stress and pain while controlling for physical activity participation. The results of the final step determined the type of mediation. According to Baron and Kenny (1986), a significant model indicates no mediation. If a significant model results with a decrease in the *beta*-value for stress and pain, partial mediation (moderation) exists. Finally, if a non-significant model results, full mediation exists.

Within the entire sample of older adults in this study (N= 99), the test for mediation results indicated that Sport PA did not qualify as a mediator of the relation between stress and pain because the association between stress and pain interference decreased, but was still significant when Sport PA was included in the model ($\beta = .514$, $p < .001$ vs. $\beta = .310$, $p < .001$, Figures 4.1 and 4.2). Thus, Sport PA was found to moderate the relation between stress and pain. However, tests for mediation were also conducted amongst age groups. In participants under age 50, Sport PA qualified as a moderator, but not a mediator of the relation between stress and pain interference ($\beta = .381$ $p <.01$, Figure 4.3). Among participants age 50-59, the results indicated that Sport PA qualified as a moderator, but not a mediator of the relation between stress and pain interference ($\beta = .367$ $p <.05$, Figure 4.4). Similarly, Sport PA moderated the relation between stress and pain interference among those age 60-69 ($\beta = .436$, $p <.05$, Figure 4.5). Particularly notable were the findings of the tests for mediation among the oldest participants (i.e. 70 years and older). In this age group, Sport PA mediated the relation between stress and pain interference ($\beta = .038$, $p >.05$, Figure 4.6), thus providing support for the original mediation hypothesis.

In this study, physical activity participation in sport and exercise-related activities seemed to help older adults age 70 and older experience less stress and lower levels of pain pain interference.

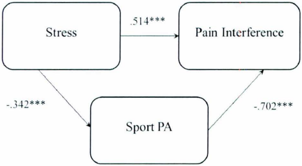

Figure 4.1: Step 3 of Mediation Analyses of Sport PA on Stress and Pain Interference (*n* = 99)

***significant at .001 alpha level

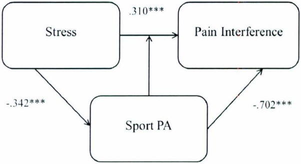

Figure 4.2: Moderation of Sport PA on Stress and Pain Interference (*n* = 99)

***significant at .001 alpha level

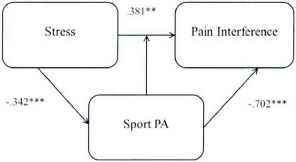

Figure 4.3: Moderation of Sport PA on Stress and Pain Interference among participants under age 50 (*n* = 34)

significant at .01 alpha level; * significant at .001 alpha level

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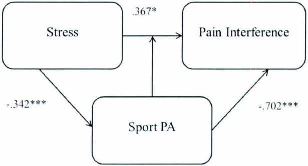

Figure 4.4: Moderation of Sport PA on Stress and Pain Interference among participants age 50-59 (*n* = 21)

significant at .01 alpha level; * significant at .001 alpha level

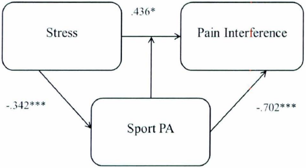

Figure 4.5: Moderation of Sport PA on Stress and Pain Interference among participants age 60-69 (*n* = 20)

significant at .01 alpha level; * significant at .001 alpha level

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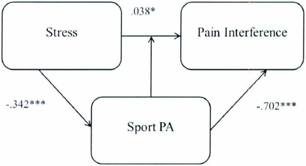

Figure 4.6: Mediation of Sport PA on Stress and Pain Interference among participants age 70+ (*n* = 25)

significant at .01 alpha level; * significant at .001 alpha level

4.6 Differences in Biopsychosocial Factors Among More Active and Less Active Participants

Participants were divided into two groups (less active/more active) based on Total PA scores being below and above the 50th percentile. On average, respondents in the less active group ($n = 38$) scored 4.4 ($SD = .83$; $SE = .14$) on the Total PA scale of 1 (sedentary) to 15 (active). Scores in the less active group ranged from 5.3 to 2.0. Respondents in the active group ($n = 60$) had an average score of 6.7 ($SD = 1.14$; $SE = .15$) on the Total PA scale, with scores ranging from 13.1 to 5.3. Differences in pain severity, pain interference, stress, and exercise self-efficacy between more active and less active respondents were determined by computing a series of independent t-tests. Levene`s test for testing homogeneity of variance was performed to determine if the variance between the two groups was equal (Field, 2005). Table 4.16 illustrates the results of these assumption tests as well as the descriptive statistics and t-tests. According to the Kolmogorov-Smirnov normality test, the following variables were not normally distributed: exercise self-efficacy for more active ($D_{(60)} = .195$, $p < .0$) and less active ($D_{(38)} = .150$, $p < .001$); Sport PA for more active ($D_{(60)} = .138$, $p < .01$); Leisure PA for less active ($D_{(38)} = .230$, $p < .001$), and more active ($D_{(68)} = .173$, $p < .001$); Work PA for more active ($D_{(60)} = .191$, $p < .001$); and Total PA for more active ($D_{(60)} = .131$, $p < .01$); and less active ($D_{(38)} = .154$, $p < .01$). According to Levene's Test, Work PA was the only variable which violated the assumption of homogeneity of variance ($F_{(1, 96)} = 6.732$, $p < .05$) among more active versus less active participants.

According to the Independent Samples tests, differences between the two groups were significant in terms of pain severity ($t_{(96)} = 2.65$, $p < .01$), and pain interference ($t_{(96)} = 3.66$, $p < .001$). In terms of pain severity, more active participants ($M = 4.4$, $SD = 1.99$) compared to less active participants ($M = 5.6$, $SD = 2.24$) experienced lower levels of pain severity. In terms of pain interference, more active participants ($M = 4.1$, $SD = 2.58$) versus less active participants ($M = 5.9$, $SD = 2.23$) also reported less pain interference. More active and less active participants also differed significantly in terms of exercise self-efficacy ($t_{(96)} = -3.92$, $p < .001$). More active participants ($M = 66.3$, $SD = 35.86$) compared to less active participants ($M = 37.7$, $SD = 34.85$) were more confident in their ability to exercise. Although not statistically significant, active participants compared to less active participants reported lower stress. This suggests that higher levels of physical activity participation may help to reduce stress.

Table 4.16: Descriptive Statistics and T-Tests of More Active versus Less Active Participants in the reporting of stress, pain severity, pain interference, and exercise self-efficacy

Variables		Less Active				More Active				
	Levene`s Test $F_{(df1, df2)}$	**K-S** $D_{(df)}$	**n**	M (SD)	SE	**K-S** $D_{(df)}$	**n**	M (SD)	**SE**	$t_{(df)}$
Stress	$1.37_{(1,96)}$	$.104_{(38)}$	38	17.2 7.95	1.29	$.09_{(60)}$	60	16.2 6.56	.85	$.71_{(96)***}$
Pain severity	$.42_{(1,96)}$	$.139_{(38)}$	38	5.5 2.23	.36	$.08_{(60)*}$	60	4.4 1.98	.26	$2.72_{(96)**}$
Pain interference	$3.91_{(1,96)}$	$.099_{(38)}$	38	5.9 2.23	.36	$.12_{(60)*}$	60	4.1 2.58	.33	$3.54_{(96)***}$
Exercise self-efficacy	$.06_{(1,96)}$	$.150_{(38)*}$	38	37.7 34.85	5.65	$.19_{(60)***}$	60	66.3 35.86	4.60	$-3.89_{(96)***}$

$* = p \leq .05$; $*** = p \leq .001$

4.7 Phase Two: Qualitative Results

In Phase Two, one-on-one semi-structured, in-depth interviews were conducted with six women living with CP in order to explore the meaning of physical activity, and to provide insight into the results of Phase One, thus addressing the following research questions: (1) What influences physical activity participation among people with CP?; (2) What does physical activity mean to people with CP?; and (3) Why are some people with CP more active while others are less active?

4.7.1 Interview Participants

The six female interview participants were chosen based on the following criteria: 1) Age: to focus on the experiences of older adults (i.e. ≥ 50 years); 2) Area of residence: to gather a wide range of experiences, I chose three participants from a rural part of NL, and three who resided in the province's main urban centre, the city of St. John's; and 3) Questionnaire responses: to conduct an extreme case analysis of their experiences. All participants were given pseudo-names. Sarah, Dee, and Gen were interviewed in-person. Lucy, Mary, and Joy were interviewed via telephone.

Sarah was 57 years old, and lived in close proximity to the city of St. John's. She was a single woman, having never been married. Sarah was unemployed at the time of the interview, but had once worked full-time. She had been formally diagnosed with a number of CP conditions, including arthritis, chronic fatigue syndrome, chronic neck and shoulder pain, chronic low back pain, irritable bowel syndrome, fibromyalgia, peripheral neuralgia, spinal cord injury, and systemic lupus erythematosus. I interviewed Sarah at a local restaurant in St. John's. I selected Sarah because she indicated very high levels of pain, high stress, and low physical activity and exercise self-efficacy on the survey.

Dee was a married, 54 year old woman, living in the city of St. John's. She had children who were no longer living at home, and she worked as a senior administrative clerk at a post-secondary institution in St. John's. After two years of CP and no prognosis, she was diagnosed with fibromyalgia. The interview with Dee was conducted in her work office. I chose to interview Dee because she reported similar levels of pain as Sarah, but also indicated very low stress, and relatively high physical activity participation and exercise self-efficacy.

Gen, a 55 year old St. John's resident was working as a taxi driver at the time of the interview. She was divorced and indicated chronic neck and shoulder pain, chronic low back pain, and migraine headaches. I interviewed Gen at the Queen Elizabeth II Library at Memorial University of Newfoundland. I chose to interview Gen because she reported high pain, high stress, and low physical activity participation and exercise self-efficacy.

Lucy was a 64 year old woman living in Lewisporte, which is a rural town in central NL. She was married, unemployed outside the home, and she had experienced pain for 30 years which she attributed to a neck injury while working at home. She had arthritis, was diagnosed with fibromyalgia 18 years after the neck injury, and also indicated chronic neck and shoulder pain. Lucy reported moderate pain severity and pain interferencej. However, she was selected because she reported higher levels of exercise self-efficacy and physical activity in comparison with other rural participants, and because she reported low levels of stress.

Mary, 62, lived in Lewisporte, NL. Her common-law partner lived away for extended periods of time due to employment. She was unemployed outside of the home, but had once worked full-time in a family-owned and operated business. She was diagnosed with fibromyalgia 15 years prior to the phone interview, and also had diabetes, chronic pelvic pain, chronic low back pain, and nerve injury pain. Mary indicated high levels of pain and exercise self-efficacy. She was selected because she reported low physical activity participation and low stress.

Joy lived in Embree, NL, with her husband. She was 50 years old and had two sons who were no longer living at home, but she had a close network of family members in the town of Embree. She was unemployed outside of the home. Joy had been experienced pain since she was a teenager, but was not diagnosed with fibromyalgia until age 35 by a physician in St. John's. She also noted arthritis, chronic abdominal pain, chronic fatigue syndrome, chronic neck pain, chronic low back pain, irritable bowel syndrome, and migraines. Joy reported low levels of physical activity participation, moderate exercise self-efficacy, and was selected for an interview because she indicated a high number of pain conditions, but low levels of stress.

4.7.2 Self-Kinesis

During the interviews, the women spoke about physical activity and exercise, as well as many other experiences within their lives. While my initial intentions were to discuss the meaning of physical activity participation, a broader discussion around *movement* emerged. Based on the findings, I decided that *self-kinesis* captured the overall themes of their narratives. I chose this term and defined it as an individual's self-chosen movement, influenced through internal and external stimuli. While self-kinesis is movement induced by both internal and external stimuli, it also holds the distinction of being movement which is chosen by the individual. Thus, self-kinesis is related to self-efficacy, self-esteem, self-image, self-concept, and self-awareness. Similar to these *self-* concepts, self-kinesis is concerned with each person's unique being. Furthermore, because it holds the characteristic of being influenced by internal and external stimuli, it is associated with concepts of energy, and areas of study and practice such as bioenergetics, body-oriented psychotherapy, and holistic psychotherapy. It is analogous with principles of bioenergetics in its relation to the flow of energy between objects (e.g., one person to another, person and environment). Finally, self-kinesis coincides with the biopsychosocial model of health because it is a personal characteristic, holistically-produced through the inevitable influence of biological, psychological, and sociological factors.

From a kinesiology perspective, the framework of this study surrounded human movement. In biological terms, exercise and physical activity are both forms of kinesis, or stimulus-induced movement. Through conducting interviews with women living with CP, it became evident that movement was experienced in a broader sense. Self-kinesis was defined as the general theme of their narratives because their experiences were created through internal and external stimuli; including physical, mental, and social components. This chapter provides the findings of this study, which help to illuminate physical activity participation. The informants' narratives provide evidence that biological and psychosocial factors are at work in their lives, resulting in self-chosen stimulus-induced movement: self-kinesis. This chapter provides the findings from Phase Two, and includes the accounts of six women with CP in support of this major theme, as well as six subthemes identified through their narratives: *endurance, power, flexibility, energy, strength, and balance.*

4.7.2.1 Endurance

Self-kinesis is described through the subtheme of endurance -- a persevering sense of self-worth discovered through purpose-driven movements. The women in this study either chose to move or not to move with endurance. The data indicated that all six women were attempting to 'live with pain,' as they had all experienced CP for at least 12 years. Likewise, the word 'chronic' describes a pain that continues to persist, thus requiring a certain level of persistence and stamina. As Lucy said, "*If I stopped from my pain I wouldn't do what I want to do in life. You know I want to do whatever I can. I mean I'm not gonna give up – that'd be pretty stupid.*" Implementing routine activities was a means of providing an external stimulus, while a sense of purpose was the resultant internal stimulus encouraging physical activity. In their efforts to persevere and endure pain, interviewees spoke about the way self-kinesis worked in their lives.

The women spoke about their daily activities, such as working inside and outside the home, and caring for others. These engagements seemed to foster a sense of purpose.

> *You look at me and you wouldn't know I got FM. I'm mobile all the time. I do what I have to do. You wouldn't know that I'm in pain. If I had given up I would've been in a wheel chair years ago. But that was not an option for me. I try to stay as active as I can. Oh yes, most certainly. (Lucy)*

This participant associated her ongoing "mobility" to the fact that she was able to endure CP. Another woman, Sarah, explained that having animals to care for helped her to endure.

> *My horse needs me and my dogs need me – and I guess that's my primary motivation. To be honest with you, if I didn't have two dogs and a horse I would be much worse off than I am now.*

Some of the interviews naturally led to the women describing their usual daily activities. Other participants began to describe their daily routine, and the discussion followed as I asked probing questions to elicit more detail.

> *I: Do you have a routine?*
>
> *Lucy: Yes I do. Yeah, I do all that because I have a purpose. There's purpose. So I could never get up and stay in the house all day. To me, many people can but I can't because I look at it different. I get up, I get dressed, there's a purpose. That's how I look at it.*

Dee talked about the association between her routine, purpose, and a positive outlook on life.

> *Well, every day I thank God when I wake up. And that's how it starts. And you know I do not start my days with anything negative. I don't. I awake and thank God – I'm blessed with being positive and that in itself plays, I think the biggest role in life's challenges. You know I wake in the morning and I'm happy and my brain is active, and I'm up and I'm ready to go, ready to face the world. By 10:30 in the night my body is saying it's time to sleep now, but I get up in the morning, and everything I do - I have a purpose.*

This participant described the relationship between her routine physical movements and the engagement of her mind towards positive thinking. In this way, developing a routine for her body helped to establish routine positive thinking and a sense of purpose as well. Furthermore, having a routine served as an external stimulus, while a sense of purpose was an internal stimulus to persevere.

Joy's story adds support to the movement occurring between external and internal stimuli. Her doctor had encouraged her to stimulate her mind when she was first diagnosed with fibromyalgia. He said *"learn another language because physically you're not going to be able to do much."* She went on to explain that his concern was focused on keeping the mind occupied so that depression would not result. In terms of self-kinesis, his suggestion was an external stimulus which seemed to precede the internal stimulus she had discovered in her experiences.

> *What it is with me is my family. They're the ones that keeps me pushin' and pushin'. Like I said, there's a lot of outside things I can't do anymore but I just can't get down over that – I can't. But to me, I'll put it this way, my self-worth comes from my family.*

Throughout the interview, it was apparent that her sense of purpose was an internal stimulus closely tied to feelings of self-worth. Her relationship with family and the ability to be a mother, wife, daughter, and sister aligned with her purpose in life. She described her ability to *"keep the house going…if I couldn't do that I just don't know. Like I don't know what I'd do because you know, I think that's where all that self-worth comes in too."* Joy also used the word "pacing" during the interview, saying:

> *J: My doctor's always saying, Joy, pace yourself, pace yourself. But I can't do that, you know?*
>
> *I: When you hear "pace yourself" what goes through your head?*
>
> *J: Well when I start something I just can't do half and then sit down. There's no way I can do it. Like when I starts to do it I gots to clean everything the one time because I knows I'm gonna have a lot of pain that I can't do it, and even though doin' it puts me down for 2 or 3 days it still don't make a difference really. It still don't ya know? It's the way I work – it's just me. There's other people who do it differently. And probably some who don't do anything. That's just my way of doing it.*

It was evident through talking to Joy that her daily activities, such as housework and taking care of her family were important because they helped define her purpose and value in life. As a result, she found it difficult to limit her physical activity and often had a rollercoaster-like experience with pain; that is, she had higher and lower pain days depending on her activities. She did not seem to find an optimal level of movement, as she often engaged in so much physical activity that she was sedentary because of pain during the days that followed. Nonetheless, she had increased self-kinesis through purpose-driven movement.

Only one of the women I interviewed described a lack of purpose in her life. Sarah was depressed because pain interfered with her daily activities and prevented her from maintaining a routine. When I asked her to imagine and describe a "pain-free day," she gave a very detailed description of getting out of bed early, walking her dogs, swimming, riding her horse, and preparing supper with enough energy to do all she wanted to accomplish. She described a day that was full of movement. However, after describing this pain-free day, she admitted that pain was also interfering with her outlook on life and level of physical activity.

> *I feel my life has no purpose. I miss working so much. I'm really angry about that. I want to work. I miss the mental stimulation. I was really good at every job I ever had. I still have letters of recommendations - glowing recommendations. Everywhere I went I did very well, and your self-esteem disappears as you become more and more invisible to the community.*

Later she continued by saying that, *"all of that makes me feel worthless. Like what is my purpose for living, you know? Why am I still here? What am I supposed to be learning from this pain?"* This participant struggled with the feeling that her life had any purpose in the midst of pain. In her account, she associated the lack of an internal stimulus (i.e. mental stimulation) due to the fact that she was unemployed. Presumably, work would have assisted her self-kinesis, but because she was without a job due to pain, she became less stimulated internally and lacked a sense of purpose.

One of the women spoke about purpose which was not related to self-kinesis derived from a personal sense of self-worth or routine activities. Gen talked about the practicality of physical activity, noting that work-related physical activity was more important than going to the gym.

> *If I don't have a job that doesn't involve physical activity, then going to the gym is utterly, utterly boring… Am in interested in checking my pulse and heart rate? No – I'm just not going to go there. I'd have to have a really massive health scare to go there. But would I buy a kayak and go camping by myself? Yeah, oh yeah. That really interests me.*

I explored her responses on the questionnaire related to exercise self-efficacy, which asked her to rate her level of confidence to continue exercise participation for at least 30 minutes a day, three times a week for the next eight weeks. She had indicated she was 50% confident to continue exercise under these conditions. The interview provided clarity and depth to her response.

> *Oh, I think I could get on my exercise bike and bike - like I will bike if it's summer time. I'll bike to work…I don't mind doing stuff like that. But there has to be some kind of practical aspect to it. I bought a stationary bike…set it up in the living room thinking that I could like watch a movie. But it's just so incredibly tedious – just so boring. Once again, it's an indoor thing, whereas real bicycling is - I like to be moving through the universe. Bicycling outdoors is a lot different than on a pedal bike, you know?*

Gen seemed to have pragmatic perceptions of physical activity, in which the practicality or purpose of the movement were key determinants. She also spoke about the importance of using her body's energy during the activity because of the unique interactions taking place between her body and the environment. Gen's notions of purpose and movement differed from the other women, as the external stimulus was the natural environment, which motivated her to engage in purposeful and practical movements. The other women did not directly speak of the sensation they felt when using their bodies to move, yet their activities (i.e. caring for animals, daily chores and housework) certainly involved physical movement. Generally speaking, all of the women described an external stimulus to be physically active which provoked a sense of purpose within.

The interviews revealed that a sense of purpose was achieved through various external stimuli, such as other people, the natural environment, and routine activities which ultimately produced a certain level of self-kinesis. Most of the narratives were related to movement – there was only one woman whose life lacked movement and a limited level of self-kinesis. In conclusion, self-kinesis is described as endurance – the persevering sense of self-worth discovered through purpose-driven movements.

4.7.2.2 Power

All the women I interviewed talked about the 'power of the mind,' as they acknowledged the relationship between thoughts, beliefs, actions or movement, and pain. As physical activity participation and pain were explored throughout the interviews, the relation between external and internal stimuli became apparent. The focus of the mind was noted as the internal stimulus which interacted with various external stimuli in the women's environment. In this way, physical and mental movements were topics throughout their narratives.

The data from the interviews suggested that the movement or position of one's thoughts, specifically positive thinking, was a powerful tool in coping with pain and motivating one to be physically active. Some of the participants seemed to have a very positive outlook on life, while others struggled with feelings of despair. Furthermore, one's attitude seemed to move as well, shifting between positive and negative thinking depending on the external stimuli. I asked one of the participants who seemed to be enthusiastic about life to explain what happened when she was feeling less optimistic about her circumstances. Dee described that there was movement which took place when she began thinking negatively about her situation, saying that it is *"momentary…just a flash and…no more than a shift of position. It's more about where your head is than anything else."* Dee said that when she notices her pain is really bad she also recognizes the need for a *"shift"*. She went on to describe the movements she usually considered, noting posture, hydration, and the previous day's diet choices as areas of question. Her occupation required her to sit at a desk most of the day, so she talked about the changes she made at work.

> *I'll get up from my chair - I'll make a cup of tea. Doesn't matter what kind it is. I'll take a stroll up the hall to the restroom. Stop and chat with the girls in the hall for a minute and just kind of re-establish my positive energy. By the time I get back to my desk, it's changed. You know, it's not as focused because of course I've moved the joint, I've worked it and you know, I've given it a chance to take a break from where it was, so it's lost its memory of all that pain now. I've gotten up – I've moved – I've changed the situation. I've distracted it, and then I can go back and work until I've reached that point again and then I'll get up and do something else.*

In her description, the movements of the body and the mind are interrelated and codependent upon each other. Moving the body was an external stimulus for moving the focus of the mind. Thus, the external stimulus of physical movement provided distraction, which helped to decrease pain within the body, helping her to have control or power over pain. Dee used a metaphor to explain how this works in her life:

> *It's like having a child that's really focused on something – they're really, really bad about something [distracted], and they are just like flat out into this, and there's nothing that you can do to take them away from that, until over here - you pick up something that catches their attention – so it's much like that. You have to change the focus. So whether that's getting up from your chair, whether that's getting a cup of tea, whether it's changing the station, whether it's recognizing the fact that you may need to turn your body in a different direction. Whatever it is, you need to do something.*

This description is a vivid illustration of the way she recognized the shift of focus within her mind, the movement of pain within her body, and her response through physical, bodily movement.

The ability to move one's thoughts and focus was evident in the other narratives. Several of the women talked about the enjoyment of activities, which often served as a distraction of their focus. An external distraction often moved them away from the internal sensation of pain. Mary talked about the daily housework she enjoys. She said, *"I love to cook. I love to bake, and it just keeps me going."* When I asked her what these activities do for her, she replied:

> *It makes me happy I guess. When you do something and it makes you feel good that you did it, well you're gonna be happy about it right? Of if you cook a good meal for your friend, and they come in and enjoy it, and they tell you they really enjoyed it or it was really good or whatever then it makes you feel good right?*

Through her description, it seems the external stimulus of engaging in this activity prompted feelings of enjoyment which helped her to reach a point of distraction from pain. Sarah referred to such engagement in enjoyable activities as a "hypnotic effect" on the body in pain.

> *I've been around horses for 40 years and I just love them, and they do have a hypnotic effect on me – in that when I'm brushing my horse I may be in pain but I forget it. And this is just when I'm working on my horse. She's very affectionate and loves to see me. But it's very ironic in that as soon as I get in the car to go home all the things I've done, all the pain that I've started up as a result of working in the barn - it's amazing how I start to feel it.*

Throughout the interview, Sarah talked about the enjoyment of being with animals and their hypnotic effect, yet she also talked about trying to "escape" the pain. She explained that she had contemplated suicide and self-harm in the past – "*anything that will make me feel pain somewhere else.*" She explained this desire for escape as "*a build-up of terrible anxiety because I can't leave my body – I can't escape this. It's like being in prison where you're being tortured.*" She discussed the effects of meditation and energy healing on pain, describing that these experiences allowed her to "*leave her body*" for a certain period of time. Yet, similar to leaving her horse, or ending any activity that she enjoys, the distraction from pain is usually fleeting. She described her experience with energy healing.

> *I could be crippled walking into her house, walking with a cane and everything, after she's finished working on me, it's like I have no pain anywhere, but I'm also in kind of a frozen state - in that psychologically I don't want to leave. I don't want to get off the table…of course, they have the next client arriving and I have to get up and leave. I'm usually ok until I get in the car, but by the time I get home, the pain is starting to come back again.*

Sarah described unsuccessful attempts at pain relief if the pain was too intense, with momentary lapses of relief through distraction. Thus, her narrative shows the imperativeness of a balance between internal and external stimuli. For example, the external stimulus (e.g. housework, animals, and interactions with people) may lack the power to serve as a distraction within the mind and decrease the impact of pain. While this was often the case with Sarah, many of the other women proclaimed successful attempts at diversion.

As the data collection progressed, I was able to explore this discrepancy further because other participants also talked about the pain relief they experienced through meditation and energy healing. I asked Gen whether she ever had a recurrence of pain after successful pain relief through meditation, she said:

> *No, only if you lose your mind. For instance, when you first start meditating, you start noticing just how much is going on in your mind, and initially it's quite common for people to go, "my mind was never like this before I started meditating – now that I'm meditating, my mind is full of all this stuff." What's going on is that you're actually noticing all this stuff going on in your mind. All that stuff was always there, right? So basically it's almost like being around here, where you open closet doors and you go, "no don't think I want to deal with that right now," or you go, "oh yeah, what's in here – this is interesting." So you go in and you look around. So what happens over time is you develop a sense of equanimity around whatever arises…the other part of what happens with meditation is, you're not going to get instant results. You will get results, but you have to be persistent, and you have to practice it persistently. It's an everyday thing- you have to do it every day. What happens is, the only way I can explain this is – it becomes automatic.*

Her explanation helps to clarify the way meditation works in her management of pain. As Sarah described only a momentary escape, Gen explained that momentary escapes are due to a lack of practice and *"losing one's mind,"* providing evidence for the theme – the power of the mind. It was clear that Gen had established the power of her mind to work in favour of reducing pain through control, focus, and distraction. According to Dee, *"99% of achievement is in your mind… If you set your mind to it - if you convince your mind that you can do it, you can do it."* The power of the mind was also recognized as something achieved through practice and repetition. Joy seemed to have trained this power in her own life:

> *If you're gonna focus everyday on oh my this, oh my that, oh my I got this, I got that - well sure that's all it'll be. You would be focused on that all the – I can't focus on that. I can't because I don't want to get down, ya know? I focus on, well I'm still doing pretty good. As bad as what it is sometimes, and I'll be honest with ya, it's bad. But to me, it's like, no I'm OK. That's the way I looks at it Jennifer. You know I got friends, I mean you talk to em, and oh you know, you keep thinkin that way you're not gonna do anything. You're not gonna get better. Ya know, your mind, your mind got to get better, right? Your body's gonna be bad for the rest of your life, you gotta keep your mind good.*

Joy described a number of interactions which took place between internal and external stimuli. The external support through friends stimulated positive thinking within. At the same time, she recognized the difference between her experience and the lives of friends who were less proactive in regards to focusing their thoughts on the "good." While many of the other participants also spoke about the importance of a positive outlook on life, Dee spoke about allowing for times of negativity:

> *There are times that you have to say, ok, my block of time to allow this to consume me is going to be between 12 and 12:30 today - knowing full well that during that time you're in deep water fitness. Now if you don't take that time to consume you then, you don't get any other time during the day. So always schedule these negative thought periods for a time when you know you're doing something else you enjoy. And if it creeps in there when you're doing that, then that's ok – it's allowed. Don't beat yourself up over it. You're allowed to be consumed with it because it's consuming your life. There's nobody says that you can think about it, that you can't say "oh my God I feel so miserable, I feel so, uh, I just wanna curl up and stay here and make the pain go away" cause we all do. We all wanna make it go away. But lying there and wishing it to go away is not gonna help. It's not going to help. Rest is good for your body, but you have to get up and MOVE.*

Dee's description helps to tie in the intricate roles of external and internal stimuli in producing self-kinesis. She noted the importance of entertaining negative thoughts in the presence of a positive experience, perhaps as a way of maintaining a certain level of control over one's negative thoughts through the enjoyment and energy of another activity. In other words, negative external stimuli could be buffered by a strong internal stimulus. Interestingly, the example she gave in regards to this exception was of a time when one is engaged in physical activity. While this was contrary to some of the other accounts, the power of the mind was maintained through physical activity and a conscious 'power' present within one's mind. Through a balance of the movement of one's body and the shift of thoughts from positive to negative ones, self-kinesis was achieved.

Within the theme of power, self-kinesis describes the movement of the mind; specifically the power of negative and positive ways of thinking. In addition, self-kinesis is related to escaping the body in pain through enjoyable physical activities and distractions achieved through shifting of one's thoughts. In conclusion, self-kinesis is described through power - the focus of one's mind through distraction, positive thinking, and enjoyment.

4.7.2.3 Flexibility

The interview data revealed that self-kinesis is characterized by *flexibility*, defined as the ability to change, adapt, and make choices. Despite the pain and other challenges that many of the women faced on a daily basis, most of the women reported on the importance of being flexible in the midst of life's problems. They discussed modifications they had made in their activities in order to avoid pain and feel confident in their abilities. Within their discourses about making changes, stress became a topic of conversation. Mary had reported a low level of stress on the survey. In exploring her response further she explained:

> *I always say I do what I can and I'll leave the rest. You know, I'll do what's most important and I'll leave the rest. The work will always be there – it will never go away, will it?*

Mary said she *"paces"* herself when doing housework and everyday chores. She didn't seem bothered by the fact that she often had to work on one project over the course of several weeks before it was completed. She had learned to stay active despite the fact that pain was present, explaining that she had to allow for changes in plans or timing of activities.

Lucy talked about taking *"skidoo"* (snowmobile) trips during the winters. These trips required her and her husband to travel from their home in central NL. Because long periods of sitting often exacerbated her pain, they divided their travel over a longer period of time. Lucy explained that because she loved the outdoors so much, she was motivated to do this activity despite the discomfort and pain that often accompanied their travel. *"You work around it. Otherwise you would stay home. You have to change it around a little bit – change your plans a little bit."* Not only was she weighing out the costs versus the benefits before engaging in the activity, but in terms of self-kinesis, the pure enjoyment of the trip was a sufficient internal stimulus to motivate her to adapt. Other participants also spoke about the balance between internal and external stimuli. Sarah said that cleaning the house is difficult when she is in pain, but she decides:

> *I can't stand the dirt in the house anymore, and pain or no pain, it's the aggravation of not getting the work done – it motivates me to do it despite the*

> *pain because I don't like living in a dirty house with lots of dog hair all over the place.*

In Sarah's life, the internal stimulus was the *"aggravation of not getting the work done."* Self-kinesis was the result of a flexibility to negotiate pain through the motivation of an internal stimulus. Thus, many of the women with CP were able to accomplish daily chores and engage in enjoyable activities.

The ability to adapt, change, and be flexible requires one to move their position. Throughout the interviews, it became apparent that moving one's position was achieved through changing one's beliefs and adapting activities which required physical movement. However, Sarah talked about the frustration associated with the fact that she was not always able to do what she had intended to do because of pain. Many times, this resulted in cancelling or changing her plans. She told of a time which she had planned to cook dinner for a friend, but had to cancel repeatedly over the course of several months because of pain. *"It's very frustrating, you know, you make a plan – I'll be over Thursday, I'll cook supper, and when the day comes you're just out of your mind in pain and you can't."* Changing her original plans because of pain was often difficult to accept. Joy also talked about the difficulty in making and breaking plans. She explained that due to the nature of CP, she is not a very dependable person in terms of making plans in advance. She said that if someone asks her to do something, she must wait until the day comes before she can commit. Yet, when I asked her if cancelling plans was difficult, she insisted that making plans with her family is imperative to life and coping with CP:

> *J: We still make plans no matter what…You still plan and that's your life. If you can't plan for little things like that then you know…*
>
> *I: Why is making plans important?*
>
> *J: There'd be nudding [nothing] to look forward to - you'd be, to me, just existing… I've learned I've got to live with this. I've been living with it for over 25 years, and the last 10 years has gotten worse. But to me, if I didn't do any of this, and make plans, and do what I can, when I can, that's I think when the depression would come in. If you never had anything to look forward to, you'd be depressed pretty quickly. That's one thing I never, well I think I must've been depressed for 4 days and I had to pull myself outta there pretty fast because once you're down in that place it's hard to come out of it.*

Joy expressed her willingness to change activities and plans allowing her to do more than *"just exist."* The women negotiated making plans with others and these plans changed according to their willingness to be flexible. Rather than believe that pain was an insurmountable disability, most of the women explained ways which they modified their plans and focused on their ability. Dee was diagnosed with fibromyalgia after two years of unexplained pain. She described not being able to walk, cook, or sleep for several months. Eventually she asked herself, *"what else can I do? If I can't walk I'll go to the pool."* She began going to the pool for aerobic classes, and after two or three months of exercise reported feeling a noticeable difference in her strength and ability. Now, she walks, swims, and attends exercise classes regularly because she knows her body will feel better. Dee described the adaptations that are imperative to her success:

> *I work through the pain…let's say my hip is really bad one day. I go to the gym and the instructor says, 'we're gonna do 87 squats'. I'm gonna say, 'well you know I prefer to go out and walk the track', which is easier for me, easier on the joint, still exercising. It's always a matter of choices. I can choose to go in there and do 87 squats, sort of, and not enjoy it and be in a lot of pain, and you know, because at the end of that session I won't feel like I've achieved anything and it won't have been beneficial to me, then there was no point in even starting that one. So you have to recognize – you have to know your limitations - but you also*

> *have to know your capabilities. And it's important that we all push ourselves. I might do 30 squats and then decide that I'm gonna walk around the track. So you can't walk away from it. You have to be able to face the fact that there is going to be some discomfort when you start something new.*

While change is often accompanied by anxiety, this statement describes Dee's confidence in her ability to adapt. She was able to modify the exercise and set realistic goals for herself. The characteristic confidence and flexibility she maintained also assisted her in reaching a higher level of self-kinesis compared to many of the other participants.

In conclusion, flexibility was influenced by an interaction of internal and external stimuli, such as participants' relations with others, adaptations to physical activity, and their beliefs about change and their abilities. The women who reported confidence in their ability to engage in physical activity and manage pain possessed a level of self-kinesis which opposed rigidity and a life of unmovable pain. Thus, flexibility is described here as an element of self-kinesis which involves one's ability to make plans, and change or adapt when necessary.

4.7.2.4 Energy

In this section, self-kinesis is discussed as energy, describing the characteristics of the internal and external stimuli which determine movement. Throughout the interviews, I noticed that the women spoke about a pain that moves. *"I find with FM – I don't know if everyone finds the same thing, but I find it moves – it's moving from one part of your body to another continually."* When Joy began telling her story, she described it this way:

> *You know it's like you don't want to complain about it cause you're all – it's like every part of your body. If the migraine stops, then I'll have a kidney problem,*

> *and when that stops it'll be something else, that's just the cycle of it. It seems like one stops the other one starts. The main thing is the muscle pain.*

To most of the women, it seemed that pain was an internal stimulus of moving energy which affected their body in terms of tension and negative energy. My interview with Gen was very insightful in explaining the connection:

> *If I started to get a migraine headache right now, you will know right away because my energy will change, and I will become like this ball of negative seething anger. It's unmistakable – you can't miss it.*

Gen said that pain made her a *"ball of negative seething anger,"* and in her case the pain had not always been obvious – it was only when she started having *"gaps in the pain"* that she noticed the feeling. She said, *"when the pain would stop, then, the rage would stop and I would calm down."* Gen's offered a unique description compared to the other women's stories. She was the only participant who was identified that pain resulted in feelings of anger and rage. The way she described pain was a change of energy, in which the migraine headache itself was a type of pain and mobile energy. After noticing the energy and anger, she said:

> *Then I could see the headache start to assemble. They would start in the feet, you'd start getting tension up the back of your legs, the tension would get worse along your calves, up into your buttocks, then that would go right up the spine into the neck where the areas where it was damaged. Right out over all the muscles in your head. And it was like our head was in a vice. Once I knew what to look for, I could tell when it was going to happen.*

It was noted in all of the interviews that tension, stress and pain have an enormous connection. Yet Gen was the only participant who identified this as an *"energy block"* associated with the movement from stress to pain. Through an illustration, she described that there is a significant amount of energy from the environment (external stimuli), but the type of energy is important in determining the nature of the internal stimuli produced. She explained that when a person is sitting on the beach, it is difficult to be stressed or have an abundance of overwhelming, "*neurotic*" thoughts. Gen gave her own example of the meaning of "*neurotic*" thoughts:

> *Neurotic in the ordinary life sense – like making plans on how to get a job, and what's the grocery list and da da da da – ordinary busy sort of stuff that goes on in your head. It takes you away from what's happening right now…usually you'll slow down enough to be able to just contemplate one issue that you're having at a time, but you won't have 20 issues going on at once 'cause there's not – the space doesn't allow it. You have to have a ceiling for the energy to bounce off for it to start to speed up to the point that you're neurotic in that way.*

Gen seemed to have an appreciation for the serenity of nature and the capacity it has in terms of energy. While she recognized movement between people and the environment, she noted that nature provides an environment conducive to optimal energy flow and thus self-kinesis. From my interview with Gen, it became apparent that the ability to identify changes in energy associated with the movement of pain, and the stimuli from one's environment and thoughts are important in self-kinesis. Movement produced through various stimuli from within the person and from their surroundings can influence the flow of energy. In the end, these are key factors in the relation between stress and pain.

While all participants spoke about the connection between psychological stress and pain, many of them even shared their understanding of stress and pain before I asked questions related to these concepts. Joy said, "*with fibromyalgia, stress drives it wild. You can ask my doctor, and she says, stress is one of the worst things that drives fibromyalgia.*"

Earlier in the interview Joy said that receiving medication to manage her pain helped her to have energy to do things in life.

> *The pain is never gone, it's never totally gone. But the pain is subsided for a little awhile, and it seems like then I gots the energy then to do what I needs to do, which is wonderful!*

The meaning of stress, pain, and energy was similar in her experience, where the movement of pain, the flow of energy, and stress are intricately involved with the experience. Furthermore, changes in the movement of pain or stress seem to help unblock the energy and promote movement.

Joy discussed a situation in her life that resulted in improvement in pain management. Conflict amongst family members had been a source of stress to her over the last several years. She explained that her involvement in the situation was making her pain worse. As a very caring person, she felt that she was abandoning people who needed help. However, she decided that, *"it goes back to the stress level. When I start to deal with this, I have to get out of it. And that seemed to be mean, but really it, it wasn't."* She went on to describe the ways she literally and figuratively left the situation, choosing not to be involved with her physical presence in certain conversations and places with those people, as well as choosing to focus her mind on other things in life. In terms of self-kinesis, the external stimulus from interpersonal family conflicts was provoking a high level of stress. By resolving to move away from the situation, Joy achieved better management of pain.

Dee talked about pain management in terms of self-kinesis, where movement was linked to happenings within the body and mind. She stated that she *"re-establishes her positive energy"* when she gets up from her desk at work to walk down the hall, talk to co-workers, or make a cup of tea. Movement is important, and as she simply puts it, *"whatever it is, you need to do something."*

While movement in many forms was accompanied by energy, a lack of movement was related to the subsequent stress and pain from immobility. Lucy said, *when I am stressed, my muscles tense up. That's a given, like I know that for a fact, right?"* She went to explain that she feels it is *"the stress that probably comes first."* She talked about the tension she could feel in her body and the way she attempts to relieve the pain.

> *I know that when I'm stressed I can feel the tension, like my muscles and tightness, like in my neck and shoulders I'll have a lot of pain. So I'll massage them. I try to reach back and massage my neck and shoulders, and I'll put on a heating pad, and you know just get the muscle warmed up, and then I massage my neck and shoulders, that type of thing. It helps to loosen up. Sometimes in my arm there's a lump there, and I can find the lump and it's really tender, so I just work it around and around and around and I work it out.*

The way she uses massage may suggest an attempt at moving the energy within her body. Joy also explained the role of stress and energy as stimuli:

> *Like in myself, I got no stress with my husband and with my boys. But in myself, there's a battle every day, to live, to cope with everything when you've got so much stuff in your body going on.*

This participant seemed to describe the energy in the body as *"so much stuff in your body going on."* Similarly, as previously discussed, many of the women described their attempts to purposefully and try to relax parts of their body through meditation. In terms of self-kinesis, energy was stimulated through these internal factors as well as other external factors, such as the environment.

Movement of energy is significant, and it is evident that moving one's thoughts, noticing energy in the body, and recognizing the movement of pain are interactive in self-kinesis. Overall, the women's narratives show that stress and pain have a clear connection, which may be attributed to an energy block. Self-kinesis is produced through stimulating the movement of energy.

4.7.2.5 Strength

Strength is one's resilience despite pain. In one way, social support helped the participants to persist despite pain. In fact, the women metaphorically referred to pain as a weight or burden which must be lifted or carried with strength. Lucy put it this way, *"If you have 100 pounds of flour to carry, it makes it easier to have someone help you carry it doesn't it? A burden shared is the same as sharing a heavy weight."* Many of the women spoke positively about the influence of others on their life. For example, Joy talked a lot about the support of her family.

> *You've got to have somebody you can lean on. I've got friends that got husbands that look at em and say, you could do it if you wanted to. So I try for them. They're the ones that are there for me - and when you're sick every day of your life, that's the only thing that keeps you going. My family is the only thing that keeps me going.*

An important element in Joy's experience was the ability to do things for her family. She explained that her self-worth comes from being able to care for herself and others in her life. These stimuli influenced her self-kinesis, as the internal sense of feeling significant in life was related to the external act of caring for other people through her role as a caretaker of the home. The presence of others and having a responsibility towards others was also significant in Sarah's experience. She shared that living alone was often difficult.

> *I think social isolation plays a huge role in this - so that when I get home on Friday night and I'm having panic attacks because the pain is so bad, there's no one there to talk me down and say, now listen, I'm going to get the bed ready and turn on the heating pad, and pour a hot bath for you that will help your back and get you a cup of hot tea. I'm gonna get you your muscle relaxant. So that living alone, pain, um, is much harder than if you had a partner who would help you and be patient and understanding.*

Sarah said she had hired a housecleaner in the past, which had been helpful in a number of ways. Not only did the woman come to clean the house, but her presence motivated Sarah to be more active.

> *Having someone else around - and there are things that need to be put away that she doesn't know where they go. Having somebody else around also, um, helps, like there have been times when I was having seizures – I can't make my bed alone – and we'd be making my bed together, and they were mostly absence-type seizures – and I feel safe having someone around.*

Similar to the presence of the cleaning lady, her two dogs were also "comforting." Sarah said the dogs encourage her to get out of bed sometimes to take them for a walk. If she didn't have anyone at all, her experience would be more difficult and she would be more discouraged in terms of physical activity. While living alone was often a constraint to living with pain, the presence of another person (external stimulus) brought Sarah a sense of safety (internal stimulus).

The effectiveness of CP support groups was a topic of conversation in many of the interviews. Many of the women had attended groups in the past, but none of the women were currently meeting with a support group. However, many of them were in contact with others who also had CP conditions. In fact, Joy talked about the importance of having friends with similar pain experiences because *"healthy people don't understand sick people."* She lightheartedly remarked, *"it's like all the sicks stick together."* A few of the other women commented that the CP support group was a positive experience because it was nice to get together and talk with other people who were experiencing the same thing. Three of the women had attended the same support group when it existed. Joy gave her opinion about why the support group was no longer meeting together.

> *The reason why they never kept it up is because this disease – you know there was nights that there were only two people there. Now sometimes there was about five or six, maybe even ten or twelve, but it would range mostly under four or five people. It was just too much - they couldn't be renting a room just to get the latest flyers or news on this - but that' what this disease is, it's very overwhelming. So that's why it didn't work out. It was just too much. Unless we had a big crowd every month… and that was still hard because it could be on a day that people's having just a bad day - and with fibromyalgia you cannot, you know, assign yourself to anything, like, I'm not dependable.*

The other two women who had attended the group seemed to have similar opinions – the support group was a positive experience, but people had either lost interest or there was no one to lead and organize. While a few of the women seemed to enjoy their experiences with CP support groups, Dee had a different opinion. She explained that when she first started having pain, she decided to attend a CP support group meeting. After her first experience she decided, *"I can't come back here. How much negativity is in this room? Sitting and dwelling on it and talking about the negative aspect of it is not helpful to me."* From her experience, it seemed that the negative discourses about CP only added to the 'weight' of living with pain, thus providing an external stimulus which was too 'heavy' to bear. In this way, others did not provide strength or resilience for self-kinesis.

In terms of other negative social interactions, a concern over the perception of others was discussed by many of the informants. Mary explained the difficulty associated with working in a family-owned and operated business:

> *It was very hard to do - to try to work, to try to be courteous to your customers – and you know, when you're in pain, you just don't – you just don't take your pain outside of your house. When you go outdoors nobody knows that I got fibromyalgia and I mean people look at me and they can't believe I got diabetes either. So you know I just don't go outdoors and be moanin and groanin, right?*

Lucy also expressed her concern about talking with others about CP, saying she doesn't talk much about her experience with anyone because she doesn't want her problems to make their life more difficult.

> *I would want to encourage you. I would never talk about my issues, you know? You know, she don't need any more. It's much more important to be there for her. I would never mention mine.*

While sharing one's experience with others often added to the women's strength in moving through life with pain, many of the women seemed to also believe that CP was a burden or heavy weight which should not be shared but kept to themselves – internalized. The way others perceived CP influenced the women's relationships. Some of the women seemed to feel as though they were under a watchful, judgmental eye.

> *People think that if you're up and doing some things - if they see you outside up and moving around and doing some things, they see ya, and well, why can't you do it another time? If you can do that, why can't ya do this? They figure if you can do one or two things they figure you can be doing whatever you should be doing (Joy).*

Joy explained she had worried for years about the perception of others, but her thoughts had changed.

> *Years ago, I used to worry about it, I used to think about it a lot - oh my goodness, what does this person think? And oh my goodness, what does she think? But I don't – I'm not anymore - not anymore. It's just too much energy... I don't do it anymore because you know what, it doesn't matter. It doesn't matter what you says or does because they're gonna believe what they're gonna believe. You're either gonna believe me or you're not.*

Joy spoke about expending a lot of effort by worrying about the perception of others. Her account offers evidence to the concept of self-kinesis, as she describes her choice to move away, escape, and let go of her concern over what others think.

Sarah also spoke about the judgment of others. While volunteering at a community event, one of the organizers commented, "Now Sarah, I don't want to hear that you've been in bed with pain for 4 days from this." She went on to describe her reaction to this experience:

> *It makes you feel like you're a leper or something. Here I am, I've shown up on time, doing everything right. I'm even doing more than what was asked of me and I'm enjoying it. I'm meeting new people. I'm learning about a process I never understood. I was meeting new people and enjoying myself, and then this woman who heard from a neighbour about my pain issues made this comment - to me it was demeaning. For one day I wasn't thinking about pain.*

The judgmental perception of others had contributed to Sarah's negative experience. In terms of self-kinesis, she described engaging in physical activities because her mind had moved to a place of enjoyment, purpose, and keen interest in the work she was doing. Yet after hearing the woman's comment, her perception of the experience changed. Instead of having strength to continue in the activity the remark had served as an external stimulus which hindered her abilities.

This section has provided evidence for the subtheme, *strength,* in the context of one's resiliency and the influence of others. Strength was negotiated as a number of people and events helped and hindered the participants' self-kinesis. The women's stories showed that negative experiences with others were often external stimuli provoking an internalization of pain. Many of the women voiced that keeping pain to themselves was better because others seemed to have an inaccurate perception of their experience. On one hand, they expressed several challenges in facing the perception of others and negative attitudes of family, friends, and support group attendees. However, they also spoke about the assistance others provided as a positive means of social support. In conclusion, there were a number of stimuli influencing their self-kinesis and strength – one's ability to be resilient.

4.7.2.6 Balance

Balance is a characteristic of self-kinesis, in terms of the equilibrium one finds in determining movement. This section presents evidence for the presence of opposing forces, as well as the decisions faced when presented with various internal and external stimuli. Several of the women talked about barriers such as weather and accessibility of facilities. The weather in NL is often wet, rainy, and snowy. I interviewed the women in the month of January, and they spoke about experiences in the winter. Lucy expressed the difficulty of exercising *"when the weather is bad."* In fact, she said that *"you can't go"* walking when it's raining. Sarah explained that she tried to walk her dogs as much as possible, but the field next to her house is often muddy, icy, and wet. These conditions deter her from walking there because she had fallen in the past.

The women voiced concern about the safety and ease of exercising outdoors during certain weather conditions. They also spoke about the accessibility of indoors facilities and the comfort of their experience. Sarah admitted that she would be more motivated to swim if she had access to a therapeutic heated pool. Dee also mentioned a preference for swimming in warmer water, but said she had found two facilities in the city of St. John's where the water is warm enough. Also in terms of accessibility to indoor exercise facilities, one of the women mentioned the cost of membership and participation. Mary said she had not participated in exercise at the local community centre because it was "*probably pricey.*" She mentioned this twice during the interview, admitting that she had never actually inquired about the cost of classes or membership, but assumed that it would be more than she could afford. In another part of the interview, Mary also said she had to quit doing physiotherapy because it was not covered under insurance and she could no longer afford to receive treatment. Still, she reported continuing with the exercises she had learned.

All of the women talked about various types of exercise, and most of the women talked about the avoidance of strenuous activities. In fact, Lucy mentioned that high intensity exercise deters her from being involved with fitness classes at a local community centre:

> *If I were to do a strenuous exercise, like lifting, or, I've never done any of those exercises that you go to fitness centre. I don't know how I'd manage those because I've never done it, you know where there's different things you do. That looks like it's strenuous on some kind of a program.*

Sarah said that caring for her horse was detrimental to her experience because she was doing heavy lifting without getting "*regular physical exercise*" through other activities:

> *So I'm probably getting the worst kind of exercise with the horse because I haven't built up the muscle strength through regular physical exercise like the pool cause I know how to do therapeutic exercises in the pool to strengthen all my muscles.... I'm kind of mad at myself, but I'm getting the worst kind of exercise when I'm at the barn because I'm doing sudden, heavy, lifting of heavy objects.*

Housework was the primary daily activity for three of the six participants interviewed. Mary talked about the impact of strenuous movements, saying that "*hard housework or strenuous housework, like mopping floors or vacuuming or whatever, I find the pain increases.*" Joy described her experience in her regular work activities:

> *Joy: Believe me, when I'm working, I'm two days straight, upstairs, downstairs. I can just barely move then for three days, but I don't care. My doctor's always saying, Joy, pace yourself, pace yourself. But I can't do that, you know?*
>
> *I: When you hear pace yourself what goes through your head?*
>
> *J: Well when I starts something I just can't do half and then sit down. There's no way I can do it. Like when I starts to do it I gots to clean everything the one time because I knows I'm gonna have a lot of pain that I can't do it, and even though doin' it puts me down for 2 or 3 days it still don't make a difference really. It still don't ya know? It's the way I work – it' s just me. There's other people who do it differently, and probably some who don't do anything. That's just my way of doing it.*

Her account introduces the concept, "*pacing,*" which the other women spoke about as well. Lucy said, "*any housework that I do, I pace myself, like I don't do dusting anymore. I do my bathrooms and that but I can only do a little bit at a time, just a little.*" She went on the explain that if she cleans the bathroom she may have to wait a week or two before doing another strenuous activity like that again. Many of the women seemed to have developed a plan that involved pacing. In other words, they balanced the amount of energy being exerted and "*listening to the body*" became important in achieving balance. Thus, listening to the body was an internal stimulus provoked in order to balance one's activities. In fact, all of the women talked about the ways which their body communicated to them. Dee talked about how this works in her life when I asked her how she deals with pain.

> *It means making sure you're sitting properly, making sure that your posture is ALWAYS looked after, making sure that you listen to what your body tells you, because your body will tell you, you know, if you're sitting at your chair at your computer and all of a sudden you say 'my shoulders are really tired', then chances are, you needed to get up and stretch 15 minutes prior to that. You know your body will always react to, uh, stresses, and that can be leaning forward, you know, having weight on your belly – it can be whatever it is, your body will tell you – you need to make changes but we're not really good at listening to it.*

She explained later that pain was an indication of the need for rest, in which case, one needs to listen to the body. In her life, part of listening meant setting realistic goals. In addition, she achieved balance by being aware of her limitations, but also recognizing her capabilities. She put it this way:

> *So you have to recognize that some days there are limitations and some days there are factors that are going to prohibit you from making your goals, that's ok. Do what you can. My God, you got up and walked halfway around Long Pond. That's great! That's great!*

Balance was an underlying theme in the interviews in relation to the forces which influenced women to move. Both internal and external stimuli existed in the form of motivation and listening to the body (internal), as well as weather and accessibility of exercise facilities (external). In terms of self-kinesis, these factors influenced pain and their experiences with physical activity through balance – the equilibrium between opposing forces.

4.7.3 Conclusion

In the quantitative phase of this study, pain interference was more significantly associated with Sport PA, stress, and exercise self-efficacy than pain severity. However, unlike pain interference, pain severity was significantly correlated with Leisure PA. In addition, physical activity participation in sport and exercise-related activities buffered the relation between stress and pain interference among older adults age 70 and older. More active participants versus less active participants reported lower pain severity, lower pain interference, and higher levels of exercise self-efficacy. In the qualitative phase, self-kinesis was defined as the general theme because the participants' experiences with physical activity were described as having physical, mental, and social components. Self-kinesis was defined as self-chosen stimulus-induced movement, and described through characteristics and subthemes of *endurance, power, flexibility, energy, strength, and balance.* The findings provide evidence for the biopsychosocial model as a framework for understanding the factors at work in the lives of people with CP.

Chapter 5: Discussion and Conclusions

5.1 Introduction

The purpose of this mixed methods study was to examine biopsychosocial factors associated with physical activity participation among people with CP, and to explore the meanings associated with their dynamic experience. In this chapter, a discussion of Phase One (quantitative survey) and Phase Two (qualitative interviews) are presented in separate sections. A general discussion follows, including the findings and limitations of this study, as well as implications for wellness research and practice.

5.2 Phase One: Quantitative Discussion

Adults with CP completed a self-administered paper or web survey that examined the associations between the study variables: pain, stress, exercise, and exercise self-efficacy. Research questions included: 1)What are the associations between stress, pain, physical activity participation, and exercise self-efficacy among people with chronic pain? 2) What are the differences between older adults (50 years and older), and younger adults (under 50 years) in terms of these relations? 3) What are the differences between more active and less active participants in terms of the study variables?; and 4) Does physical activity participation buffer the relation between stress and pain? The results of this study allow for some conclusive answers to be drawn regarding these questions.

5.2.1 Pain Interference and Physical Activity Participation

It has been reported that pain intensity contributes more to disability and depression among people with CP than any other factor (Arnstein et al., 1999). The current study examined differences between people with CP who are more active and those who are less active in order to understand factors contributing to physical activity participation within the context of CP. The results indicated that pain intensity and pain interference ratings were higher among less active participants, while those who were more active reported lower levels of pain severity and less pain interference. Interestingly, pain interference was more strongly related to psychological stress and exercise self-efficacy than the severity of pain itself. Pain interfered slightly more with activities (*M* = 5.16, *SD* = 2.75) than affect (*M* = 4.27, *SD* = 2.71), with the highest rated interference in areas of work, sleep, and walking ability. Despite the fact that pain interfered more with activities than affect, stress also had a stronger relation with pain interference than pain severity. Thus, stress was strongly related to the participants' perception of the way pain interfered with their life, rather than the severity of pain itself.

In addition to the above-mentioned differences, more active participants had higher exercise self-efficacy than less active participants. Respondents rated their exercise self-efficacy on a scale of 0-100%, and the mean score was 56.8% (SD = 37.53). These results indicate that many participants reported on one of two extremes of the scale (i.e. very high self-efficacy or very low self-efficacy). Furthermore, in contradiction to the findings of previous studies, exercise self-efficacy was not associated with age. Other researchers have reported that older adults with CP are more likely to have lower self-efficacy for exercise and less positive attitudes and control beliefs about exercise (Arnstein et al., 1999; Leveille et al., 2003; Buckelew et al., 1995). However, exercise self-efficacy was not a significant predictor of physical activity associated with exercise and sport.

Efficacy theory posits that one's confidence in their ability to participate influences motivation and subsequent behaviour (Bandura, 1986). In another study examining processes related to efficacy and leisure physical activity among a sample of individuals with CP, Loucks-Atkinson & Mannell (2007) proposed that constraints, motivation, and negotiation are not factors which are independently influential on physically active leisure participation. Instead, they operate synergistically, resulting in a complex process of influence. Furthermore, one's confidence in their ability to use negotiation strategies (e.g. changing leisure aspirations, improving finances, changing interpersonal relations, skills acquisition, and time management) was directly related to their motivation and negotiation, suggesting that people with CP who have high levels of efficacy will persevere to cope with pain and disability despite perceived constraints. The current study shows that pain interference is more strongly related to psychological stress and exercise self-efficacy than the severity of pain itself. Perhaps the significant association between stress, exercise self-efficacy, and pain interference in this study were due to motivation and negotiation, or other variables pertinent to the constraint negotiation process. It appears that the role of stress may have implications for studying the connections between negotiation efficacy, constraints, motivation, and pain interference within the context of physical activity participation.

5.2.2 Sociocultural Influences on Physical Activity Participation Among Older Adults with CP

Participation in physical activity was measured in three different areas: Work PA, Sport PA, and Leisure PA. In this study, the majority of participants indicated that their physical activity participation during work, exercise, or leisure was of a low intensity. These findings are related to current research findings and recommendations for people with CP, which suggest that lower intensity physical activities may be more beneficial than higher intensity. Furthermore, people with CP are often encouraged to pace themselves, which was also noted by the women interviewed in this study. Even though this study compared differences between more active and less active participants, it should be noted that the most active participants in this study were still only moderately active. Older adults in NL are not highly active (Stats Canada, 2008), but in this study, physical activity increased with age. However, pain severity, pain interference, and stress were not significant predictors of one's level of participation in work physical activity. These results should be interpreted alongside the fact that many of the subjects were retired (53%), and did not consider their everyday "work" physical activity when responding to items on the questionnaire. Yet, some conclusions may be drawn from these findings, in relation to social, cultural, and contextual factors, specifically the marginalization of physical activity among older adults in NL.

To my knowledge, there is one other study which has examined physical activity beliefs among NL's older adult population. Witcher, Holt, Spence, and Cousins (2007) reported that many Newfoundlanders have been socialized into a subculture of work physical activity since childhood. Within this culture of work activity, leisure-time physical activities are marginalized to the edge of acceptable societal norms. The results in the current study are similar in many ways. According to the data, Work PA, Sport PA, and Total PA increased with age, but Leisure PA scores did not increase with age. These findings may be related to the subculture of work activity and marginalization of leisure time physical activity identified in Witcher et al.'s (2007) study. In their study, interviews with rural residents revealed that staying "busy" is an important aspect of the meaning of physical activity among the older adult population in this province. Yet "busy" activities are not always physically active (Witcher et al. 2007). The findings of the present study were similar, particularly among the women living in more rural areas of the province. Every day activities were not always perceived by the women as being physically active, even though many of the activities they spoke about in the qualitative interviews (Phase Two) involved walking and house work activities (e.g. cleaning, washing dishes, doing laundry), which are in fact considered to be 'physical activity' -- defined in this study as any bodily movement caused by muscle contraction and characterized by the level of physical effort (CDC, 2011).

The notion of 'successful aging' was also noted in Witcher et al.'s (2007) study, as many adults felt they were too old to consider physical activity. In their study, it became evident that strategies for successful aging typically involved keeping busy, but 'busyness' did not include participating in leisure-time physical activity. In this study on physical activity among older adults with CP, staying busy was related to the meaning of successful aging as well as successful pain management. Staying busy may be an attempt to cope with pain and the aging body, in such a way that one still feels like they contribute to society in a meaningful way: 1) Do people with CP, especially older adults with CP, lack a sense of competence?; and 2) How does physical activity participation and other individual factors contribute to the psychological need for a sense of purpose? It is unclear whether older adults with CP feel sidelined in society due to pain or age. These discrepancies may be explored in future research. Indeed, marginalization in society is experienced by both those with CP and older adults. Thus, being an older adult with CP deserves a unique examination in this regard.

5.2.3 of the Effects of Physical Activity Participation on Stress-Pain

Research suggests that the experience of pain is impacted by psychological stress. There is evidence that exercise may provide stress-coping and health benefits (Iwasaki, 1997). However, among people with CP, research also shows that the maintenance of exercise may depend upon one's ability to cope with stress, pain, disability and other barriers to exercise (Dobkin et al., 2005). In the current study, the associations between stress, pain interference, pain severity, exercise self-efficacy, and physical activity participation were explored through hierarchical regression and mediation analyses.

Previous research indicates that older adults with greater pain disability experience heightened psychological distress (e.g. James, Miller, Brown, & Weaver, 2005). Contrary to prior knowledge, the results of this study showed that increasing age was associated with decreasing stress, and pain severity and pain interference were not significantly associated with age. In addition, physical activity increased with age. At the same time, age was not significantly associated with exercise self-efficacy. These relationships coincide with the mediation findings of this study, as participation in sport and exercise physical activities mediated the relation between stress and pain interference among the oldest adults (70 years and older). Evidence for mediation was not found among younger participants (under 70 years), suggesting that participation in sport and exercise is a significant factor in subduing the relation between stress and pain interference among adults with CP. To my knowledge, this is the first report to show that exercise and sport physical activity participation (Sport PA) is an effective means to help older adults with CP cope with stress

Coping mechanisms, such as physically active leisure, often buffer against life stress only when significant problems are present (Cohen & Willis, 1985). In other words, physical activity will lessen the effects of stress only when stress is high. On the other hand, when stress is relatively low, the contribution of leisure physical activity is expected to be less substantial. Accordingly, other studies have found that physically active leisure works to reduce stress when stress levels are high (Reich & Zautra, 1981; Wheeler & Frank, 1988). In fact, individuals who are highly active and satisfied with their leisure are less vulnerable to the adverse effects of life stress than those who are less active and less satisfied with their leisure (Wheeler & Frank, 1988). Wheeler and Frank (1988) studied the relative importance of many different intervening factors associated with stress and well-being. They discovered that the main buffers between stress and well-being were a sense of competence, nature and extent of exercise, sense of purpose, and leisure activity. Similarly, the results of this study showed that stress and pain decreased with age, and physical activity increased with age. Recreational exercise is specifically noteworthy in regards to this discussion, as others have found that psychological well-being was higher during such activities, as opposed to physical activity associated with work such as household chores (Iwasaki & Smale, 1998). The results of the current study coincide with previous research, as Sport PA was tested as the mediating variable because of the significant associations found with stress and pain interference. Work PA and Leisure PA were not tested because they were not significantly related to stress or pain interference in prior linear regression analyses.

Exercise self-efficacy was not significantly associated with age in this study, suggesting the role of other variables or characteristics which influence physical activity participation among older adults with CP. Coleman and Iso-Ahola (1993) proposed that social support plays a key role in the buffer effect of leisure activities because of leisure-generated friendships. The role of social support was noted by participants during the interviews in Phase Two of the study. Physically active leisure activities were often done with others, and perceived social support through friends, family, and chronic pain support groups was noted as an important factor in their experience. When life problems occur, people typically attempt to reduce stress by employing coping strategies, such as avoidance, devaluing the threat, obtaining support, and problem solving the crisis. These coping mechanisms may buffer the impact of stress on health by influencing the person's belief or appraisal of the stressor, or enhancing their ability and effort, which in turn may alleviate the stressor before it affects their health (Cohen & Wills, 1985). As proposed in previous leisure research, the role of social support should be further explored among older adults with CP.

5.2.4 Measurement Issues, Strengths and Limitations

In Phase One, self-administered paper surveys and web surveys were completed by adults with CP. There were only three open-ended questions on the survey, two related to physical activities in which they participated, and one asking participants about CP conditions. The CP question asked participants to tick a box labeled "Other" and then fill-in the pain condition which was not already listed on the survey. Despite the fact that the questions on the survey were close-ended, many of the participants liberally wrote additional information on the survey as an amendment or addition to their answer. This confirmed the importance of the qualitative phase of this study, as participants seemed to have more to share about their experiences that could not be fully communicated through a survey.

The fact that comments were made at all may be a sign of the strain within the functioning of the questionnaire. Evidently, many of the participants felt they could not answer the questions in a direct manner. Smith (2008) presented this as "the imagined researcher," in reference to someone who is actively engaged in the survey as an avenue for communication. In the article, *Pain Experience and the Imagined Researcher,* Smith suggests that the respondent is someone who desires to supply accurate information. In addition to feeling the need to provide ample information, it became apparent in this study that respondents were eager to be helpful. This has been noted in other studies, where participants expressed their desire to make a positive contribution to advance care and understanding of CP (Clayton, Rogers, Stuifbergen, 1999). On one hand, the respondent believes that writing in the margins of the questionnaire is communicative and helpful. On the other hand, the researcher usually pays limited attention to these notes and comments because the main task is entering the coded data for statistical analysis. Smith said, "the tick in the box has a different symbolic status" (p. 1003). Several studies have discussed the language used to communicate pain. A common theme found in studies on CP is the difficulty of clearly and accurately portraying pain to others, reflecting the inadequacy of language in expressing subjective experience (Sim & Madden, 2008). Considering the above, the mixed methods design and qualitative phase of this study was highly beneficial. Future quantitative research should carefully consider the instructions and wording of self-administered surveys regarding pain experiences. Perhaps this is a reminder to researchers that behind survey responses lie a host of decisions, various contexts, and a range of experiences which create "the tick".

While many participants included more information than what was requested, there was also missing data because the respondents did not answer all of the questions. Specifically, questions about physical activity participation in the sub-category of work physical activity on the Baecke Physical Activity Questionnaire were often left unanswered by participants. It became apparent through comments and responses on the surveys that many of the participants were retired, unemployed, or on disability. Furthermore, many of them did not consider their daily work activities (e.g. housework, yard work, etc.) when answering these questions. Future studies should indicate that work physical activity may include one's daily activities, even if they are retired, unemployed, and do not work outside the home.

The Exercise Self-Efficacy Scale seemed to be confusing for some of the respondents, based on missing, incomplete data for 12 participants. Many of the participants did not circle their confidence level (0%-100%) for each item (8 weeks). However, those participants did indicate their level of confidence for some of the items, so missing data were replaced and evaluated on a case-by-case basis. For example, one participant only responded to the first three items with 50% confidence, so they were assigned 0% for the higher level missing items. Also, some respondents indicated 100% for week 7, but did not respond to the other items, so it was assumed that the person was 100% confident at the lower levels as well. Therefore, these cases were assigned 100% for the lower level missing items. If a respondent had complete missing data then they were assigned 0% for all of the items. Future studies should consider presenting the scale in a different format to make it easier for participants to understand.

The survey question related to income in this study proved to be unclear for some of the participants, particularly those who were retired and obtaining 'income' from retirement accounts, or those who were disabled and receiving government assistance. The question asked about "total annual household income." In retrospect, rewording the question to inquire about an individual's "total income before taxes from all sources, including employment income, income from government programs, pension income, investment income and any other money income in the past 12 months" may have added clarity.

While this study adds to our understanding of physical activity participation among people with CP, there are some limitations. The sample of the study consisted mostly of females (71%). While research indicates that many CP conditions such as FM are more prevalent among females, these findings should be interpreted with this in mind. This study attempted to determine differences in physical activity levels among active and sedentary participants. However, 79% of participants reported participating in physical activity while only 21% reported not participating in physical activity. Therefore, comparisons were made between more active and less active participants. According to the Baecke Questionnaire of Habitual Physical Activity (Baecke et al., 1982), participant's activities are classified in terms of average energy expenditure (1 = low intensity, 2= middle intensity, 3 = high intensity). However, examples of sports and their intensities were not provided for many sports or activities in the description of the questionnaire, leaving many of the activities to be assigned values based on subjective evaluation of the intensity level.

Respondents were recruited using purposeful sampling techniques with several recruitment methods. I attended CP support group meetings, gave presentations to groups of older adults, and distributed posters in physician's offices where the respondents completed surveys on site or contacted me and I mailed them a survey. A web survey was also posted, but was only completed by eight participants. My presence or absence during the completion of the self-administered questionnaires could have impacted their responses. As I was not directly observing their behaviour, accurate reporting and recall errors are limitations of this study. Additionally, participants were not able to ask questions for clarification if I was not present. Due to the fact that this was a cross-sectional design, inferences about cause and effect of pain, stress, exercise self-efficacy, and physical activity levels could not be determined. However, these relations were explored during the qualitative phase of the study.

5.3 Phase Two: Qualitative Discussion

The research questions in Phase Two were: 1) What influences physical activity participation among people with CP?; 2) What is the meaning of physical activity to people with CP?; and 3) Why are some people with CP more active while others are less active? One-on-one interviews were conducted with six older adult participants, in order to further explore their questionnaire responses and the meanings they associated with physical activity in the context of pain. Self-kinesis emerged as the primary theme, and was further described through six subthemes: endurance, power, flexibility, energy, strength, and balance. Despite varying factors and unique experiences, the themes of these interviews revolved around one central concept – movement. As one participant simply stated, *"rest is good for your body, but you have to get up and move."* The purpose of the qualitative analysis was to explore factors associated with physical activity participation among people living with CP. This chapter serves as a discussion of the qualitative findings. As a follow-up to the quantitative phase of this study, it adds depth to the overall results and provides further explanation for certain discrepancies.

5.3.1 Stories are Social Constructions

The aim of this research was to produce descriptions of the lives of people living with CP. The women interviewed in this study provided descriptions which actually correspond to the social world that is described through their narratives. In this way, their stories are connected to a perspective which represents reality, yet the informants' reality or worldview is socially constructed within certain contexts (Silverman, 2004). The way stories are told is not just an individual matter because stories are shaped by the perspectives and values of one's community and social world (DeVault & Gross, 2007). Studying CP through a postpositivist and biopsychosocial lens supports that knowledge is constructed by individuals within social contexts. Thus, one of the aims of this discussion is to present the sociological factors discovered through a biopsychosocial view of the lives of women who experience pain. This chapter discusses the results of this study, which offer insight into the meaning of movement in their lives, and those whose narratives were formed by role expectations, social discourses, and individual self-reflections.

5.3.2 Interviewing Older Adult Women with Chronic Pain

The value of storytelling and qualitative methods is that it informs changing relationships between illness, health, medicine, and culture (Frank, 2001). The informants of this study told their narratives from three noteworthy perspectives – as older adults, as women, and as people with CP. Historically, these three groups have been marginalized in society. First, older adults have lived through decades of changing societal norms and expectations, particularly in regards to patient-physician relationships. The "good patient" of the 1950s was expected to respect the authority of the physician above all else (Parsons, 1951). In contrast, patients today are often encouraged and even expected to play an active role in healthcare. Teh, Karp, Kleinman, Reynolds, Weiner, and Cleary (2009) conducted a qualitative study on patient-centered treatment among older adults with CP. Their findings showed that older adults vary in their willingness to be active in their pain treatment. Therefore, older adults' beliefs about their role in pain management must be considered in this regard. Second, pain is interpreted differently depending on gender, and women have told their stories as arguments, attempting to convince others of the credibility of their pain as real and somatic rather than imagined or psychological. Indeed, it is commonly a medical assumption that women's symptoms, unlike men's, are emotional in origin (Reid, Whooley, Crayford, & Hotopf, 2001). Furthermore, Werner & Malterud (2003) reported that women with CP often negotiate a picture of themselves that fits with normative biomedical expectations of CP. Thus, social and cultural norms about a 'woman' and the roles of women influence behaviours and beliefs, particularly among women with CP.

In qualitative research, Hesse-Biber and Leavy (2004) pointed out that both the discourses of both women and men are often reflected through the standpoint of white upper class males. This dominance also occurs within the scientific and health care community. Thus, it cannot be assumed that the views of those we study are undistorted. Rather, it is likely that women's insights are incompatible with men's interpretations of reality. For example, several of the women in this study expressed the importance of caring for their families and managing the household. Women with CP in other studies have also expressed that caring for children is of the utmost importance, while working inside and outside the home is stimulating and important for their self-esteem (Mannerkorpi, et al., 1999). Still, accepting this as the only perspective women have may be overly simplistic (Hesse-Biber & Leavy, 2004). It was apparent in this study that the women met difficulty when attempting to move beyond these interpretations, and social and cultural expectations. In reference to the example above, the household has traditionally been the main responsibility of women. Yet, this work is not always viewed as a real activity or job, but as a natural, instinctual, emotional labour of love (Borchgrevink & Holter, 1995). It is possible that acting in ways which are beneficial in regards to pain and health contradict what is outlined by society as being a 'good' patient, wife, mother and woman. In this way, a woman's identity is formed in relation to others. Thus, I argue that a woman's perception of her own body and the actions which follow are not instinctive, but rather a resolve to validate herself as the woman she aligns herself to be within the culture that readily defines her.

It became clear through interviewing women with CP that the opportunity to tell their story was a positive and perhaps liberating experience to voice their own interpretations. It was relatively easy to develop connections with most of the women, despite the fact that we were 'strangers' prior to a relatively short one hour interview. Prior to a telephone interview, one of the women commented that this type of interview would be "strange." Despite her reservation, she agreed to be interviewed over the phone and expressed afterwards that she was glad she had decided to participate. She said, *"it's not often that you get to talk about your feelings… and you don't talk to someone like I'm talking to you every day."* Telling stories and communicating one's emotions and feelings are an integral facet of human social life. Establishing relationships and human connectedness are achieved through qualitative research. The qualitative data from this study not only echo the voices behind the survey responses, but emphasize the importance of qualitative research in understanding human experience.

5.3.3 The Meaning of Movement

The results of this study suggest that physical activity participation is achieved through a collaboration of factors related to movement, or "self-kinesis," a term I chose in this study to describe an individual's self-chosen movement influenced by the interaction of biopsychosocial factors. Included in this experience are: 1) Endurance: the persevering sense of self-worth discovered through purpose-driven movements; 2) Power: the focus of one's mind through distraction, positive thinking, and enjoyment; 3) Flexibility: the ability to make plans, and change or adapt when necessary; 4) Energy: stimulating movement; 5) Strength: one's inner resiliency despite pain; and 6) Balance: the equilibrium between opposing internal and external stimuli. No conclusions can be drawn over the relative importance of these themes as they appear to interact collectively to influence self-kinesis.

The interpretation of the theme of endurance highlighted the importance of having a purpose and routine to persevere and be physically active. These elements have been identified in previous literature as ways of coping. A number of studies revealed that people with CP pace themselves in daily activities. In addition, people seemed to cope by planning activities and using carefully structured daily routines (Sim & Madden, 2008). While some participants in this study could continue with normal activities to resist the impact of pain, others were severely limited in their activities. The results of the qualitative data show that the differences between those who were more active and those who were less active was related to enjoyment, routine, and purpose. Enjoyment has also been implicated as a determinant of physical activity among older adults (Jancey et al., 2009). Future studies should pay attention to the relationship between purpose, enjoyment, and routine physical activity within this population.

The women's endurance to live with purpose and develop a routine revolved mostly around language associated with a biomedical conceptualization of health and pain. The stories in this study are likely influenced by the common discourses heard by health professionals: "learn to cope with pain" and "pace yourself." Behind the stories about their life experiences, we hear medical discourses with a simple cause-effect understanding of pain. Thus, their own belief system seems to revolve around this conceptualization of pain.

In addition to the normative discourses, the women reiterated the fact that their pain was real, yet they sought to become invisible themselves. Many of the women claimed, *"nobody would know I have pain."* At the same time, one participant told of her attempt to cope with the skepticism and distrust she had met along the way.

> *All the burning in the muscles and all the pain that went with it was real – very real. And my feeling was, listen, if you think you're dealing with a psychosomatic illness, you're not. You're not. So let's start finding answers. Let's start isolating. Let's exclude whatever we know it's not, and let's look somewhere else and see what it is." (Dee)*

Werner & Malterud (2003) interviewed women with CP who also told stories as "arguments" to convince people about the credibility of their pain as a real and somatic condition rather than one which is imagined or purely psychological. Many of the women in this study said that people without CP don't understand their experience, and they gave examples of encounters with others who had doubted their pain. One participant identified the importance of physician-patient relationships in this regard.

> *They [physicians] treat me really good cause they know I'm genuine. They know I'm not just going up there for nothing. So many people, the drugs, it's all about the drugs, and your doctor got to know who you are and what kind of a person you are because they can't be giving out drugs to anybody" (Joy).*

The participants also rejected the stereotype that women with CP are crazy, weak, lazy, or dishonest. *"You look at me and you wouldn't know I got FM. I'm mobile all the time. I do what I have to do" (Lucy)*. The women seemed to struggle in their attempt to be visible, while at the same time coping with an invisible pain. Thus, they were constantly negotiating a picture of themselves that fit the normative expectations of a woman with CP.

Self-kinesis is described as power, in regards to the focus of one's mind through distraction, positive thinking, and enjoyment. Sim and Madden (2008) identified that positive thinking and finding distraction in pleasurable activities are methods of coping with CP and constraints. In this study, most of the women seemed to negotiate pain by attempting to focus on something else. Their aim to find a distraction through the body and the mind was a noteworthy finding of this study.

In the CP literature, an ambiguity emerges when confronting the nature of the mind-body connection. In the biomedical model, it could be described that the mind merely allows us to perceive events occurring within the body. In the Cartesian model of pain there is a mind-body dualism, where the mind and body are viewed as distinct entities. In a review of qualitative studies on people with CP, Sim and Madden (2008) reported that both the biomedical model and a Cartesian dualism are used to understand CP. While there is a conflict between which model should be enlisted to explain CP, this study supports the power of the biopsychosocial model, which differs from the biomedical model and the Cartesian model, as it acknowledges the role of social factors in the lives of people who experience CP.

In this study, the women conceptualized pain in their mind using metaphors. Other studies have reported the use of metaphors when people discuss pain. For example, Aldrich and Eccleston (2000) reported that participants described pain as an aggressive force. In this study, a similar metaphor was used, depicting pain as a villain. The body became the prison and the person in pain, the prisoner. In this way, pain was described as a force which influences the person in an uncontrollable way. This understanding of illness reflects the biomedical model of disease where objective forces control disease states (Engel, 1997), and forces are separate from the person experiencing the disease. Sim and Madden (2008) identified that the acknowledgement of a biomedical model may also secure certain medical resources, thus entitling the person to a medically accepted diagnosis which is important to many people with CP. While this metaphor suggests an orientation towards the biomedical model, the women who conceptualized pain this way also experienced pain as an uncontrollable, outside force. In this way, power over their body also seemed to be diminished and discouraged.

Many of the informants described pain as a child in need of distraction. Similar to the way a child focuses on an interesting object until it is presented with something else to gaze upon, a person's focus on pain may shift through the movement of one's body to engage in another activity, and the movement of the mind to focus on a particular task. Unlike the previous metaphor, this example depicts pain as a force which may be influenced and trained. This metaphor aligns with the biopsychosocial model of pain because the person in pain becomes responsible for teaching their body and managing pain. Furthermore, this metaphor depicts pain as being more child-like, susceptible, and naïve, and thus able to be controlled.

One participant used a metaphor depicting pain as an uncontrollable force, while another participant described pain as a controllable element in her life. Furthermore, some of the women expressed frustration with the fact that an external stimulus (e.g., housework, animals, and interactions with people) was unable to distract them and decrease the impact of pain. Others communicated that an undesirable stimulus, such as pain, could be overcome by a stronger stimulus, such as physical activity or meditation. The women who captured strategies which employed a mind-body connection were more effective in terms of self-kinesis. For example, Dee explained that less desired thoughts could be entertained in the presence of physical activity.

> *There are times that you have to say, ok, my block of time to allow this to consume me is going to be between 12 and 12:30 today - knowing full well that during that time you're in deep water fitness...So always schedule these negative thought periods for a time when you know you're doing something else you enjoy.*

This acknowledgement of a mind-body connection adds to the mediation results from the quantitative portion of this study because it suggests that the timing of positive and negative thinking may be a factor in determining whether or not physical activity buffers the relation between stress and pain.

The findings of this study help to show the dichotomy of the biomedical and biopsychosocial models in studying the mind-body connection within the context of pain. The results add support to the importance of the biopsychosocial model in which the patient is equipped with resources to control, manage, or often treat their condition through self-kinesis - a holistic process of movement involving biological, psychological, and sociological factors. The biomedical model is more in favour of the notion that objective forces control disease states, while the biopsychosocial emphasizes the contribution of many factors. In actuality, the acknowledgment of a mind-body dualism is less common to the biomedical model. Furthermore, as the dominant view, patients are encouraged to seek explanations which align with the biomedical view in order to ensure medical resources.

Patients who assume control over the management of pain is unlikely, as many individuals have been socialized into a culture where questioning health care providers and assuming control over the management of their care may not be accepted (Levinson et al., 2005). Studies show that some older adults participate in decisions about their pain treatment by requesting or refusing specific treatments or even managing pain on their own. On the other hand, some older adults prefer to let their provider make the decisions. Regardless of the individual's beliefs, all patients agree that being heard and understood is important (Teh et al., 2009). In addition to the consideration of older adults' experiences within healthcare, the experience of older adult women with CP is significant in this regard.

Smith's (1990) approach in exploring how knowledge is constructed and produced within sociological contexts is helpful in gathering an understanding about older adult women's experience within the two models of health in this discussion. The findings of the present study showed that some women abided with cultural and contextual 'rules' set forth by biomedicine, which separates the body and mind and positions the body as a powerless object. The women's attempt and often, struggle, to see pain, movement, and their body from a holistic standpoint is likely a result of the dominant beliefs and practices surrounding medicine. In effect, the women with CP spoke from two marginalized positions, limiting their voices to align with what is heard, understood, and taken seriously according to the primary medical philosophy.

The issue which presents from the results of this study is the presence of great discord within their experience and between these two health models. Still, the results indicated that the women with greater self-kinesis not only seemed to agree with the mind-body connection, but they also viewed pain as a stimulus in their life which could be controlled through their own power, resulting in better pain management.

The women in this study spoke about flexibility in terms of change and adaptation to a life with pain. People living with CP have expressed the need for a balance between battling against CP and living with it through adaptation. In terms of exercise, the findings of this study showed the importance of planning activities around capabilities and limitations that are constantly changing, as well as being able to adapt by making modifications to exercises. Other studies support these findings. Mannerkorpi et al., (1999) found that women with fibromyalgia try to achieve balance through adapting.

Within the conflict between intentions to manage everyday life and disabilities, resolution is achieved by adjusting one's goals to limitations.

In the current study, the women also expressed that the desire to fulfill role expectations often resulted in feelings of discontent. In relationships with friends, the participants did not view themselves as dependable. In family relations, the women who were primary caretakers of the home felt obligated to maintain their responsibilities and expressed dissatisfaction with not being able to get all the work done or care for their family even when pain levels were high. In addition, many of them recounted the adaptations they made in the beginning of their experience.

> *I went from being very active to being a woman lying in bed having someone else do it for me. I never let anyone do anything in my life because I've always been able to do it myself and I've always enjoyed doing it myself (Dee).*

The respondents in Mannerkorpi et al.,'s study (1999) also identified experiencing tension when unable to fulfill explicit and implicit expectations of others. It was apparent in the current study that some of the women had resolved to do what they could and *"leave the rest,"* while other participants felt pressure and obligation to be a 'good' woman and perform their duties related to housework, as well as be a 'good' friend by being dependable. Thus, in addition to the positive roles that families provide, it seems that there is a struggle in transcending societal expectations. These differences suggest that some role expectations still reside in their lives and influence pain, activity, and their perceptions of themselves and their bodies.

The women seemed to struggle with the desire to be a visible body experiencing an invisible pain. Due to the fluctuating nature of CP, many of the women were very active when pain was not present, but other times, they were not able to physically move because of pain. The women expressed the difficulty in always being under the examining eye of others, who often did not understand the fluctuation of their abilities and activities. Similar to other studies (e.g., Sim & Madden, 2008) there was dissonance between the individual's claims regarding pain and the lack of observable disability which would affect one's physical activities. While some of the women seemed to seek an explanation validating their level of activity or inactivity, other women seemed to appreciate the fact that they could maintain a level of normalcy in their life without disclosing the fact that they were a 'woman with CP'. These results may be explained by the fact that people with CP often take action to control feelings of stigmatization, like keeping the diagnosis secret (Schaefer, 2005). In essence, keeping the diagnosis a secret may be an attempt to appear 'strong.' In Werner, Isakesen, & Malterud (2004) study, the women with CP provided descriptions of their 'strength,' while negatively undermining the illness talk of other women with CP. The authors present this claim as a moral argument which appeals to the public eye of health professionals, interviewer, and the public. In Mannerkorpi et al.,'s (1999) study, the women regarded working life outside the home as stimulating and important for self-esteem. Similarly, a woman in the current study said, *I feel my life has no purpose. I miss working so much…I miss the mental stimulation…and your self-esteem disappears as you become more and more invisible to the community." (Sarah)*

The strength theme in this study underlines the women's resiliency and the negotiation taking place in their lives. They live with an invisible pain, but desire to be acknowledged, respected, and visible. The interpretation of the strength theme also highlighted the influence of others in the CP experience, where issues of social support and moral legitimacy of CP were featured in their accounts. In addition to family support, friendships through CP support groups represent behavioural or problem-based forms of coping (Sim & Madden 2008), which also appeared to be central to providing *strength*. Consequently, the women who had active social support or positive relations with others were also more active in other areas of their life, such as their physical activity. Thus, this theme provides further explanation for how self-kinesis is achieved in their lives.

The women's narratives showed that while stress and pain have a clear connection, self-kinesis is produced through stimulating the movement of energy. In terms of stress and pain, there seemed to be a bi-directional relationship between pain and stress. As one of the participants put it, she *"re-establishes her positive energy"* through physical movement. This movement was initiated through listening to the body, which all of the women recognized as being important with CP. Another recent study (Steihaug & Malterud, 2008) identified externalization/objectification of the body as a theme among interview participants with CP. In the current study, 'listening to the body' seemed to also involve an interactive awareness of physical and psychological symptoms. They were able to see connections between the pain experienced and their mental state, yet they talked about the mind and the body separately. Steihaug & Malterud (2008) reported that women living with CP perceive pain as neither entirely physical nor entirely mental, but rather they realized that bodily and mental aspects of pain cannot be separated. While the women in this study spoke about the mind and body as separate, they also referred to 'listening to the body' through a dualistic awareness of psychological stress in the mind and feeling tension and pain in the body. The participants in Steihaug et al.'s (2001) study discovered through an exercise-based treatment program that activity based on movement with an emphasis on noticing and experiencing one's body was most helpful to their experience. Similarly, the women in the current study tried to achieve a balance between noticing pain (i.e. listening to the body), and ignoring pain (i.e. leaving the body). These discrepancies in the women's stories may be understood in terms of body awareness and bodily dissociation.

Body awareness theory as outlined here is taken from literature in alternative and complementary therapies, psychology, and psychiatry. Thus, the resulting definition is broader than what is typically found in any one field. Furthermore, because body awareness is associated with the notion of a mind-body connection, this concept is also related to the present discussion of self-kinesis, and internal and external stimuli. Price & Thompason (2007) outlined the processes involved in body awareness and more broadly, somatic theory, in which successful engagement in psychophysical awareness requires one to be observant of inner body stimuli. This involves presence in and acceptance of bodily experiences rather than the avoidance or dissociation from bodily experience.

Body awareness and bodily dissociation are similar but distinct concepts. Body awareness refers to a multifaceted sensory awareness and the overall emotional-physiologic state of the body. The ability for some of the women in this study to identify and experience inner sensations such as tight muscles or tension in the body suggests a higher level of body awareness. On the other hand, bodily dissociation is characterized by avoidance of internal experiences. Distraction from the body and emotional disconnection are elements of bodily dissociation. It has been suggested that bodily dissociation is a protective strategy against painful memories, thoughts, or feelings. As a result, it is a mechanism used to cope with physical pain and stress (Price & Thompason, 2007). In this study, the women talked about aspects of association or being with their bodies, as well as dissociation or escaping their bodies. On one hand, a heightened level of body awareness and bodily association resulted in better pain management. However, for some of the women, it seemed that distractions from the body served as a useful mechanism to manage pain as a physical symptom. This discrepancy may be better understood with the 'competition of cues' model.

Pennebaker (1982) defined a physical symptom as the perception of the condition of one's body. This definition suggests that physical symptoms are determined by several factors: physiological, social or environmental, and psychological. Pennebaker (1982) also postulated a continuous competition between internal, bodily cues and external cues from the environment. Because humans are restricted in our capacity for attention, high stimuli in the environment result in low body awareness and low symptom perception. On the other hand, having fewer environmental stimuli result in higher awareness of bodily signals and higher symptom perception. While this theory has been applied to the experience of CP, others have reported results which contradict this theory. Bekker, Croon, and Vermaas (2002) studied body awareness in relation to outward appearance among young women without CP. As a challenge to Pennebaker's model, they found that orientation to outward appearance may not always have a negative effect on body awareness. The author's suggested that a plausible explanation may be that the orientation of outward appearance is not necessarily external information focusing. Furthermore, they suggested that perhaps the decreasing effect on body awareness is observable in people who need to cope with intensive external information on a daily basis.

In the present study, it was unclear how women with CP experience their bodies in terms of body awareness. Perhaps CP is a source of intensive external information which results in a decreased level of body awareness. On the other hand, it was evident that other external stimuli also resulted in pain relief. In this case, it may be that people with CP induce their external arousal by focusing on external stimulus cues, such as daily chores, relations with other people, and enjoyable activities, thereby decreasing internal arousal of body awareness pain. One participant gave an illustration to describe that while there is a significant amount of energy from the environment (external stimuli), the type of energy is important in determining the nature of the internal stimulus it provokes and the state of the individual within the environment. In relation to this example, it is possible that participants who experience an optimal type of external stimuli also turn their focus internally to the body and thus experience pain relief. Exploring the concept of body awareness alongside the concept of self-kinesis may be helpful in understanding how women with CP perceive their bodies because self-kinesis seems to be influenced through internal and external stimuli of biopsychosocial factors. Thus, understanding self-kinesis in this regard may help to clarify the way bodies move in relation to these stimuli.

5.3.4 Strengths and Limitations

The position of the researcher is an important consideration in any investigation as the interview is also in itself, a social construction of reality. The participants knew I was a kinesiology graduate student, which inevitably influenced their responses to my questions regarding physical activity. As the participants spoke about this topic, it became evident that the context of the questionnaire they completed in Phase One may have locally defined "exercise" in relation to the other questions about pain, stress, and exercise self-efficacy. Furthermore, an inherent limitation to this approach is that I approached the data with a theoretical bias based on previous data collected. In this way, my conceptualization of the study variables may have unintentionally guided me towards evidence which aligned accordingly. By asking probing questions about the preconceived variables, I may have swayed some participants to answer in a certain way, even though they would not have described their experience as such.

All of the women expressed the freedom they felt in sharing their experiences with another person. Nonetheless, is should be noted that three of the six interviews were conducted face-to-face and three were conducted via telephone. As a result, the interviews were very different in terms of the interactions. The women who were interviewed in-person may have found it easier to share their experiences because they were face-to-face, and there were non-verbal affirmations given throughout the interview.

Obviously non-verbal cues, such as nodding and facial expressions were not communicated during telephone interviews. On the other hand, the element of anonymity may have encouraged women who were interviewed over the phone to share more about their experiences. Overall, many of the women described themselves as people who did not want to talk very much about pain, regarding themselves as both sick and healthy. Werner et al., (2004) also noted this observation among female interviewees with CP. This may be an expression which reaches beyond a pure observation. Perhaps these discourses represent the way women are expected to talk about themselves, and how one is expected to be and understand the body in the world.

Qualitative research is a significant asset to understanding women's beliefs and behaviours. As a female researcher, I acknowledge my propensity towards social considerations surrounding the research of women with CP. Regardless, a biopsychosocial perspective on the study of CP warrants an understanding of the society at large. Aside from the stories shared by the women in this study, human experiences are not merely explainable in terms of individual behaviour, but as organizations by social discourses of gender and illness. Through qualitative research, the information collected represents the fundamentals of each individual's understanding, as well as the impact on their own physical activity and movement. In addition, this may be the very information that is remembered and likely to have an impression on future participants.

5.4 General Discussion

This section aims to synthesize the findings of this mixed methods research study. Beginning with a pragmatic epistemological approach, the navigation through theoretical frameworks was related to the purpose of the study. The purpose and questions were considered iteratively throughout the research. Therefore, while the study began with a certain rationale, it concludes with an expanded framework and newly found meanings. It was assumed that data may be collected to quantitatively measure levels of pain, stress, physical activity participation, and exercise self-efficacy. In addition, it was presumed that subjective input is one source of inquiry because humans are reflective, and knowledge is constructed through the way people describe their own lives.

At the beginning of this research, it was assumed that greater life stress exacerbates CP, and consequently, impacts pain and coping strategies such as physical activity participation. Thus, it was hypothesized that pain and physical activity participation are associated with the stress experienced by people with CP in other domains in their life. Furthermore, if stress is associated with pain, which is linked to physical activity participation, then it is also possible that physical activity represents a pathway through which stress affects pain interference. Thus, a second hypothesis was that physical activity participation acts as a mediator between stress and pain. The findings provided support to this hypothesis. Stress was indeed found to be associated with pain interference and physical activity participation. Furthermore, physical activity participation completely mediated the relation between stress and pain interference among adults over 70 years of age. In other words, stress from everyday life was not only directly associated with pain interference, but through physical activity participation.

Stressful experiences are not isolated events. People react to stressors after considering the broader context of their life. Constraints, available resources, responsibilities, and personal goals and attributes are involved in the attempt to assess and deal with problems (Lazarus & Folkman, 1984). In this study, interview participants acknowledged a cause-effect relationship between stress and pain; with stress preceding pain. However, some of the women also talked about stress which resulted from experiencing pain. It is apparent that problems stemming from pain also impact the way they evaluated the stressfulness of their life. Therefore, it is underlined that the association between stress and pain is clearly bi-directional. The nature of this relation is supported by other studies of individuals with chronic illnesses (Karademas, Karamvakalis, and Zaogiannos, 2009). Either way, life stress may place a greater burden on people who experience pain.

In this study, the relation between life stress and pain severity was weaker than the one between stress and pain interference. Thus, it seems that people with CP evaluate interference from pain as more severe. Through interviewing women, the topics surrounding interference on life activities were developed. The data from the interviews occupied many of the spaces between the framework of the quantitative data, thus enriching the overall findings. The participants reported that a certain level of participation in exercise was beneficial in reducing pain. At the same time, they talked about other ways of moving which influenced their experience. The major theme which arose from their narratives was self-kinesis, defined as self-chosen movement which is influenced by internal and external stimuli. This holistic conceptualization of movement is a biopsychosocial one because the women illuminated that movement extended beyond physical activity to other aspects of life. It may be this wide-ranging movement which is partially responsible for the experience of pain interference. This study points to the possibility that when patients assess experiences as stressful, they also develop a perception of how pain interferes with their life, taking into consideration the broader life context.

5.4.1 Recommendations for Future Research

The present findings add to the literature by revealing information about the historical, social, and contextual factors that may contribute to physical activity participation among older adults with CP. Understanding more about the underlying social and contextual influences associated with physical activity beliefs among Newfoundlanders may help those working in exercise promotion to use established social norms like 'busyness,' to promote physical activity from its seemingly marginalized position in the Newfoundland culture. Accordingly, further research is required to compare findings among different populations and contexts. It is especially important to understand more about the way older adult women with CP perceive their experience with leisure-time physical activity, considering the marginalization associated with being in any or all of these three positions. An understanding regarding older adults' beliefs regarding work and leisure physical activity is needed. Exploring these variables within the context of work physical activity self-efficacy or leisure physical activity self-efficacy among older adults with CP may help to better understand the role of psychosocial factors in relation to stress and pain. As previously mentioned, the role of social support should be studied within this population, as well as the relationship between purpose, enjoyment, and routine physical activity.

This study adds to the knowledge we have about physical activity participation among people with CP in NL. The population of Newfoundland is one of the least active in Canada. Future studies should examine this model among people from other geographical locations. The model tested in this study, particularly the role of sport and exercise physical activity as a mediator between stress and CP, needs to be examined with other populations to determine its generalizability. In this study, non-cancer CP was examined, irrespective of condition. Thus, it is recommended that studies be conducted on populations of people living with specific types of non-cancer pain (e.g. nociceptive or neuropathic pain) which may differ in regards to the variables examined in this study.

As previously mentioned, the significant association between stress, exercise self-efficacy, and pain interference in this study may be attributed to variables such as motivation and negotiation, or other factors pertinent to the constraint negotiation process. It appears that the role of stress may have implications for studying the connections between negotiation efficacy, constraints, motivation, and pain interference within the context of physical activity participation. The literature suggests that older adults are better able to cope with pain when independence and control are effective (Sofaer et al., 2005). Some people are successful in managing pain through the ability to adopt positive meanings to pain (Van Huet et al., 2009). Future theory and research should focus on identifying whether or not the mediation of physical activity participation on the relation between stress and pain is related to one feeling independent, in control, and their ability to adopt positive meanings from their experience. How do feeling independent, in control, and being positive about one's experience influence stress and subsequent pain?

Research on illness often seeks to rewrite accounts as behaviour to be explained through terms such as coping, giving and receiving support, denial, and adherence. Frank (2001) and Smith (1999) recommend that a new way of doing qualitative research may involve more of a sociological approach. Many studies seek to explain people's behaviour, rather than explain to them and ourselves the socially organized powers in which our lives are embedded and to which our activities are contributed. Because we often discuss these behaviours as adaptive to clinically normative standards, perhaps we should instead seek to explain the social systems in which our lives are embedded. This approach may result in greater knowledge dissemination between the researcher and participant, and between patient or client and health professional. All of the interviewees in this study were women, and gender expectations and social norms arose as a topic of the interviews. Because CP is more common amongst women, future qualitative research should explore the gender-specific meanings associated with pain in personal relationships, as well as in client-professional relationships. It proves to be particularly enlightening to study CP among women through a sociological lens, examining the social and cultural context alongside their experience. This study revealed that women with CP are motivated to learn and understand their experience. Therefore, an approach which helps to explain the social powers present within people's lives may promote behaviour change through stimulating and encouraging a higher level of awareness.

The participants in this study were eager to understand more about pain. Not only do people with CP seem to have a desire to learn about the external social influences of their experience, it is also apparent that they turn inwardly toward their own bodies to understand and manage pain. Body awareness is a concept currently discussed in research and practice as tool in CP management. Therapies designed to increase body awareness use a holistic approach directed towards an awareness of how the body is used in terms of function, behaviour, and interaction with self and others (Gard, 2005). In body awareness therapy, a physiotherapist uses movements, breathing, massage, and awareness to attempt to restore balance, freedom, and unity of body and mind. The first step is the acceptance and contact of the patient with his or her own body. The next step is integrating breathing and movements. The patient is encouraged to move in ways that encourage postural control, balance, free breathing, and coordination using both body movements and words. Included in body awareness is the expression of one's emotions, which can lead to increased self-awareness and a mobilization of the patient's own resources to produce self-help. These aspects of body awareness therapy are central to the concept of self-kinesis, where movement in one area of their life influences movement in other areas. In CP, a person's ability to mobilize resources (physical, emotional, social) may influence their pain and other aspects of their experience. Previous studies in people with CP have shown that body awareness therapy stimulates a process of living and being in one's body, and knowing more positive aspects of the body and self through bodily experiences (Mannerkorpi & Gard, 2003). Few studies have examined the processes of how meaning is created from bodily experiences in the body awareness and physiotherapy treatment process. To date, most studies on body awareness and CP have assessed the usefulness of body awareness therapies. Considering the fact that internal and external stimuli were noteworthy contributors to self-kinesis in this study, future research should explore the ways which people experience internal and external cues, as well as the body as an object competing for one's attention with signals from internal or external stimuli. Understanding the body within the context of CP to explore the processes by which people move may help us to learn more about physical activity from a biopsychosocial viewpoint.

The degree of acceptance of the biomedical model and its relevance in people's experiences, particular those of women, requires further clarification. Throughout the interviews, it was clear that many of their responses coincided with social and medical discourses commonly associated with CP. Thus, the language of healthcare practitioners is apparently influential. Many of the informants referred to "pacing," "listening to the body," and "dealing with the pain." Further research on the influences of the biomedical and biopsychosocial models on discourses associated with CP may also be helpful in understanding people's experiences with health practitioners.

5.4.2 Recommendations for Health Practice

The results of this study reinforce that pain is a multidimensional experience, and thus should be regarded in health practice by a team of multidisciplinary health professionals. In the process of treating or managing CP, biomechanical and physiological aspects of the body, and psychosocial and biological factors related to pain are considered. Health and fitness specialists, holistic health practitioners, and medical doctors focus on certain aspects of CP depending on their area of specialty. This section aims to provide a collection of suggested implications and practical guidelines for health practitioners working with people experiencing CP.

Health and fitness specialists are often concerned with questions related to physical activity adherence. What determines exercise participation? How can we motivate people to be more active? The answer is as complex as CP itself. Many CP conditions are thought to be unexplained through physiologically means, and consequently, are often dismissed from research and practice. Yet studying CP through a kinesiology perspective has added to the understanding we have about CP, revealing that the way people move involves more than just exercise. Considering the collective interaction of external and internal stimuli and the resultant movements are important in the creation of the experience. The results of this study show that physical activity is a broad topic in the lives of people with CP. Thus, answering questions about physical activity participation are broader than originally thought. This study showed that CP is comprised of various factors, and physical activity participation is equally complex. Health behaviour theories have added to our knowledge of exercise adherence, and this study expands upon our current understanding.

Self-efficacy is a person's belief in their ability to exercise, and is determined and developed by a number of factors, such as mastery experiences, modeling, social persuasion, and physiological feedback. The meanings of these elements were clarified within the context of CP in this study. The women's self-kinesis was partially determined by relationships with others (e.g. social persuasion and modeling), tension and stress (e.g. physiological feedback), and purposeful movements through routine activities (e.g. mastery experiences). The examples given by the interview participants are noteworthy to health and fitness specialists seeking to motivate and encourage physical activity. The results of this study suggest that biopsychosocial factors and internal and external stimuli contribute to self-kinesis, which should be considered in coaching people with CP. In this way, movement is conceptualized as a broad concept within the person's life. Self-kinesis may illuminate other factors associated with physical activity participation.

Pain and other symptoms associated with CP conditions are often barriers to being active. It was widely acknowledged by the women in this study that exercise is beneficial in reducing pain, and the quantitative results showed that sport and exercise-related physical activities have the potential to lessen the relation between stress and pain interference. Pain severity alone was not found play a significant role in the model with stress and pain. This suggests that one's perception of how pain impacts their life and activities deserves considerable focus. Promoting physical activity among people with CP should focus on areas related to pain interference (e.g. mood, general activity, social relations, and work) in order to identify ways to reduce stress and pain. Pain may interfere with exercise because individuals with CP are often fearful of engaging in exercise, particularly strenuous activities. According to the Transtheoretical Model of Behaviour Change, providing information about the benefits of engaging in a particular behaviour may encourage someone to change (Prochaska & Velicer, 1997). Therefore, education should be aimed at teaching individuals with CP about safe and beneficial exercises for people with pain. Still, mere knowledge about the benefits of physical activity does not always result in behaviour change or maintenance of exercise. The findings show that educating people about the benefits of exercise is important, but it is also imperative to understand how pain and other factors associated with pain interfere with their life and act as barriers to their movement.

Studies have shown that the maintenance of exercise may depend upon one's ability to cope with stress, pain, disability and other barriers to exercise (Dobkin et al., 2005). Stress and pain interference may be related to a lack of enjoyment, adaptability, competence, or control. The more active women in this study perceived less pain interference when they enjoyed the activity. In addition, more active women felt a sense of control over exercise choices, adapted their exercises to maintain a routine program, and were independent in choosing exercises based on their abilities and current state of pain. Thus, fitness trainers should encourage clients to engage in activities which are enjoyable, adapt exercises to foster a sense of competence, and give them choices in exercises which allow them to have control over their movement. The meanings attributed to physical activity were exemplified through the accounts of women living with CP. If we listen to their voices speaking in the midst of pain, we find valuable information to apply to health coaching and fitness training.

Health and fitness professionals with specialized training in body awareness should use such methods to enhance the effectiveness of coaching and training clients with CP. Holistic practitioners (e.g. acupuncturists, naturopathic medical doctors, reflexologists, and Reiki practitioners) provide treatments for CP which originate from a biopsychosocial perspective. Self-regulatory and body awareness therapies, such as meditation, biofeedback, and cognitive behavioural therapy, are designed to increase physical and mental well-being through such mind-body connections. There is evidence for the effectiveness of these modalities among people with CP, yet there is a need for more multidisciplinary pain clinics and primary care settings which use these protocols. It is important for people with CP to be aware of the many treatment approaches which may be available to them, especially older adults and people living in less-developed, rural areas of NL and other provinces who may not have access or knowledge of all treatment options. A collaborative treatment plan prescribed by practitioners with various specialties would be the most optimal course of care. This approach also has the potential to lessen the distress associated with fitness training, treatment, and ambiguous diagnoses.

Patients with CP often consult with various health practitioners throughout their course of treatment and diagnosis. Many of the participants in this study talked about the pre-diagnosis period of their pain experience, which is often difficult because it involves consultations with various health professionals. It has been suggested that people with ambiguous CP conditions seek meaning in their pain experience and that a diagnosis brings stability to the situation. While some participants expressed relief in knowing that their condition was not life threatening as they previously feared, others spoke about their concerns revolving around the uncertainty of the future. As Sim and Madden (2008) reported in a meta-synthesis of studies on the experience of fibromyalgia, the initial sense of stability is often replaced by ambiguity of future events. In this way, some individuals do not view a diagnosis as an endpoint of resolution. Practitioners should address future concerns patients have about their pain or other medical conditions by providing them with resources or referrals to other health practitioners.

While a multidisciplinary approach may be the most effective course of treatment, most of the women seemed to favour the biomedical explanation of their problems. Barker (2005) suggests that this favour towards a biomedical explanation may be attributed to the way which pain is typically perceived by women and interpreted by health professionals. Yet since pain seems to be symptom of collective factors and experiences, it also seems logical that a biopscyhosocial assessment based on individual experiences would provide both the person in pain and the healthcare professional with much needed information. Similar to what other studies have found (Sim & Madden, 2008), the women I interviewed described seeking an explanation for their symptoms, but they were often told that nothing was wrong. Many of the women described that this type of 'diagnosis' from doctors left them with the interpretation that the symptoms were psychological. While the women did perceive their symptoms to be biological in nature, they also spoke about the association between pain and other psychosocial factors (e.g. stress, anxiety, and interpersonal conflicts). Some of the participants were able to identify that pain was associated with certain emotions, such as "rage". Further, this acknowledgement allowed them to successfully manage pain through mind-body work (e.g. meditation). This suggests that healthcare professionals should encourage patients to reflect on pain as a holistic experience. Undoubtedly, this may not be an easy task, considering that CP is often stigmatized as a psychological illness. The nature of the message communicated by health professionals will be important: pain is not all in the mind, but pain is in the mind-body-spirit which are connected. Thus, health professionals and fitness specialists should consider using a biopscyhosocial approach in coaching and developing training and treatment plans.

Research studies have shown that there is often dissonance between health care practitioners-patient perceptions and approaches to health because both bring implicit norms and expectations to the consultation (Werner & Malterud, 2003). These are rarely directly communicated, so no clarification of differing opinions is possible. Both have been accused as 'speakers' rather than 'listeners,' resulting in neither feeling heard by the other. It is important for both the client or patient and health practitioner to understand the viewpoint from which the other is entering the situation. Thus, an open line of communication may result in the ability to highlight possible reasons for a lack of congruence between professionals' recommendations and peoples' actions. Health and fitness trainers should strive to listen to the client's understanding of their body, pain, and exercise, as well as their life experiences outside of physical activity. This relationship is particularly important among older adults who are often inexperienced in communicating pain information because they assume that doctors and other health specialists, such as fitness trainers, know best about pain management. Older adults may forget to bring up an important pain issues once they are distracted by responding to other questions or engaging in exercise. In this case, inquiring about their pain and activities is imperative during coaching sessions. Furthermore, older adults may perceive interference with functional activities as a normal part of aging (McDonald, Shea, Rose, & Fedo, 2009).

This concern reinforces the need to ask pain questions which prompt information about pain interference. Overall, understanding self-kinesis is likely to help health and fitness practitioners to better assist and advise clients in regards to appropriate strategies to deal with the challenges of movement and CP.

As the findings of this study support, a biopsychosocial approach to health, pain, and physical activity participation is necessary. Despite its complexity, this study offers a deeper understanding to the factors which influence physical activity participation among people with CP. Practitioners, researchers, and people with CP alike should be open-minded towards an 'alternative' approach to the common biomedical model of health.

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Appendix A: Ethics Application

STATEMENT OF ETHICAL ISSUES

Harms and Benefits

Harms: The harm associated with this research should be minimal. During the interview, participants may experience psychological distress associated with discussing past experiences. In addition, the time required to complete the survey and participate in the interview may be stressful. If subjects are recruited through physician's offices, they may feel pressured to participate in the study. The physician-patient relationship will be not be influenced by the patient's participation in the study, as knowledge of their participation will not be disclosed to the physician(s) or nurse(s).

Benefits: This study may provide some benefits to participants. The research process will provide participants an opportunity to discuss their physical activity participation and experiences with pain. The interview should be an enjoyable opportunity as participants may learn something about improving physical activity adherence in their own lives. The information obtained in the research may be used to develop future wellness and physical activity programs for people with CIP.

Free and Informed Consent

Competence: Participants will be given an informative description of the study when their consent is requested. All subjects will be informed that participation is voluntary, and that no repercussions or judgments will be made if participants choose not to take part in the research. Participants will be assured that their withdrawal from the research will have no repercussions, penalty or harm.

Free Consent: There will be no pressure to participate in this research. No financial benefits will be exchanged for participation. To ensure that participation in this study is not affiliated with treatment or care given by the physician, participants recruited from physician's offices will not be asked to participate by the nurse or physician. Instead, subjects will be recruited through poster advertisements in the physicians' offices. On a voluntary basis, they may volunteer to complete a survey which will be distributed by the receptionist during their visit. Patients will complete the survey and return it via postal mail to the researcher. Members of the chronic pain support groups will be recruited on a volunteer basis. Registry members and those accessing the web-based survey will do so voluntarily. All participants who complete a paper survey will be asked to give their contact information only if they are willing to participate in a follow-up interview.

Recruitment Process: I have verbally obtained consent from Carol Stanley, the organizer of the St. John's Long Term Chronic Pain support group, to give a guest presentation at one of the meetings and introduce the study to potential participants. I have also obtained written consent from Margaret McGee (Action Atlantic) and Brenda Kitchen (Arthritis Society) to distribute information to registry members via email, as well as post information on the organizations' website about the web survey. Potential participants contacted via email or recruited from the website posting will be directed to the web-based survey on www.SurveyMonkey.com where consent will be assumed upon completion of the survey. I have obtained verbal consent from physicians in the St. John's area, to recruit participants for the study. Patients of local physicians will be informed of the research study through poster advertisements in the physicians' offices (Appendix E: Poster). Finally, written and verbal consent has been obtained from other chronic pain support group organizers across NL. I will attend the meeting in-person to introduce the study and recruit potential participants, or I will send the questionnaires and consent forms to be distributed by the group's leader.

To protect participant's information, contact information and follow-up interview participation will not be requested of participants completing web-based surveys. All participants completing paper surveys will be asked if they would be willing to be contacted for a follow-up interview. Consenting participants will write their contact information (i.e. name, phone number, address, and email address) in order to schedule an interview. Interview consent forms will be completed and collected before each interview is conducted. All participants mentioned above will be invited to participate in the research. However, anyone can withdraw, at any time, from completing the questionnaire, web-based survey, or face-to-face interviews.

Administration of Questionnaires: I will be attending at least one support group meeting to give a guest presentation on physical activity and chronic pain. I will introduce myself to the members attending the meeting, and ask those who would like to participate in the study to complete a survey. For support groups meeting in other areas of NL, surveys will be completed and returned via postal mail. If the surveys are completed at the group's meeting, the group facilitator may collect the surveys and return them via postal mail. Upon their request, patients recruited through local physicians' offices will be given a survey by the receptionist at the office, and the surveys will be returned via postal mail. If I am not present, my contact information will be made available to all. Everyone will be given a copy of the consent form along with the paper survey. All participants recruited to complete paper surveys will also be given the option of completing the web survey. Consent will be assumed for those completing a web-survey.

Informed Consent: All potential participants will be informed of the research and the research consent process. Prior to completing a paper survey and conducting interviews, consent will be obtained (Appendix F: Survey Consent Form, Appendix G: Interview Consent). Consent to complete the web-survey will be assumed once individuals have read the consent statement and have agreed to participate in the study (Appendix H: Web Survey Consent).

Deception: No deception will occur.

Documentation of Informed Consent: All participants will be asked to complete and return the consent form after they have had an opportunity to read the study description and ask any questions. Paper survey participants will be asked to return completed consent forms along with the completed survey. Consent will be assumed from participants who complete the web-based survey. Consent forms will be collected from interview participants prior to conducting the interview.

Consent for aspects of the interviews: Participants will be informed that face-to-face interviews will be audio recorded, and that the recordings will be transcribed and archived for a period of 5 years. If participants agree to participate in a face-to-face interview but wish not to have their interview recorded, there will be no interview.

Consent for aspects of the paper survey: It will be reiterated that participation is completely voluntary. Participants recruited through physician referrals will be informed that their participation in the study will remain confidential, and their involvement will not be disclosed to the physician or the nurse giving treatment or care.

Consent vs Release: Participants agreeing to participate in the research are voluntarily agreeing to the research process outlined in the project summary.

Privacy and Confidentiality

Given the nature of the support groups in various geographical locations across NL and the relationships between participants, I will attempt to maintain the privacy and confidentiality of all individuals participating in the research. However, I cannot guarantee anonymity because participants who volunteer to participate in an interview will disclose contact information for scheduling a follow-up interview. I cannot guarantee anonymity or confidentiality for those completing web surveys because Survey Monkey is owned by an American company. Therefore the data is subject to the US Patriot Act and has the potential of being appropriated by a designated government agency without any notification to me or the participants. However, steps will be taken to reduce issues of privacy and confidentiality:

- Data will be stored at Memorial University, in the Physical Education building (Room 3013) for five years;
- Access to audio recorded information only will be provided to the researcher and thesis supervisor who may help with transcription;
- Transcribed data will be kept in a separate location from informed consent;
- Data collected will only be used in relation to this research project;

- Participant's anonymity will be protected to the greatest extent possible. Pseudonyms of interviewees will be immediately selected, and any textual information (transcripts, notes) will refer to participating individuals by this name only. Questionnaires and consent forms will be given an identification code and will be stored separately.

Limits to confidentiality: Information collected in this study will be treated in a respectful and private manner. However, if anyone presenting information indicating that they may be in need of protective intervention or in need of other social support services, it is lawful that this information be reported to the appropriate authorities.

Conflict of Interest: Patient participation in this study will not be disclosed by the researcher, in order to maintain the patient-physician relationship.

Inclusiveness: This research project is designed to study the experiences of people with chronic pain which has no identifiable physical cause. For this reason, participants will be selected from responses to a questionnaire item regarding diagnosis with chronic pain conditions, including those with and without known physical causes.

Appendix B: Questionnaire

MEMORIAL
UNIVERSITY
School of Human Kinetics and Recreation

My name is Jennifer Hulburt and I am a graduate student at Memorial University of Newfoundland. Thank you for taking time to read this form which explains the study I am conducting: "Biopsychosocial factors influencing physical activity participation among people with chronic pain in Atlantic Canada."

Purpose:
The reason for this study is to better understand the factors which influence pain and physical activity in the lives of people with chronic pain. I will write about the results in my thesis, and I hope to present my findings to those in health- and exercise-related professions who work with people who have chronic pain, so that they can learn about your experience and help you to live healthier and more active life.

Overview of Study Procedures:
I am asking individuals with chronic pain who are 19 years of age and older to complete a survey which will help me learn about the pain, physical activity participation, socio-demographic information, and perceived stress in this particular group. I am interested in chronic pain, which is continuous or intermittent pain which has persisted for at least six months. If you volunteer to take part in this study, you will be asked to complete a paper survey which will take about 30 minutes of your time. For each question there are no correct or incorrect responses. I am simply interested in your current physical activity levels, your feelings about physical activity and how you feel about your own personal health. Please return the survey to the person you received it from, or return it in a stamped, addressed envelope. At the end of the survey, there is question asking if you are willing to participate in an interview with me in order to talk about your pain, and beliefs about physical activity. If you agree to be interviewed, please write your contact information so that I can contact you in order to arrange an interview.

Risks and Confidentiality:
There are minimal risks associated with this study. Your participation in this study is voluntary, and you can refuse to answer any questions in either the questionnaire or the interview without giving any reason and without ramifications. You can ask to have all the information about yourself returned to you, removed from the research records, or destroyed. Anonymity can not be ensured if you choose to give your name and contact information to participate in a follow-up interview. Confidentiality is ensured, even if you require help completing the survey, such as having someone read the questions to you or help you respond to the questions. Please feel free to ask me or someone you trust to assist you. The results of your participation and information provided during the study will not be shared with others. Only my thesis advisor and two committee members will see the raw results of my study. There will be no financial benefit for participation in this study. All data will be kept in confidence at the School of

Human Kinetics and Recreation at Memorial University.

Compensation:
There will be no financial compensation for participation in this project.

Questions:
The proposal of this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at (709) 737-2861.
If you have any further questions or concerns, please feel free to contact me. I am best reached by email at j.e.hulburt@mun.ca or by phone at (709) 737-3138.

Consent:
Signing this form gives your consent to take part in this study. It tells me that you have understood the nature of the study and received satisfactory answers to your questions. By signing this form, you are agreeing to take part in the study but can leave the study at any time. If you choose to participate in the study by providing your signature consent on the consent form attached to the survey booklet, please keep the other copy for your records.

I have read and understand the above information. I have had the opportunity to ask questions about the study, and my participation and rights. I consent to participate in the survey study.

Name: ____

Signature: ____ Date: ____________________

BIOPSYCHOSOCIAL FACTORS INFLUENCING PHYSICAL ACTIVITY PARTICIPATION AMONG PEOPLE WITH CHRONIC PAIN

Thank you for taking the time to complete this survey. I want to learn about physical activity participation in people with chronic pain. There are no correct or right answers to any of the following questions. Please respond to the best of your ability, indicating how you feel about the particular topic. Please be open and honest in your responses.

PHYSICAL ACTIVITY

I am interested in finding out about your participation in physical activity, sport, or exercise which is a part of your everyday life. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport. These may include, but are not limited to the following: bowling, tennis, golf, swimming, gardening, basketball, snowshoeing, aerobics classes, hiking, walking, rowing, and weight training. Please answer each question even if you do not consider yourself to be an active person.

What physical activity, sport or exercise do you MOST OFTEN participate in? (please write in space provided) : ______________________________

How many hours do you participate in this activity each week? (please circle one)

Less than 1 hour	1	2	3	4	More than 4 hours

How many months do you participate in this activity each year? (please circle one)

Less than 1 month	1-3 months	4-6 months	7-9 months	More than 9 months

What is the SECOND MOST OFTEN physical activity, sport or exercise that you participate in? (please write in space provided) : ___________________________________

How many hours do you participate in this activity each week? *(please circle one)*

Less than 1 hour	1	2	3	4	More than 4 hours

How many months do you participate in this activity each year? *(please circle one)*

Less than 1 month	1-3 months	4-6 months	7-9 months	More than 9 months

Using the scales below, <u>please circle</u> which answer is most suited to you for each of the following statements.

During leisure time **I watch television:**

Never	Seldom	Sometimes	Often	Very Often

During leisure time **I walk:**

Never	Seldom	Sometimes	Often	Very Often

During leisure time **I cycle/bike:**

Never	Seldom	Sometimes	Often	Very Often

During leisure time **I participate in sport, physical activity, or exercise:**

Never	Seldom	Sometimes	Often	Very Often

During leisure time **I sweat:**

Never	Seldom	Sometimes	Often	Very Often

Do you participate in sport, physical activity or exercise? (e.g. bowling, golf, gardening, aerobics classes, swimming, dancing, tennis, basketball, running, hiking, walking, rowing, snowshoeing, weight training, etc).

Yes **No**

In comparison with others of my own age I think my physical activity during leisure time is…

Much more More The same Less Much less

What is your main occupation? Being a student, a parent, or homemaker are occupations. *(please write in space provided) :* ______________________________

For each of the following statements, please indicate how much physical activity you do in your occupation. Using the scale below, please circle how often you do each of the following at work.

At work I sit	Never	Seldom	Sometimes	Often	Very Often
At work I stand	Never	Seldom	Sometimes	Often	Very Often
At work I walk	Never	Seldom	Sometimes	Often	Very Often
At work I lift heavy loads	Never	Seldom	Sometimes	Often	Very Often
After work I am tired	Never	Seldom	Sometimes	Often	Very Often
At work I sweat	Never	Seldom	Sometimes	Often	Very Often

In comparison with others of my own age I think my work physical activity is…

Much heavier Heavier As heavy Lighter Much lighter

In comparison with others of my own age I think my physical activity during leisure time is…

Much more More The same Less Much less

What is your main occupation? Being a student, a parent, or homemaker are occupations.
(please write in space provided) : ______________________________

For each of the following statements, please indicate how much physical activity you do in your occupation. Using the scale below, <u>please circle</u> how often you do each of the following at work.

At work **I sit**	Never	Seldom	Sometimes	Often	Very Often
At work **I stand**	Never	Seldom	Sometimes	Often	Very Often
At work **I walk**	Never	Seldom	Sometimes	Often	Very Often
At work **I lift heavy loads**	Never	Seldom	Sometimes	Often	Very Often
After work **I am tired**	Never	Seldom	Sometimes	Often	Very Often
At work **I sweat**	Never	Seldom	Sometimes	Often	Very Often

In comparison with others of my own age I think my work physical activity is…

Much heavier Heavier As heavy Lighter Much lighter

HOW CONFIDENT ARE YOU THAT YOU CAN PARTICIPATE IN PHYSICAL ACTIVITY?

The items listed below are designed to assess your beliefs in your ability to continue physical activity three times per week at moderate intensities (upper end of your perceived exertion range), for **30**+ minutes per session in the future. Using the scales listed below please indicate how confident you are that you will be able to continue to participate in physical activity in the future.

For example, if you have complete confidence that you could participate in physical activity three times per week at moderate intensity for **30**+ minutes for the next four weeks without quitting, you would **circle 100%**. However, if you are not at all confident that you could participate in physical activity for the next four weeks without quitting, you would **circle 0%**.

Mark your answer by circling a % (percentage):

Not at all Confident	**Moderately Confident**	**Highly Confident**

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

I am able to continue to participate in physical activity three times per week at moderate intensity for 30+ minutes for...

The NEXT WEEK

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT TWO WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT THREE WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT FOUR WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT FIVE WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT SIX WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT SEVEN WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

The NEXT EIGHT WEEKS

0%	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**

PERCEIVED STRESS

These questions ask you about your feelings and thoughts during the last month. In each case, please circle one response describing how often you felt or thought a certain way.

In the last month, how often have you…

Been upset because of something that happened unexpectedly?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt that you were unable to control the important things in your life?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt nervous or "stressed"?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt confident about your ability to handle your personal problems?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt that things were going your way?

Never	Almost Never	Sometimes	Fairly often	Very often

Found that you could not cope with all the things you had to do?

Never	Almost Never	Sometimes	Fairly often	Very often

Been able to control irritations in your life?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt that you were on top of things?

Never	Almost Never	Sometimes	Fairly often	Very often

Angered because of things that were outside of your control?

Never	Almost Never	Sometimes	Fairly often	Very often

Felt difficulties were piling up so high that you could not overcome them?

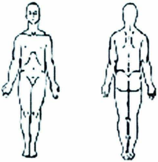
Never	Almost Never	Sometimes	Fairly often	Very often

PAIN

Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). ***Have you had pain OTHER THAN these everyday kinds of pain today?***

Yes **No**

On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



Please rate your pain by circling the one number that best describes your pain…

At its worst in the last 24 hours

0 1 2 3 4 5 6 7 8 9 10

At its least in the last 24 hours

0 1 2 3 4 5 6 7 8 9 10

On the average

0 1 2 3 4 5 6 7 8 9 10

Right now

0 1 2 3 4 5 6 7 8 9 10

Circle the one number that describes how, <u>during the past 24 hours</u>, pain has interfered with your…

General Activity

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Mood

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Walking Ability

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Normal Work (includes both work outside the home and housework)

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Sleep

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not interfere										Completely Interferes

Which of the following conditions have you been diagnosed with? (*please check all that apply*)

☐ Arthritis
☐ AIDS
☐ Cancer
☐ Chronic abdominal pain
☐ Chronic fatigue syndrome
☐ Chronic neck/shoulder pain
☐ Chronic low back pain
☐ Chronic pelvic pain
☐ Irritable bowel syndrome
☐ Fibromyalgia
☐ Nerve injury pain
☐ Phantom limb pain
☐ Peripheral neuralgia
☐ Post surgical pain
☐ Raynaud's disease
☐ Spinal cord injury
☐ Sport-related injury
☐ Work-related injury
☐ Other ____________________
☐ Don't Know

BACKGROUND INFORMATION

Are you:

☐ Female ☐ Male

What is your date of birth? Month ________ Year ______

What is the highest level of education you have achieved? (*please check ONE*)

☐ No schooling
☐ Elementary school
☐ Some secondary school
☐ Secondary school graduation
☐ Some Trade school
☐ Some University
☐ Certificate or diploma from a trade school
☐ Bachelor degree
☐ Master/Medicine/Doctorate

What is your present marital status? *(please check ONE)*

☐ Single, never married

☐ Married/Common-law living in same residence

☐ Significant other/Partner not living in same residence

☐ Separated/Divorced

Please check the category into which your annual household income falls: *(please check ONE)*

☐ No income

☐ Less than $5,000

☐ $5,000 to $9,999

☐ $10,000 to $14,999

☐ $15,000 to $19,999

☐ $20,000 to $29,999

☐ $30,000 to $39,999

☐ $40,000 to $49,999

☐ $50,000 to $59,999

☐ $60,000 to $79,999

☐ $80,000 and more

What is your *current* employment status? *(please check ONE)*

Full-time

Part-time

Unemployed

Retired

Are you willing to be contacted for an interview to discuss your pain, physical activity participation, and factors which might be related to your experience?

☐ Yes ☐ No

Due to time constraints for my thesis, please understand that I will not be able to interview all willing participants. If you are selected for an interview you will be contacted by December 2010.

Would you like the results of the survey sent to you? ☐ Yes ☐ No

***If you answered 'YES'** to either of the above questions, please fill-in the information on the next page.*

Name: ____

Address: ____

Phone number: _______________________________________

Email Address: _______________________________________

THANK YOU FOR TAKING TIME TO COMPLETE THIS SURVEY.

Appendix C: Web Survey Script

Survey Monkey is a web-based survey site and tool that employs multiple layers of security to make sure that the survey account and data remains private and secure. Survey monkey employs a third-party firm to conduct daily audits of their security, and the survey data resides behind the latest in firewall and intrusion prevention technology. However, since Survey Monkey is owned by an American company, guarantees of confidentiality and anonymity provided must be tempered by the acknowledgement that all data collected and maintained by the company is subject to the US Patriot Act and has the potential of being appropriated by a designated government agency without any notification to the researcher or participants. Therefore, anonymity and confidentiality cannot be guaranteed. While it is highly unlikely that United States Homeland Security would demand the data and scrutinize any of the participants entering the United States, the possibility does exist. The web-survey data will be accessible to the researcher and her supervisor who have the password for the site. Consent to complete the web-survey will be assumed once individuals have read the consent statement and have agreed to participate in the study.

Appendix D: Web Survey Consent Form

My name is Jennifer Hulburt and I am a graduate student at Memorial University of Newfoundland. Thank you for taking the time to participate in this study on: "Biopsychosocial factors influencing physical activity participation among people with chronic pain in Atlantic Canada." The reason for this study is to better understand the factors which influence physical activity participation among people who have chronic pain. The results of my study may help to improve the lives of people with chronic pain. I will write about the results in my thesis, and I hope to present my findings to those in health- and exercise-related professions who work with people who have chronic pain, so that they can help people to live more active and healthy lives.

I am asking individuals who are 19 years of age and older to complete a survey which will help me to learn about pain, physical activity participation, perceived stress, and self-efficacy beliefs. I am interested in chronic idiopathic pain, which can be defined as pain which has persisted for at least 6 months and has no readily identifiable physical cause. For example, people with arthritis or cancer-related pain will not be included in this study. If you volunteer to take part in this study, you will be asked to complete an online survey which will take about 20 minutes of your time. For each question there are no correct or incorrect responses. I am simply interested in knowing about your pain, physical activity, and beliefs.

There are no risks associated with this study. This website is password protected. However, since Survey Monkey is owned by an American company, guarantees of confidentiality and anonymity provided must be tempered by the acknowledgement that all data collected and maintained by the company is subject to the US Patriot Act and has the potential of being appropriated by a designated government agency without any notification to the researcher or participants. Therefore, anonymity and confidentiality cannot be guaranteed. While it is highly unlikely that United States Homeland Security would demand the data and scrutinize any of the participants entering the United States, the possibility does exist. The web-survey data will be accessible to the researcher and her supervisor who have the password for the site. Consent to complete the web-survey will be assumed once individuals have read the consent statement and have agreed to participate in the study (see Appendix H: Web-Based Survey Consent Form). The researcher will not report individual data, and only aggregate data with summaries will be available. Your participation in this study is voluntary. You can leave the study at any time and stop taking part without giving any reason and without any penalty. You can ask to have all the information about yourself returned to you, removed from the research records, or destroyed.

The proposal of this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at (709) 737-2861. If you have any further questions please contact Jennifer Hulburt at (709) 737- 3138 or j.e.hulburt@mun.ca. Thank you for your support and contribution to this project.

By proceeding to the on-line survey you are consenting to take part in the study. It tells me that you have understood the nature of the study and received satisfactory answers to your questions. You are agreeing to take part in the study but can leave the study at any time. It is suggested that you now print this statement of consent to retain for your personal records.

Appendix E: Organization Recruitment Letter

My name is Jennifer Hulburt and I am a graduate student at Memorial University of Newfoundland. Thank you for consenting to distribute questionnaires for the study I am conducting on: "Biopsychosocial factors influencing physical activity participation among people with chronic pain in Atlantic Canada". This study is important because it will provide information for us to better understand the factors which influence pain and physical activity in the lives of people with chronic pain. The purpose of the study is to explain the associations between factors which may influence physical activity adherence and pain, and learn more about people's experiences with chronic pain and physical activity. I will write about the results in my thesis, and I hope to present my findings to those in health- and exercise-related professions who work with people who have chronic pain, so that they can help people to live more active and healthy lives.

Included in this package are copies of the consent form, and questionnaires. Both items should be distributed to each participant. The self-administered questionnaire will be 1) completed by each participant on-site and collected immediately afterwards or 2) completed by each participant and sent via postal mail in the self-addressed, stamped envelope. Those who would like to participate in the study may also complete the same survey on the Survey Monkey website.

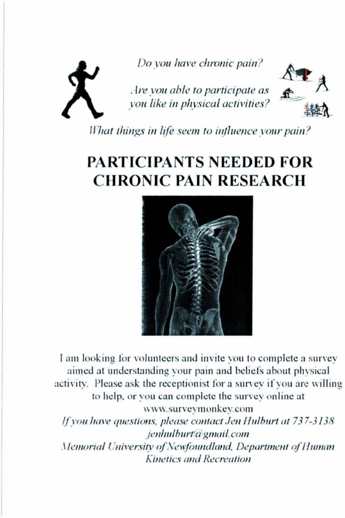
The proposal of this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at (709) 737-2861.

If you have any questions or concerns regarding the study or the questionnaire, please do not hesitate to contact me at j.e.hulburt@mun.ca or (709) 737-3138. Again, thank you for your support and contribution to this project.

Sincerely,

Jennifer Hulburt

Appendix F: Poster Recruitment



Do you have chronic pain?

Are you able to participate as you like in physical activities?

What things in life seem to influence your pain?

PARTICIPANTS NEEDED FOR CHRONIC PAIN RESEARCH

I am looking for volunteers and invite you to complete a survey aimed at understanding your pain and beliefs about physical activity. Please ask the receptionist for a survey if you are willing to help, or you can complete the survey online at www.surveymonkey.com

If you have questions, please contact Jen Hulburt at 737-3138
jenhulburt@gmail.com
Memorial University of Newfoundland, Department of Human Kinetics and Recreation

Appendix G: Interview Guide

Opening

The purpose of my study is to understand physical activity adherence. I want to hear about your beliefs as someone who experiences chronic pain. I encourage you to share your thoughts and understanding openly because what you say is important. It will add to the information I have collected through surveys, and ultimately it may influence the knowledge we already have about exercise adherence.

- After completing the survey, what reflections or thoughts did it provoke about your own experience?

Pain

- o *In your opinion, what factors in your life seem to influence your level of pain?*
- o *Could you tell me more about how pain interferes with…?*

Physical Activity

- o *What motivates you to be physically active? To exercise?*

Exercise Self-Efficacy

- o *You indicated on the survey that you would be able to continue exercise for at least 30 min/day, 3x/week for the next ____ weeks – can you tell me how you came to your answer? What thoughts went through your mind?*

Stress

- o *Could you tell me more about an experience in the last month which you felt (survey response)?*
- o *How does this feeling influence your life?*
- o *How do you cope with stress?*

Closing

Is there anything else you'd like to say? What is your impression of the questions and topics we discussed?