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Age Differences In Pain Locus Of Control And Pain Outcomes

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by

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CERTIFICATE OF APPROVAL

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ABSTRACT

Chronic pain is responsible for the majority of physician visits in the United States and results in substantial medical costs. Thus, it is vital that a comprehensive understanding of the pain experience be obtained. There is surprisingly little research on the experience of chronic pain among the growing aging population. To date, the literature on younger individuals has been generalized to older individuals, and research has failed to examine differences that may exist between younger and older individuals with chronic pain. The present investigation sought to gain a more comprehensive understanding of age differences in the pain experience, particularly in relation to pain locus of control. Pain locus of control refers to the beliefs or expectancies that a person holds about their ability or available resources to alter pain. The present study examined 178 younger and older individuals with chronic pain on their pain locus of control and its impact on pain outcomes. It was anticipated that older individuals would endorse an external locus of control more often than younger individuals. Age was also expected to moderate the relationship between locus of control and pain outcomes, such that an external locus of control would be associated with increased pain severity, perceived disability, and affective distress for younger individuals, but would not be significantly related to outcomes for older individuals. Results revealed age was not a moderator in the relationship between locus of control and pain outcomes. Further, contrary to expectations, age was not associated with external locus of control. However, there is support for age differences in pain presentations.

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INTRODUCTION

Overview

The lifetime prevalence of chronic pain in the United States is estimated to be 20%, affecting one in five individuals, and the costs associated with treating this population are substantial (Turk & Melzack, 2001). Thus, it is vital that a comprehensive understanding of the pain experience be obtained. There is a vast literature on chronic pain, with much support for the role of psychosocial factors, particularly cognitive factors, in the chronic pain experience. A specific cognitive variable that is examined in the literature is locus of control. The concept of locus of control has progressed from Julian Rotter's social learning theory of external and internal controls of reinforcement, to health locus of control, and also, more recently, to pain locus of control.

Research has revealed that there is a link between locus of control and pain outcomes. Generally, patients who endorse an internal locus of control report less pain intensity than those with an external locus of control. Similarly, an external locus of control has been found to be linked with reports of increased pain intensity (Pellino, 1998). Regarding pain locus of control and perceived disability, those who endorse an internal locus of control tend to experience lower perceived disability, whereas those who endorse an external locus of control tend to report greater functional impairment as a result of their pain (Jensen & Karoly, 1992b). Similarly, lower affective distress is associated with an internal locus of control, whereas greater affective distress is associated with an external locus of control (Crisson & Keefe, 1988). It is important to note that the vast majority of research on pain locus of control has focused on individuals under the age of 65, and it is questionable as to whether these findings are able to be generalized to older adults.

Despite a vast literature on the chronic pain experience, studies have largely failed to address age differences. The majority of the current literature focuses on adults under 65 years of age. This is a striking gap in the literature, considering the expected growth in the aging population in the United States over the next few decades (United States Census, 2005). More specific to chronic pain, a large percentage of older individuals experience chronic pain at some level. The literature also suggests that aging may be associated with greater expectations of pain, more pain sites, and greater interference of pain in daily activities (Gibson, Katz, & Corran, 1994). Moreover, there appear to be marked age differences in reports of pain severity and overall pain presentation (Cook & Chastain, 2001; Corran, Farrell, Helme, & Gibson, 1997).

Just as in younger adults, cognitive variables have also been found to be a vital component in the experience of chronic pain among older adults. The attribution an individual makes about their pain has a profound impact on how they will respond to their pain. There are findings to suggest that older individuals, their friends and family members, and their health care providers often make the age attribution (Melding, 1995). The age attribution is the belief that pain is an expected part of the aging process. Research has shown that many older individuals attribute mild pain symptoms as part of the normal aging process. Similarly, there appear to be marked age differences in the endorsement of locus of control. First, findings suggest that older individuals may endorse a more external locus of control as compared to younger adults (Gibson & Helme, 2000). There are mixed results, however, as to whether older individuals perceive more or less control over their pain when compared to younger individuals. Some studies suggest that older individuals perceive a greater degree of control over their pain, even while maintaining an external locus orientation (Lachapelle & Hadjistavropoulos, 2005). Overall, findings suggest that older individuals tend to endorse a more external locus of control but do not rate their pain as being more severe or their lives as any more disabled as a consequence of their pain. These findings are in direct contrast to the findings in younger individuals experiencing chronic pain. Thus, it appears that the endorsement of an external locus of control in older individuals may not necessarily be maladaptive. Another distinction between younger and older adults is that there are findings to suggest that the general construct of locus of control may lead to different outcomes depending on age (Blanchard- Fields & Irion, 1988).

The present investigation will seek to explore the moderating effects of age on pain locus of control among individuals with chronic pain. More specifically, the current study examines potential age differences in the cognitive components of the pain experience. Furthermore, given that there are preliminary findings to suggest that an external locus of control may lead to different outcomes for older individuals when compared to younger individuals with chronic pain, this study seeks to examine whether there are different pain outcomes in younger and older individuals who endorse an external locus of control. This paper will provide a comprehensive overview of the differences in the chronic pain experience between younger and older individuals. The current literature on pain-specific cognitive variables and aging are also reviewed. A review of the literature on pain locus of control and the potential age differences associated with this cognitive aspect of the pain experience will also be reviewed.

Chronic Pain

Chronic pain, by definition, is pain that has persisted for a duration greater than six months. Chronic pain accounts for over 35 million new office visits to physicians and over 80% of all office visits to physicians each year in the United States. Almost one in five adult Americans experience some form of chronic pain during their lifetime (Turk & Melzack, 2001). There are significant financial costs associated with chronic pain as well. The estimated combined direct and indirect costs of treating chronic pain exceed $125 billion a year in the United States alone (Turk, Okifuji, & Kaluaokalani, 1999). Thus, there is clearly a need to gain a comprehensive understanding of the chronic pain experience in order to provide adequate care to individuals suffering from chronic pain.

The chronic pain experience is complex and multidimensional in nature and is a highly subjective experience. A major breakthrough in the understanding of chronic pain was the gate-control model of pain which included psychological factors as a fundamental part of the pain experience (Melzack & Wall, 1965). This model incorporated three systems in the processing of painful stimuli: sensory-discriminative, motivational-affective, and cognitive-evaluative. The gate-control theory integrates the physiology and psychology of chronic pain to aid in a better understanding of the subjective experience of chronic pain. Although this model has been challenged, it has laid the theoretical foundation for the more recently proposed biopsychosocial model of chronic pain, which includes the social component to the pain experience. The biopsychosocial model focuses on illness as a result of a complex interaction of biological, psychological, and social variables. Similar to the gate-control theory, the biopsychosocial models provides an integrated model for the understanding of chronic pain that incorporates physiological processes as well as psychological and social contextual variables that may cause, exacerbate, and perpetuate pain. The biopsychosocial model views illness as an integrated interaction between biological, psychological, and sociocultural variables that form an individual's response to pain. This model proposes that physical changes occur in the body and these painful messages are sent to the brain. These signals are processed by the nervous system and they may or may not be interpreted as painful. These messages are only labeled as painful when the messages have been perceived and appraised as such (Okifuji & Palmer, 2004).

Cognitive Factors and Pain

Idiosyncratic cognitions about the pain experience are one aspect of the complex, subjective, and multidimensional nature of chronic pain. Cognitions regarding the pain experience include beliefs, appraisals, and expectancies individuals form about their pain. There has been much focus on the role of cognitive factors as they contribute to the pain experience and overall disability. The role of cognitive factors in the chronic pain experience is based on the idea that individuals are active processors of their experience of pain. In other words, individuals seek to make sense of the pain they are experiencing. Research has found that certain cognitive appraisal processes and beliefs, such as fear of re-injury and an external locus of control, lead to subsequent maladaptive behavior, such as inactivity and catastrophizing, which in turn may contribute to affective distress and feelings of helplessness (DeGood & Tait, 2001; Turk & Flor, 1999).

Individuals with chronic pain appraise their pain experience in order to make sense of it and also to initiate coping strategies. The appraisal of pain is the meaning an individual attributes to their pain. The appraisal of pain is often based on beliefs an individual has developed over his or her lifetime and leads to subsequent expectations about the outcome of pain. For example, an individual who appraises their pain as ongoing tissue damage will likely suffer and experience behavioral dysfunction as a result of their pain. On the other hand, an individual who appraises their pain as a condition that will possibly improve will not likely experience the level of suffering and behavioral dysfunction as the previously mentioned individual. It is important to note that the physiological input may be identical for two different individuals, but their appraisal of the pain can lead to different experiences and outcomes. It has been proposed that the pain appraisal process is a dynamic process, and there is evidence to suggest that the appraisal of pain may change as an individual ages. This may result in differences in pain presentation as an individual ages (Gibson & Helme, 1995; Melding, 1995; Prohaska, Leventhal, Leventhal, & Keller, 1985; Yates, Dewar, & Fentiman, 1995).

Individuals experiencing pain have idiosyncratic beliefs that determine the meaning and significance of their pain, as well as beliefs about the actions they should take to relieve their pain. Beliefs about the meaning of symptoms, the patient's ability to control pain, the impact of pain on his or her life, and worry about the future are examples of beliefs that play a central role in the experience of chronic pain. Pain beliefs that are frequently examined in the literature involve fear-avoidance, self-efficacy, blame, and locus of control. Experimental research has revealed the vital role that these pain beliefs play in the pain experience. For example, Salomons, Johnstone, Backonja, and Davidson (2004) manipulated the belief of control over a painful stimulus among 19 healthy participants. Participants in the controlled pain condition were informed that they could control the painful thermal heat by a joystick that was held in the non-dominant hand, whereas participants in the experimental condition were not given any directions and were was nothing they could do to manipulate the pain. Functional magnetic resonance imaging revealed that participants in the uncontrollable pain condition had greater activation in the anterior cingulated cortex, periaqueductal gray, and posterior insula. These three areas are consistently linked with pain processing. These participants with higher activation in these areas reported significantly higher levels of pain when compared to participants in the controllable pain conditions. These results suggest that activation at these sites is modulated by cognitive variables, such as perceived controllability. Overall, these results suggest an important influence of cognitive variables on the pain response. More specifically, they reveal that cognitive variables result in a physiological response that modifies the pain experience and influences the manner in which the pain stimulus is processed.

Locus of Control

A widely studied cognitive variable in the pain literature is locus of control. Locus of control can be divided into two distinct components, internal and external. An internal locus of control refers to an individual's belief that he or she can exert control over life experiences. Further, individuals with an internal locus of control believe that their own experiences are controlled by their own skill or efforts. Individuals with an external locus of control tend to attribute their experiences to fate, chance, or luck. Further, endorsing an external locus of control can also coincide with the belief that other people or entities are in control of one's future. Locus of control is typically defined in the literature by individual's endorsement on self-report measures such as the Multidimensional Locus of Control scale (MHLC; Wallston, Wallston, & DeVellis, 1978) and the Pain Locus of Control scale (PLOC; Toomey, Mann, Abashian, & Thompson-Pope, 1991). With these two commonly utilized measures, internal locus of control is represented by its own scale and the construct of external locus of control is represented by the Powerful Others subscale and the Chance subscale. External locus of control is typically discussed in the literature in terms of an individual's endorsement on these two subscales. The Powerful Others subscale and the Chance subscale have been found to be highly positively correlated (Crisson & Keefe, 1988; Gibson & Helme, 2000; Pastor et al., 1993).

It is important to discuss the origins of locus of control, as it has only recently been applied to the pain experience. There have been several fundamental psychological theories that have led to the understanding of locus of control in chronic pain (Jensen & Karoly, 1992b). The original concept of locus of control was developed in the context of Julian Rotter's social learning theory and was referred to as internal and external controls of reinforcement. Phares (1965) explained that Rotter's controls of reinforcement refer to the extent to which an individual feels he or she has control over the reinforcements that occur relative to his or her behavior. Those with an external control of reinforcement believe that forces beyond their control are the essential determinants of the occurrence of reinforcements. In other words, people with an external locus of control perceive a lack of a relationship between their activities and subsequent outcomes. Among these individuals, outcomes are perceived to be controlled by forces external to themselves, such as other individuals or by chance factors. Forces of chance refer to the belief that the outcome of a situation is dependent on fate or luck, rather than some controllable, predictable force. The concepts of fate and luck are thought to be similar constructs, and these beliefs are assumed to be passive defense mechanisms that serve to preserve an individuals' self esteem in the face of failure (Rotter, 1966). A belief in powerful others refers to the belief that one's future is dependent on other people. In the case of chronic pain, powerful other individuals, who are perceived to have control, are typically physicians or other health care providers. Individuals with an internal control, on the other hand, tend to feel they have control over their own destiny and are effective agents in controlling their own lives.

Bandura's (1977) social leaning theory suggests that a greater sense of personal control might be expected to be associated with greater use of adaptive and active coping strategies. Although Rotter and Bandura's theories are similar, Bandura's theory places more emphasis on the outcomes that may result from an individual's perception of personal control. More recently, locus of control has been explained as: "one's attempts to control their personal environment are influenced by internal and external factors; more specifically, the extent to which an individual believes that events within their personal environment are under their own control or are controlled by external circumstances" (Williams, Golding, Phillips, & Towell, 2004, p.1682). This recent definition appears to reflect Rotter's theory of perceived control over environmental factors in relation to external and internal appraisals. Although coping strategies are not mentioned in this modern definition of locus of control, there has been much emphasis on locus of control and subsequent outcomes as a result of coping strategies.

Health Locus of Control

The fundamental concept of locus of control has been more specifically applied to health. The concept of health locus of control was derived from elements of Rotter's and Bandura's social learning theories. Wallston (1992) asserted that an individual's perception of control regarding their health is a major determinant of his or her health-related behavior and the outcome of illness. Wallston also explained that according to social learning theory, locus of control is a generalized expectancy. In other words, locus of control is generalized across situations, and therefore, more like a trait rather than a state. Wu, Tang, and Kwok (2004) explained that, according to this theory, internal health locus of control refers to people's beliefs that their own behaviors exert influences on their overall health status, whereas an external health locus of control refers to people's beliefs that health outcomes are dependent on other people's behaviors or chance variables, such as luck or fate.

When examining the literature on health locus of control, an internal locus of control has been found to be more adaptive in terms of subsequent health behavior and overall health status. Wallston and Wallston (1978) conducted a review of several health-related issues, such as smoking, contraception use, weight loss, and sick role behaviors. Overall, the results revealed that in the context of health locus of control, individuals with an internal orientation showed fewer sick-role behaviors, such as less use of analgesics following surgery. Furthermore, an internal locus of control was associated with greater preventative health behaviors, such as seatbelt use and contraception use, and individuals having an internal locus of control were more likely to successfully modify poor health behaviors, such as smoking, when compared to individuals with an external locus of control. Harkappa, Jarvihoski, Mellin, Hurri, and Luoma (1991) examined health locus of control among 459 patients with chronic or recurrent low back pain and found that a stronger internal locus of control was associated with a decrease in disability and higher exercise frequency. A stronger belief in external locus of control, particularly powerful others, was associated with lower frequency of exercise.

The majority of past studies suggest that an external locus of control is associated with more maladaptive health outcomes (Crisson & Keefe, 1988; Harkappa et al., 1991; Pastor et al., 1993; Williams et al., 2004). Seligman (1992) argued that the negative mental health implications of external health locus of control beliefs may be related to people's feelings of hopelessness and helplessness when they perceive events as beyond their control. However, Wallston and Wallston (1978) noted that despite the surmounting evidence that an internal locus of control regarding health results in more positive behaviors, there is some contradictory evidence suggesting that, in some cases, an external locus of control may not necessarily be maladaptive. Wallston and Wallston suggested that if interventions are tailored to an individual's particular locus of control orientation, the outcomes may not necessarily be maladaptive, even if an individual endorses an external locus of control. For example, Wallston, Wallston, Kaplan, and Maides (1976) used treatment protocols for weight reduction that matched an individual's locus of control orientation. More specifically, individuals endorsing an internal locus of control were enrolled in a weight loss group that was independent and self-regulated, whereas individuals endorsing an external locus of control relied more on expert opinions or support from others. They found that those individuals with an external locus of control lost more weight in the externally-oriented group program, while those with an internal locus of control lost more weight in an internally-oriented group program. Furthermore, participants who were matched to their locus of control expressed greater satisfaction with the program. These findings suggest that an external health locus of control may not necessarily be maladaptive as long as an individual's locus of control orientation is taken into account, and treatment is tailored to their orientation. However, the majority of the existing literature appears to support that an external locus of control is associated with maladaptive coping strategies (Crisson & Keefe, 1998; Williams & Keefe, 1991) and poor health outcomes (Arraras, Wright, Jusue, Tejedor, & Calvo, 2002; Pastor et al, 1993; Toomey et al., 1991).

Pain Locus of Control

Concepts of locus of control and health locus of control have been more recently applied to the experience of chronic pain. Essentially, the concept of pain locus of control is a modification of the general concept of health locus of control, applied specifically to the pain experience. Pain locus of control refers to the beliefs or expectancies that the patient holds about their ability or available resources to alter their pain. In particular, pain locus of control is manifested by internal and external beliefs. Patients with chronic pain who have an internal locus of control perceive their own efforts to affect the future course of their pain. An individual with an internal locus of control orientation might assert that the behaviors he or she engages in will control the intensity of their pain. Individuals with chronic pain who employ an external locus of control perceive a lack of a relationship between their behavior and their ability to minimize or tolerate their pain.

To better illustrate the difference between chronic pain and internal locus of control, consider two individuals with chronic pain whose pain begins to worsen. An individual with an internal locus of control would hold that they can engage in behaviors to reduce the pain. On the other hand, the individual with the external locus of control orientation would assert that there is nothing to be done about the worsening pain and they must let the pain run its course. It is apparent that the individual with an internal locus of control perceives more control over the situation and subsequently the outcome of the increase in pain, whereas the individual holding the external locus of control makes few if any active attempts to alleviate his or her pain.

It is important not to confuse locus of control with a similar construct, perceived control. Although they are similar, perceived control refers to "the belief that one has at one's disposal, a response that can influence the aversive event" (Thompson, 1981, p. 90). In other words, the individual believes that they have the capacity and resources in their environment to reduce negative outcomes. As described by Williams et al. (2004), perceived control can be a behavioral response or a cognitive strategy. Furthermore, the control need not be provided, but simply needs to be perceived as available. Wallston (1992) explained that locus of control is merely a subset of perceived control. Perceived control appears to be the perception that modes of control are available, whereas locus of control refers to the source of the modes of control. These modes of control can be within the individual's control (internal) or outside of the individual's control (external). Tan, Jensen, Robinson-Whelen, Thornby, and Monga (2002) have more recently proposed that pain locus of control is a multidimensional construct. They conducted an exploratory factor analysis on a questionnaire that was comprised of multiple measures of control appraisals and identified six factors that contribute to locus of control. The following factors were labeled as: Control over effects of pain, Control over life, Active pain control, Lack of pain control, Control over pain, and Pain control without additional medication.

Pain Locus of Control and Outcomes

It has been proposed that locus of control is associated with pain coping strategies that individuals utilize to alleviate their pain and minimize negative pain outcomes. Pain outcomes that have been examined in the chronic pain literature include pain intensity, perceived disability, and psychological adjustment, among others. It is widely accepted that there is a link between locus of control, pain coping strategies, and pain outcomes. However, there is debate with respect to the directionality of the relationship between these variables, which is likely due to the cross-sectional and correlational nature of the majority of past studies. Some research has proposed that coping strategies mediate the pain experience. For example, locus of control leads to subsequent coping strategies that can be adaptive or maladaptive in nature. These coping strategies lead to subsequent pain outcomes (Arraras et al., 2002; Crisson & Keefe, 1988). Thus, coping would be the mediator. However, research has also suggested that the directionality of variables differs in that coping strategies lead to perceptions of control over pain and subsequently pain outcomes (Haythornwaite, Menefee, Heinberg, & Clark, 1998; Toomey et al., 1991). For example, Haythornwaite et al. (1998) found that utilizing specific active coping strategies, such as coping self-statements and reinterpreting pain sensations, were predictive of greater perceived control over pain. Furthermore, Haythorntwaite et al. suggested that greater flexibility in the use of available coping strategies is associated with greater perceived control over pain. Maladaptive strategies are, by comparison, associated with lower perceptions of control over pain. Arraras et al. (2002) suggested that the relationship is cyclical, or bi-directional. The authors provided the following example to illustrate their point. Anxiety and depression lead to avoidant or passive coping styles, which leads to lower internal locus of control orientations. Avoidant or passive coping styles can also lead to a lower internal locus of control which contributes to affective difficulties. Thus, it is apparent that these variables are closely linked, but the directionality of the relationships is in question.

Locus of control orientation has been found to be associated with particular coping strategies (Arraras et al., 2002; Crisson & Keefe, 1988; Haythornwaite et al., 1998; Schermelleh-Engel, Eifert, Moosbrugger, & Frank, 1997). Numerous studies have identified a link between external locus of control and maladaptive coping strategies, which many suggest are related to poor pain outcomes (Arraras et al., 2002; Crisson & Keefe, 1988; Haythornwaite et al., 1998; Schermelleh-Engel et al., 1997). However, an internal locus of control has been found to be associated with utilization of active coping strategies to manage pain, which has been found to be related to more positive pain outcomes, such as lower affective distress, lower pain intensity, and lower perceived disability (Crisson & Keefe, 1988). Further, there have been findings to support the link between performance of health behaviors and the expectancy that one has control over their pain. In adults under the age of 65, external locus of control has been found to be associated with increased pain, functional impairment, depression, and the use of more maladaptive coping strategies (Gibson & Helme, 2000). If individuals believe that the future course of their chronic pain is dependent on interventions by other people (e.g., physicians or health care providers) or due to chance factors, such as fate or luck, they tend to rely on more passive and maladaptive pain coping strategies, which results in poor pain outcomes.

Regarding pain intensity, internal and external locus of control have been found to have profound effects on the level of pain intensity reported by patients with chronic pain (Pellino, 1998). More specifically, several studies have found that patients who endorse an internal locus of control report less pain intensity than those with an external locus of control (Bachiocco, 1993; Giorgino et al., 1994; Pastor et al., 1993; Tennen, Affleck, Urrows, Higgins, & Mendola, 1992). Similarly, an external locus of control has been found to be linked with reports of increased pain intensity (Schermelleh-Engel et al., 1997). Experimental pain research also suggests that perceived control plays a vital role in reported pain intensity. For example, Williams et al. (2004) randomly assigned 61 pain-free volunteers, ages 19 to 50, to one of three conditions involving pressure pain: information and control (I +C), information and no control (I-NC), and no information and no control (NI-NC). All participants experienced two trials of a painful stimulus. Baseline measures of pressure pain threshold were taken for all participants as well as pain ratings using a visual analog scale. In addition, all participants completed a measure of locus of control and were asked to compare the two pain experiences using a five-point rating scale. All participants were read the briefing that corresponded with their particular condition and subjected to a second pain stimulus that was identical to their baseline measure. Participants in the information condition received specific information about the procedure. The participants in the control situation were instructed to halt the experiment at any point during the second trial, whereas the participants in the no-control group were told that there was no point in halting the experimenter because the pressure pain threshold the participant previously identified would be automatically applied. Results revealed that individuals who perceived less control over the situation rated the second stimulus as significantly more painful than the first although they were identical. Individuals who were in the control group rated the second trial as identical to the first, whereas participants in the I-NC group rated the second trial as more painful than the first. Furthermore, there was a trend towards participants with an internal locus of control giving lower pain ratings for the second trial. Overall, results revealed that a greater reliance on an internal locus of control was associated with lower pain ratings, and a greater reliance on an external locus of control was associated with higher pain ratings.

Disability from pain, whether real or perceived, has been found to have a profound impact on patients' well-being and medical care utilization. Jensen and Karoly (1992b) found that in a group of patients with chronic pain, those who believed themselves to be disabled by their pain demonstrated significantly lower levels of activity and psychological well-being, and higher levels of professional healthcare utilization. The authors suggest that those who perceive themselves as more disabled by their pain are those who feel helpless about their condition. Regarding pain beliefs and disability, Woby, Watson, Roach, and Urmston (2004) found that increased perceptions of control over pain were uniquely related to reductions in disability, even after controlling for reductions in pain intensity, age, and sex. Regarding the distinction between internal and external orientations and their relationship with perceived disability, Pastor et al. (1993) found that in a sample of 137 outpatients diagnosed with rheumatoid arthritis, patients endorsing an internal locus of control showed less disability in upper and lower extremity function. In contrast, they found that participants who endorsed an external locus of control or belief in fate reported more perceived disability in lower extremity function. In a related vein, Vallerand, Hasenau, Templin, and Collins-Bohler (2005) conducted a cross-sectional study with 281 patients with cancer-related pain where pain intensity, pain related distress, functional status, and perceived control over pain were measured. Results revealed that patients with the perception of control over their pain reported less pain related distress and less perceived functional impairment when compared to participants who had less perceived control over pain.

Many studies have offered support that locus of control is an important factor when considering psychological adjustment to pain. Crisson and Keefe (1988) assessed 62 patients with chronic pain under the age of 65 who presented to a multidisciplinary pain program in order to examine the relationship between health locus of control and psychological distress. The authors found that a chance locus of control was significantly and positively related to psychological distress as measured by the SCL-90. More specifically, after controlling for pain severity, individuals who endorsed an external locus of control were found to report multiple symptoms of depression and anxiety and higher levels of overall psychological distress when compared to participants who endorsed an internal locus of control. More recent studies have confirmed that individuals who endorse a more external locus of control over their pain tend to endorse greater anxiety and depressive symptoms (Scharloo et al., 1999; Schermelleh-Engel et al., 1997). By contrast, Gibson and Helme (2000) examined 169 patients above the age of 65 and found that a high internal pain locus of control was related to lower levels of depression. Similarly, Ulmer (1997) found that among a sample of 32 patients in a burn treatment center, those who reported greater control over their pain endorsed fewer depressive symptoms when compared to patients who reported less perceived control over their pain. Thus, the literature strongly supports a relationship between pain locus of control and affective distress. More specifically, an external locus of control has repeatedly been found to be associated with many forms of psychological distress, whereas an internal locus of control is associated with less distress.

Chronic Pain and Aging

Despite a vast literature on the chronic pain experience, studies have largely failed to address age differences. The majority of the current literature focuses on adults under 65 years of age. This is a striking gap in the literature, considering the growing aging population in the United States. According to the United States Census data obtained from the *65+ in the United States: 2005* report that was commissioned by the National Institute on Aging (NIA), the United States population age 65 and over is expected to double in size within the next 25 years. By 2030, almost one out of five Americans, some 72 million people, will be 65 years or older. Furthermore, the age group 85 and older is now the fastest growing segment of the United States population (United States Census, 2005).

More specifically related to chronic pain, approximately 70-80% of older people have at least one chronic health problem that is likely to be associated with chronic pain (Melding, 1995). It is striking that despite chronic pain affecting such a large segment of the older population, the majority of past studies utilize younger samples. Corran and Melita (1998) reported that older individuals represent only 7-10 % of pain clinic patients, and due to their comparatively lower numbers in pain clinics, they are underrepresented in research studies and treatment outcome studies. The authors suggested that the lower representation of older individuals in pain clinics is likely a result of fewer referrals from health care providers due to the belief that pain is a normal part of aging. Some reviews suggest that the experience of persistent pain may become more prevalent and disabling with advancing age (Gibson & Helme, 2000). The pain experience in older adults is also thought to be a risk factor for suicide. Individuals 65 years and older commit suicide at higher rates than any other age group in the United States (Blazer, Bachar, & Manton, 1986). This finding is especially important to consider when attempting to understand the chronic pain experience in older adults because there have been findings to suggest that older individuals with debilitating illness, particularly illnesses related to pain, are at greater risk for suicide (Melding, 1995).

The literature also suggests that aging may be associated with greater expectations of pain, more pain sites, and greater interference of pain in daily activities (Gibson, Katz, & Corran, 1994; Harkins, Davis, Bush, & Kasberger, 1996). However, others suggest that frequency of pain complaints may peak in mid-life and decline thereafter (Gagliese & Melzack, 1997; 1999). These findings can likely be attributed to the fact that certain pain-related medical difficulties do, in fact, peak in mid-life and decline thereafter. For example, Gibson and Helme (1995) explained that the prevalence of knee and hip pain nearly doubles in elderly adults above the age of 65 when compared to young adult samples. On the other hand, the prevalence of headaches shows a dramatic decrease with increasing age, peaking in prevalence at 45-50 years of age. The frequency of facial, dental, and abdominal pain also appears to decrease as age increases. The prevalence of chest pain may peak during late middle age and then reduce during the later portions of the lifespan. Findings appear to be more varied in the prevalence of back pain (Gibson & Helme, 1995).

There also seems to be mixed findings on whether older individuals experience greater pain severity when compared to younger individuals. Some studies suggest that older individuals do report more pain severity when compared to younger individuals. Yates et al. (2002) sought to examine the attitudes regarding effective pain management in a sample of 113 oncology patients, 52 of whom were over the age of 61. Findings suggested no age-related differences in the prevalence of pain, but there were significant age differences in reported pain severity, with those older than 60 years reporting greater pain severity. Findings also revealed a trend that older patients were more likely to agree that pain was organic or physiological and were more willing to tolerate pain as compared to the patients under 60 years of age. Other studies suggest there are no age-related differences in the experience of pain severity (Green, Ndao-Brumblay, Nagrant, Baker, & Rothman, 2004). Although there may not be age-related differences in the experience of pain severity, there may be age-related differences in the reporting and presentation of chronic pain.

Pain Presentations

Several studies describe pain presentations that are specific to older individuals. For example, Corran, Farrell, Helme, and Gibson (1997) sought to explore the idiosyncratic presentations of pain based on age among 340 participants ages 17 to 93 from a multidisciplinary pain clinic. Participants were divided into two groups, age 65 or younger and ages 66 or older. Participants completed various questionnaires that assessed the participants' pain experience, pain beliefs, and symptoms of depression. The authors identified three clusters in both the younger and older cohorts. Twenty percent of the younger and 25% of the older individuals endorsed 'positive adaptation to pain.' This cluster was categorized by high levels of pain, but low levels of depression and functional impact. The 'chronic pain syndrome' cluster was comprised of 23% of the younger participants and 0% of the older participants, and was characterized by high levels of pain, depression, and impact. Fifty-seven percent of the younger and 50% of the older participants were classified into the 'good pain control' cluster, which was characterized by lower pain severity, lower functional impairment, and fewer symptoms of depression. Interestingly, the authors identified a 'high impact' cluster that was apparent only within the older participants and included 25% of the older sample. This cluster was characterized by low levels of pain, but high levels of functional impact and relatively high levels of depression. The authors suggest that the multiple disease sites in advancing age may modify the presentation of pain. They also suggested that potential age differences in coping and attribution style result in idiosyncratic pain presentations in older adults. Overall, it appears that the existing literature infers that older individuals present with lower perceived pain. However, even pain of mild intensity can result in a significant impact on affective well-being and physical functioning in older adults. Furthermore, older individuals may present with a unique profile of pain symptoms that are not typically identified in younger and middle aged individuals with chronic pain.

There have been other studies that have suggested an idiosyncratic pain presentation in older adults. Cook and Chastain (2001) identified significant differences in clinical presentations across age and sex groups. They identified several presentations of pain in their sample of 374 chronic pain patients by using a measure of pain intensity, a measure of perceived disability, and a symptom checklist for affective distress. It is important to note the age distribution in the sample was highly skewed, given that 300 of the participants were ages 13-59 and only 74 participants were ages 60-89. A ‘good control group’ was identified in both younger and older participants and was associated with lower pain intensity, perceived disability, and affective distress compared to the other clusters identified. Interestingly, the older participants reported less affective distress and pain of longer duration, thus comprising the ‘stoic-prolonged’ group. The stoic presentation was found only in the older participants and was associated with disproportionately low levels of affective distress, even beyond the low levels reported by the ‘good control’ group. The authors offered stoicism as a potential contributor to increased pain tolerance among older adults.

Green et al. (2004) assessed pain severity, depressive symptoms, and perceived pain interference in physical and social functioning among 2975 participants ages 18-91 experiencing chronic pain and presenting to a multidisciplinary pain center. The authors’ identified three clusters of pain presentation. Cluster I was characterized by high pain severity, depression, and disability. Cluster II was characterized by lower pain severity, depression, and disability. Cluster III was characterized by moderate pain and depression and high disability. In Cluster I age was significantly associated with pain severity and depression but not with disability. Within Cluster I people 60 years or older were more likely to report lower pain and lower depression than people younger than 60. Thus, although Cluster I was characterized by high levels of pain severity, depression, and disability, older individuals were reporting comparatively lower levels of these factors than individuals under 60. Initially in Cluster II, age, gender, and pain duration were not significantly associated with pain severity, depression, or disability. However, after adjusting for possible confounds, such as pain duration, results revealed that people 60 years or older experienced less disability than people younger than 60 years. In Cluster III age was significantly associated with pain severity and depression in that people 60 years or older were more likely to have lower pain, lower depression, and higher disability than those under 60. These results were markedly different from previous studies. Overall, the studies examining pain presentations in older individuals demonstrate that there are idiosyncratic pain experiences in the aging population and there is a need to gain a better understanding of the pain experience in older populations. These pain presentations suggest age differences in the outcomes of the pain experience and are related to discrepant pain outcomes among younger and older individuals. However, it is important to question the ability to generalize these findings to older individuals due to several methodological issues. According to Corran and Melita (1998) older individuals represent only 7- 10% of pain clinic patients. The above mentioned studies examining differences in pain presentations used older individuals from multidisciplinary pain centers. Thus, the participants in these studies may not be representative of the general population of older individuals who experience chronic pain.

Cognitive Factors of Pain and Aging

Just as in younger adults, psychosocial factors have also been found to be a vital component in the experience of chronic pain among older adults. More specifically, studies have revealed that the existing knowledge on cognitive variables in the experience of chronic pain is applicable to older populations (Bishop, Ferraro, & Borowiak, 2001; Turner, Ersek, & Kemp, 2005). As previously mentioned, the attribution an individual makes about their pain has a profound impact on how they will respond to their pain. There are findings to suggest that older individuals, their friends and family members, and their health care providers often make the age attribution (Melding, 1995). The age attribution is the belief that pain is an expected part of the aging process. Research has shown that many older individuals attribute mild pain symptoms as part of the normal aging process (Leventhal & Prohaska, 1986; Prohaska et al., 1985). For example, Yates et al. (1995) sought to investigate the views held by elderly people living in long-term residential care settings regarding pain and pain management. Results suggest that most of the participants were prepared to accept their pain. Furthermore, they appeared to be ambivalent about the benefit of any action for reducing their pain and were reluctant to express and report their pain. It is important to note that the study used interviews with only 50 participants, and there were no standardized questionnaires used in the study. However, Yates et al. revealed that there appear to be many misconceptions about pain that need to be alleviated for older individuals. If older individuals believe that pain accompanies aging, they will be less likely to attempt to alleviate pain or report their pain to others. These factors may result in older individuals perceiving little or no control over their pain. However, despite their low perceived control over pain, the participants in this study showed a trend towards acceptance and tolerance of pain. This finding of acceptance and tolerance of pain is striking in that it suggests that the older individuals may perceive less control over their pain, but do not necessarily feel helpless. Numerous studies have found that helplessness in regard to pain is a maladaptive belief, whereas acceptance of pain leads to adaptive coping (McCracken, 1998; McCracken, Vowles, & Eccleston, 2004; Rankin & Holttum, 2003; Samwel, Evers, Crul, & Kraaimaat, 2006).

Locus of Control

Pain locus of control also appears to play a role in the interplay between the experience of pain and pain outcomes in the older population, but there appear to be marked differences in the type of pain locus of control endorsed between younger and older adults. First, findings suggest that older individuals may endorse a more external locus of control than younger adults. Gibson and Helme (2000) found significant differences in older individuals with chronic pain when compared to younger participants with chronic pain in chance locus and a strong trend for higher scores on powerful others locus in a subset of older adults, but no age difference in Internal Locus of Control. The 81+ age group displayed significantly higher scores on chance locus than all other groups. In a study examining the reliability of the Pain Locus of Control Questionnaire (PLOC) with older individuals with chronic pain, Gibson and Schroder (2001) found a significant shift towards a more external locus of control with advancing age. One limitation of Gibson and Schroder's study is that it did not address the impact of these age differences on pain outcomes.

Despite the evidence for a more external locus of control in older individuals, there are mixed results as to whether older individuals perceive more or less control over their pain when compared to younger individuals. Some studies suggest that older individuals perceive a greater degree of control over their pain even while maintaining an external locus orientation (Lachapelle & Hadjistavropoulos, 2005). The finding that older individuals endorse an external locus of control, yet perceive control over pain, may be attributed to the fact that participants in this study were gathered from a variety of community organizations and treatment facilities that helped individuals cope with chronic pain. Thus, the individuals recruited to participate in this study may have already received extensive assistance in coping with chronic pain. These findings appear to be related to Wallston and Wallston's (1978) finding that external locus of control may not necessarily be maladaptive if the intervention is tailored to an individual's locus of control. Another potential explanation of Lachapelle and Hadjistavropoulos's (2005) findings is that external locus of control, even without an intervention, may not necessarily be maladaptive for older individuals as has been found with younger individuals.

There have been findings to support the idea that an external orientation may not necessarily lead to maladaptive outcomes in older adults. Blanchard-Fields and Irion (1988) examined the moderating effects of age between locus of control and coping strategies. Results of the study were inconsistent with more recent literature in that the authors found that younger participants endorsed more of an external locus of control when compared to older individuals. However, the authors found striking differences when comparing younger and older individuals who endorsed an external locus of control, particularly the endorsement of the influence of powerful others. Results revealed that those older adults who endorsed a belief in the control of other people over life circumstances, endorsed more planful and effective problem-solving techniques and more self-controlling mechanisms. The belief in the control of other people was negatively related to these strategies in younger age groups. The authors suggested that older adults may operate under the realization that life's circumstances are under the control of powerful others, but they are still willing to exert a high degree of instrumental effort to attempt to resolve stressful situations. This is consistent with the literature that suggests that older individuals may endorse a more external locus of control but do not necessarily perceive themselves to have less control over their pain when compared to younger individuals (Lachapelle & Hadjistavropoulous, 2005). The results of the study suggest that different outcomes result from the endorsement of an external locus of control depending on the age of the participant.

Pain Outcomes

The literature suggests that there are striking differences in pain outcomes when comparing younger and older adults with chronic pain. For instance, Corran et al. (1997) found that a significant percentage of their older sample endorsed lower levels of pain, yet had significant functional impairment and increased levels of depression. This presentation was only identified in older participants. Cook and Chastain (2001) identified a stoic presentation that was unique to the older participants in which they experienced pain of longer duration yet reported lower affective distress. In addition, Green et al. (2004) found participants older than 60 years reported less pain severity, lower depression, and lower perceived disability when compared to younger participants. Thus, the current literature on pain outcomes appears to suggest that there are differences in pain outcomes when comparing younger and older individuals, but there does not appear to be a consistent trend identified.

Regarding pain outcomes and locus of control, findings suggest that older individuals tend to endorse a more external locus of control, but do not rate their pain as being more severe or their lives as any more disabled as a consequence of their pain. (Gibson & Helme, 2000; Sorkin, Rudy, Hanlon, & Turk, 1990; Yates et al., 1995). These findings are contradictory to the pain literature conducted with younger participants in that an external locus of control in younger individuals appears to be associated with greater perceived disability and greater pain severity. Thus, it appears that the endorsement of an external locus of control in older individuals may not necessarily be associated with poor pain outcomes.

Description of the Study

Due to the limited amount of literature on locus of control in older individuals with chronic pain, the present investigation evaluated whether age impacts pain locus of control among individuals with chronic pain. Additionally, the present investigation sought to identify whether pain locus of control is associated with pain outcomes in the same manner for younger and older individuals. More specifically, given that there are preliminary findings to suggest that an external locus of control may lead to different outcomes for older individuals when compared to younger individuals with chronic pain, the study examined whether there is a difference in pain outcomes in younger and older individuals who endorsed an external locus of control.

Hypotheses

Based on past research, the following hypotheses were made: (1) Older individuals with chronic pain would endorse higher levels of external locus of control when compared to younger individuals, as defined by their endorsement on the both the Powerful Others and Chance factors of external locus of control, (2) age would moderate the relationship between locus of control and pain outcomes, such that for younger adults, the endorsement of an external locus of control would be associated with poorer health outcomes in the areas of pain severity, perceived disability, and affective distress and for older adults, endorsing an external locus of control would not be significantly related to pain outcomes.

CHAPTER 2

METHOD

Design

A correlational design was used in which participants were recruited on a volunteer basis from a pain rehabilitation center, a pain center, and two primary care facilities. Pain locus of control was one of the primary predictor variables and was analyzed based on the Internal, Chance, and Powerful Others subscale scores on the Pain Locus of Control Questionnaire (PLOC). Age was another primary predictor variable and was analyzed as a continuous variable based on participant self report. Age was also examined as a possible moderator of the relationship between locus of control and pain outcomes. The dependent variables were pain outcomes. Pain outcomes were measured using the West Haven-Yale Multidimensional Pain Inventory (WHYMPI) and consisted of four measures of pain outcomes including pain interference, pain severity, perceived life control, and affective distress.

Power Analysis

A power analysis was conducted in order to determine appropriate sample size for a correlational design using age as a continuous variable. A small to medium effect size was assumed. This range of effect sizes has been repeatedly found in the literature on relationships among age, pain locus of control, pain severity, pain interference, and affective distress. For example, Gibson and Helme (2000) found small to medium effect sizes (.06- .3) for relationships between the different facets of pain locus of control (i.e., Chance, Powerful Others, Internal Control) and age. Furthermore, several studies have identified small effect sizes (.05-.21) for the relationship between the facets of pain locus of control and pain severity (Gibson & Helme, 2000; Pellino, 1998). Regarding the relationship between pain locus of control and affective distress, small to medium effect sizes (.08-.41) are also frequently found in the literature (Crisson & Keefe, 1988; Pastor et al., 1993). Finally, regarding pain locus of control and pain interference, medium to large effect sizes (.27- .53) have been identified (Haythornwaite et al., 1998; Pastor et al., 1993). Considering the variability in the literature on the size of effects for these variables, and the observation that the literature appears to support a trend towards medium effect sizes, the present study assumed a small to medium effect size.

Consistent with convention that allows for minimizing both type I and type II errors, alpha was set at .05 and power was set at β=.80. Based on these criteria, power analysis revealed that a sample size of approximately 67 participants was needed to detect a medium effect size and 481 participants would be needed to detect a small effect on a test of multiple correlations with two independent variables and the pain outcome variables of interest (Cohen, 1992). The study also needed to have enough power to examine moderators. As recruiting over 400 participants would take a very lengthy period of time, it was decided to recruit approximately 200 participants.

Participants

A total of 233 individuals with chronic pain participated in the study. Of those, seventeen did not meet the pain duration requirement of six months, three did not meet the age requirement of 18 years of age, and twelve provided grossly incomplete questionnaires resulting in insufficient data to complete analysis. Of the remaining 201 participants, twenty three were excluded from analyses due to failure to report duration of pain, thus making it impossible to determine if they met the pain duration requirement for the study. Thus, 178 participants were included for analyses. Table 1 provides information about the basic demographic characteristics of the sample. The majority of participants were female and Caucasian and approximately half reported a high school (or GED) education. Also, the majority of participants were unemployed (64.6%) and a majority of participants were under the age of 65, with only 30 participants being above the age of 65.

Participants were initially recruited when they initiated intent for treatment or were referred to the multidisciplinary pain center or the pain rehabilitation program at Miami Valley Hospital in Dayton, Ohio. Medical pain management is the focus of the pain center (e.g., injection therapies, nerve blocks, nerve stimulation, and medications). It was expected that an ample population of older individuals would be in attendance at the pain center based on staff report. The pain rehabilitation center requires the presence of rehabilitation potential for patients. Further, most insurance guidelines require patients to fail pure medical management techniques in order to receive a referral to the rehabilitation program. Although treatment in the rehabilitation program catered to vocational and home/daily living rehabilitation, the majority of referrals are for vocational rehabilitation purposes. The pain rehabilitation participants were potentially younger and with more severe pain.

Initial recruitment was done through an invitation letter included in the routine paperwork mailed by both programs. Potential participants were instructed to return the completed research packet included in the routine paperwork at their initial appointment. This initial procedure yielded few participants, so an advertisement was placed in the waiting room and exam room of the offices in the hospital. An incentive for a drawing for a monetary award was also offered. However, due to lack of staff motivation to participate in the study, minimal participants were recruited. Only 28 participants were recruited from the MVH locations with 6.2% from the rehabilitation center and 9.6% from the pain center. Efforts were then made to recruit participants in the waiting room of two primary care facilities in the Terre Haute area via advertisement and personal invitation from the principal investigator. These locations were considered rural compared to the urban, Dayton population. This procedure was fruitful due to the principal investigator's personal involvement and staff and facility support of the study. Thus, the majority (56.7%) of participants were recruited from the Union Hospital primary care facility, 27.5% were recruited from the Clay City Center for Family Medicine, 9.6% were recruited from the Miami Valley Pain Center, and 6.2% of participants were recruited from the Miami Valley Pain Rehabilitation Program. Thus, the majority of participants were recruited from a rural, general medicine treatment sites. Due to the variability in sites, a portion of analyses were focused on examining differences among the recruitment sites in age, pain characteristics, locus of control, and pain outcomes.

Table 1

Demographic Characteristics of Patients with Chronic Pain

Demographic	*n*	%

Male	47	26.4
Female	131	73.6
Race/Ethnicity		
Caucasian	145	81.5
African-American	13	7.3
Hispanic	2	1.1
Native American	7	3.9
Bi-racial	3	1.7
Other	2	1.1
Level of Education		
Less than High School	22	12.4
High School or GED	88	49.4
College or Beyond	68	38.2
Marital Status		
Single	39	21.9
Married	87	48.9
Divorced	41	23.0
Separated	2	1.1
Widowed	8	4.5

(*n*=178)

In order to be involved in the study, participants were required to report pain duration of at least six months. This criterion was necessary as chronic pain, by definition, must persist for at least six months. Those experiencing acute pain, classified by duration of less than six months, were excluded from participating in the study. The other exclusion criteria was that participants must be 18 years of age or older in order to consent to participate in the study. Because it was likely that participants experiencing chronic pain would be on medications for pain management or currently involved in some type of treatment for pain, these factors were not part of the exclusion criteria. However, individuals were asked to report this information on a demographic and medical history questionnaire. Furthermore, it was necessary for participants to be fluent in English in order to participate in the study. It was assumed that individuals who were illiterate or cognitively impaired would use their own discretion in their ability to participate in the study.

Measures

Demographic/Medical Questionnaire

A demographic and medical history questionnaire developed by the researcher was used to collect basic demographic information, such as age, gender, highest level of education, race/ethnicity, and marital status. Regarding medical information, the questionnaire inquired about participants' current diagnosis, current site of pain, duration of pain, and current medications. Furthermore, the questionnaire inquired whether the pain was the result of a work-related injury and whether the participant was currently involved in litigation related to the work injury or pain problem (Appendix A).

Pain Locus of Control Questionnaire

(PLOC; Toomey et al., 1991) The PLOC is a revision of the Multidimensional Health Locus of Control Scale (MHLOC; Wallston, Wallston, & DeVellis, 1978). The questionnaire consisted of 36 items with 12 items assigned to each of the three scales: Internality, Powerful Others, and Chance (Appendix B). The Internality scale consisted of items such as "If my pain gets worse, it is my own behavior which determines how soon I will get relief," and "I am in control of relieving my pain." The Powerful Others scale consisted of items such as "Regarding relief of my pain, I can only do what my doctor tells me to do," and "My family has a lot to do with whether my pain gets worse or better." The Chance scale consisted of items such as "If it's meant to be, I will have relief from pain," and "Most things that affect my relief of pain happen to me by accident." The PLOC has been examined as a 36-item measure and as two 18 item forms. The 36-item version of the PLOC was used in the present investigation, and it has been shown to have good internal consistency (0.67-0.95) (Toomey et al., 1991). Participants were asked to rate, on a six-point Likert scale, the degree to which they agree with each of the 36 statements, with 1 being "strongly disagree" and 6 being "strongly agree." The total score of each scale was tallied and used for data analyses. The PLOC has been found to have test-retest reliability ranging from 0.88-0.95 (Main & Waddell, 1991). Furthermore, Gibson and Helme (2001) reported that the PLOC has been found to have good internal consistency with an older population ranging from 0.75 to 0.87.

West Haven-Yale Multidimensional Pain Inventory

(WHYMPI; Kerns, Turk, & Rudy, 1985). The WHYMPI was used to assess participants' perceived disability, affective distress, and pain severity (Appendix C). The WHYMPI is a 56-item measure with three sections. The first section includes items measuring the following factors: Interference, Pain Severity, Life-control, and Affective Distress. Sample items from the first section include "In general, how much does your pain interfere with your day-to-day activities," "during the past week how tense or anxious have you been," and "rate the level of your pain at the present moment." The Interference Scale assesses the level of interference in daily activities and relationships an individual experiences as a result of their pain. The Pain Severity Scale focuses on the level of pain severity an individual experiences. Higher scores indicate greater pain severity. The Life Control scale is a function of how much control the individual perceives their pain to have over their life in activities and relationships. Thus, higher scores on the subscale indicate that the individual perceives pain to have greater control over their life. Finally, the Affective Distress Scale examines the impact an individual's pain has on their mood. Higher scores indicate greater affective distress. The second section of the WHYMPI included questions regarding the individuals' perceptions of others' responses to their pain, and the final section examined the frequency in which the individual engages in daily activities. Only the first section was used for the purposes of the current study, resulting in a total of 25 items. Individuals were asked to rate the degree to which they experience the various items on a 7-point Likert type scale with 0 being the absence of the experience and 6 being the extreme range of the experience. The authors of the inventory reported that the internal consistency of the WHYMPI scales Interference, Pain Severity, Life-Control, and Affective Distress ranged from 0.72 to 0.90. Furthermore, the test-retest reliabilities of these scales over a period of two weeks ranged from 0.68 to 0.86.

Procedure

The initial procedure for the study was based on the new patient procedures of the Miami Valley pain center and rehabilitation center. New patients at the pain center routinely received a packet of information prior to their first appointment and were required to return the packet of new patient information and screening materials at their first appointment. The questionnaires for the proposed study were included in the new patient information packet. The research packet was placed at the end of the routine screening materials. Reception staff at the pain center were oriented to the research protocol by the primary investigator before data collection began, and they were instructed on how to handle the returned materials in order to ensure confidentiality of the participants. The primary investigator continuously and consistently visited the pain center and pain rehabilitation program to ensure the protocol was appropriately being carried out. The research materials began with a consent form beginning with a letter of invitation to participate in the study. A detailed description of the purpose of the study as well as any risks and benefits of participation was also included (Appendix D). The voluntary nature of participation was emphasized, and participants were told that their participation had no bearing on their approval for treatment at the pain center or pain rehabilitation program. If patients agreed to participate, they were instructed to proceed with the questionnaires provided. A coversheet was placed in front of the questionnaires instructing the participants to complete the questionnaires and place them in the envelope provided (Appendix E). Participants were instructed to seal the envelope before returning it to the pain center in order to ensure the confidentiality of their responses. Thus, the reception staff had no way of matching participants to their questionnaires. Participants had the option of completing the questionnaires in their own homes and or in the reception area. Completion time for the questionnaires was approximately 30 minutes. All participants returned the questionnaires in the sealed envelope to the reception or waiting area in the pain center or rehabilitation program from which they received services. The envelopes were placed in a designated file bin and were collected by the principal investigator periodically.

Procedures were modified four months into the study due to low response rates. Participants at the Miami Valley Pain Center were recruited via flyers in the waiting room and exam rooms (Appendix F). An incentive was also offered. Participants had the chance to enter into a drawing for a $50 Walmart gift certificate. The flyers alerted the potential participants to the incentive and instructed them to ask their nurse or the receptionist for a research packet. When they chose to participate, participants then had the opportunity to fill out the entry form for the drawing that was included with the research packet. It was apparent that the entry form was optional, and they were instructed to write their name, telephone, and mailing address on the form (see appendix G). The entry form was included with the research packets, and participants were instructed to place the entry form in the envelope before sealing it and return it to the receptionist. Individuals were only allowed to enter the drawing if they had returned a completed research packet in the sealed envelope provided. Including the entry forms in the sealed packet further protected the confidentiality of the participants by decreasing involvement of the receptionist. Further, the primary investigator ensured that the packets were complete before their names were entered into the drawing. The primary investigator separated the names from the questionnaires and placed them in a drawing box. After the drawing was completed, the remainder of the entry forms were shredded.

In addition to patients presenting at the Miami Valley Pain Center, participants were recruited from the Family Medicine Center affiliated with the Union Hospital

Health Group and the Clay City Center for Family Medicine. Flyers were placed in the exam rooms and the waiting area inviting individuals to participate (Appendix H). The flyer alerted participants to the study and the incentive, and participants were instructed to ask the receptionist or nurse for a research packet if they had chronic pain. Blank research packets were placed with the receptionist along with a designated bin for participants to return their sealed envelopes. The primary investigator was on site at the Family Medicine Center and the Clay City Center for Family Medicine several days a week to personally recruit participants for the study. The consent form was slightly modified for the new site (Appendix I). The same instruction sheet and entry form were utilized (Appendix E and G).

CHAPTER 3

RESULTS

Analysis Plan

First, descriptive statistics were performed on participants' demographic information (i.e., age, race/ethnicity, level of education, marital status, and employment status) in order to describe the samples. Age was treated as a continuous variable. Descriptive statistics were also performed on the WHYMPI and the PLOC subscales in order to explore the internal consistency of the measures. Means and standard deviations were also determined for the PLOC and WHYMPI subscales in order to compare participant's responses to previous samples, and to determine locus of control orientation and associated pain outcomes of the current sample. Descriptive statistics were obtained for pain characteristics (i.e., length of pain, total pain sites, total pain conditions, location of pain, medication use and type of medication). A series of statistics were utilized in order to make comparisons among variables in order to better understand the population of the study and identify potential confounding variables. T-tests were utilized to compare PLOC and WHYMPI subscale scores according to participant gender, medication use, and employment status. Differences between categorical variables were analyzed via chi-square analyses. A series of one-way ANOVAs were then utilized to examine differences between PLOC and WHYMPI subscales scores and the following variables: participant location, use of pain medication, and type of medication. Examination of location via one-way ANOVA was particularly important given the drastic differences among recruitment sites (e.g., rural vs. urban, general medicine vs. specialized treatment, pain rehabilitation vs. pain management). Race and marital status were not examined due to small sample size. Bivariate correlations were then examined for relationships among the PLOC and WHYMPI subscale scores and age, pain duration, and pain characteristics in order to understand the fundamental relationships between variables examined in the study.

Hypotheses were tested using a series of stepwise hierarchical regressions. Age, Internal Locus of Control, Powerful Others, and Chance were entered into the first block of the regression. Interaction variables were created for Age and PLOC subscales resulting in the following predictor variables: Age X Internal, Age X Chance, Age X Powerful Others. These interaction variables were entered into the second block of the regression to determine if the interaction terms contributed to the variance in pain outcomes above and beyond the first model.

Pain Characteristics

Table 2 provides information about the pain characteristics of the participants. Participants' pain duration was obtained by asking participants on the demographic questionnaire to indicate how many years and/or months they were in pain. It is important to mention that 146 participants were included in analyses of pain duration. In actuality, 178 participants reported pain duration, but 32 participants documented "over 6 months" pain duration or simply checked years on the demographic questionnaire rather than actually specifying the number of years. Thus, these participants met inclusion criteria

Table 2

Pain Characteristics of Participants

	n	Mean (*SD*)	Range	%
Duration of Pain (years)	146	7.6 (7.8)	0.5 – 60	
Total Pain Sites	178	3.3 (1.8)	0.0 – 9	
Total Pain Conditions	178	1.5 (1.2)	0.0 – 5	
Pain Characteristic				
Currently taking medication	125			70.2
Type of Medication				
Controller	75			42.1
Non-Controlled	35			19.7
Non-Prescription	7			3.9
Other/Cannot remember	9			5.1
Currently Employed				
Yes	62			34.8
No	115			64.6
Result of Work Related Injury				
Yes	21			11.8
No	152			85.4
Involved in lawsuit due to pain				
Yes	6			3.4
No	168			94.4

but the exact duration of pain could not be determined. Also of note, the range of pain sites and pain conditions begins at zero because some participants might report a pain site but not necessarily a pain condition, or vice versa. In addition, reporting a pain site or condition is not an inclusion criteria and some participants may not have indicated a site or condition. Participants were asked to check the pain conditions with which they had been diagnosed. Options included not knowing a diagnosis and a space for participants to provide an additional diagnosis not listed. Table 3 reviews the frequencies of various pain sites and pain conditions reported by participants.

Table 3

Pain Sites and Conditions Endorsed by Patients with Chronic Pain

Location	*n*	%
Back	129	72.5
Arn/Leg	104	58.4
Knee	87	48.9
Hip	72	40.4
Headache	62	34.8
Stomach	31	17.4
Chest	19	10.7
Feet	18	10.1
Face	12	6.7
Neck	12	6.7
Dental	9	5.1
Shoulder	8	4.5

Table 3 (continued)

Location	*n*	%
Overall Body	5	2.8
Other	4	2.2
Condition	45	25.3
Do not know	44	24.7
Migraines	40	22.5
Degenerative Disc	39	21.9
Other	34	19.1
Rheumatoid Arthritis	34	19.1
Diabetes	26	14.6
Fibromyalgia	24	13.5
Peripheral Neuropathy	19	10.7
Cancer	5	10.7

Regarding pain medication use, 70.2% of participants reported taking medication to treat their pain (Table 2). Comparisons of pain characteristics and pain medication use are summarized in Table 4. Participants who reported the use of pain medication to manage their pain endorsed significantly more pain sites than participants who reported no pain medication use. In addition, participants who reported the use of pain medication endorsed significantly more pain conditions than participants who reported no pain medication use. With regard to pain duration, there were no significant differences between participants taking pain medication and those who did not.

Table 4

Differences in Pain Medication Use and Endorsement of Pain Characteristics, PLOC, and WHYMPI Means

Characteristics/Subscale	Participants Using Pain Medications (*n=125)* Mean (*SD*)	Participants Not Using Pain Medications (*n*=52) Mean (*SD*)	*t*
Pain Duration	8.13 (07.87)	6.57 (07.61)	1.13
Total Pain Sites	3.49 (01.87)	2.71 (01.61)	2.62*
Total Pain Conditions	1.79 (01.87)	0.81 (00.84)	5.44**
PLOC			
Internal	45.28 (11.82)	46.59 (11.07)	-0.69
Chance	32.79 (11.18)	31.10 (09.73)	0.95
Powerful Others	41.04 (13.51)	33.68 (12.31)	3.39*
WHYMPI			
Interference	4.17 (00.78)	3.32 (00.86)	6.31**
Pain Severity	4.37 (01.09)	3.53 (01.29)	4.41**
Life Control	4.66 (01.11)	3.44 (01.37)	6.12**
Affective Distress	4.08 (01.23)	3.49 (01.51)	2.70**

*$p<.05$; **$p<.01$

Regarding type of medication, 42.1% of participants reported using controlled medications, 19.7% reported using non-controlled pain medications, 3.8% reported using non-prescription/over the counter pain medications, and 5.1% could not remember the medications they were taking to manage their pain (Table 2). Table 5 provides information regarding relationships between type of medication and pain characteristics. There were no significant differences in pain duration and types of medication used or between groups in regard to total pain sites and total pain conditions reported.

Table 5

Means, Standard Deviations, and Analysis of Variance (ANOVA) Results for Pain Characteristics as a Function of Type of Medication

	Controller Mean (*SD*)	Non-Controlled Mean (*SD*)	Non-Prescription Mean (*SD*)	Do Not Know Mean (*SD*)	*F*
Pain Duration	9.96 (08.65)	5.72 (05.98)	4.67 (03.09)	5.45 (06.34)	2.75
Pain Sites	3.71 (01.76)	3.20 (02.15)	3.00 (01.73)	3.78 (01.64)	0.83
Pain Conditions	1.93 (01.19)	1.60 (01.24)	1.29 (01.11)	1.67 (01.00)	1.11
PLOC					
Internal	44.62 (12.10)	46.36 (10.39)	48.57 (06.48)	43.46 (18.12)	0.42
Chance	32.35 (10.89)	32.45 (11.50)	30.13 (08.47)	39.52 (12.65)	1.29
Powerful Others	40.71 (13.63)	42.45 (12.17)	38.57 (12.21)	41.24 (17.07)	0.22
WHYMPI					
Interference	4.31 (00.67)	3.97 (00.39)	3.96 (00.46)	3.98(00.96)	2.00
Pain Severity	4.52 (00.95)	4.07 (01.32)	4.67 (00.77)	4.19 (01.36)	1.61
Life-Control	4.85 (00.98)	4.35 (01.37)	4.57 (00.53)	4.39 (01.27)	1.79
Affective Distress	4.14 (01.11)	3.87 (01.46)	4.29 (01.31)	4.44 (01.40)	1.05

Demographic Characteristics

Analyses were conducted to compare participants recruited from the four sites (Table 6) on the independent and dependent variables. A series of one-way analyses of variance (ANOVAs) revealed there were no significant differences between participants recruited from the four locations for any of the variables including age, pain characteristics, locus of control, or pain outcomes. Due to the small sample sizes in the MVH recruitment locations, the four recruitment sites were collapsed into two groups and t-tests were utilized in order to make comparisons between specialized pain treatment sites and general medicine sites. Again, there were no significant differences between the two groups regarding age, pain characteristics, locus of control, or the majority of pain outcomes. Due to the small sample sizes in each group, analyses examining marital status, race, and level of education were not conducted.

Table 7 summarizes findings for the mean comparisons between men and women for pain duration, total pain sites, and total pain conditions. Women endorsed significantly more pain conditions as compared to men. Analyses of means did not reveal any significant differences between women and men in regard to pain duration and total pain sites. A chi-square analysis revealed no significant relationships between gender and medication use: $X^2(1, n{=}177) = .03$, ns. There was also no significant relationship detected between gender and type of medication used X^2 $(1, n{=}\ 177){=}\ 2.38$, ns. There were no significant differences between men and women on PLOC and WHYMPI subscales.

Table 6

Means, Standard Deviations, and Analysis of Variance (ANOVA) Results for Pain Characteristics as a Function of Location of Treatment

	Union Hospital Mean (*SD*)	Clay City Mean (*SD*)	MVH Rehab Mean (*SD*)	MVH-Pain Mean (*SD*)	*F*
Pain Duration	7.60 (07.35)	7.13 (06.42)	7.71 (08.88)	8.54 (12.57)	1.1
Pain Sites	3.22 (01.82)	3.27 (01.78)	2.73 (01.85)	3.82 (01.98)	0.87
Pain Conditions	1.40 (01.19)	1.63 (1.20)	1.91 (01.14)	1.41 (01.12)	0.93
PLOC					
Internal	46.05 (11.16)	45.14 (11.29)	46.48 (16.21)	44.66 (12.28)	0.13
Chance	32.64 (11.22)	31.69 (10.45)	35.25 (12.96)	29.34 (06.97)	0.78
Powerful Others	39.72 (13.06)	39.16 (13.81)	32.45 (18.02)	38.04 (12.65)	0.98
WHYMPI					
Interference	3.92 (00.94)	3.85 (00.91)	4.07 (00.78)	4.20 (00.66)	0.70
Pain Severity	4.09 (01.20)	3.96 (01.27)	4.55 (02.28)	4.66 (00.92)	1.82
Life Control	4.23 (01.21)	4.20 (01.57)	4.63 (01.29)	4.84 (00.99)	1.34
Affective Distress	2.87 (00.96)	2.96 (00.94)	2.36 (01.10)	2.94 (01.06)	0.89

Table 7

Gender Differences in Pain Characteristics, Mean PLOC, and WHYMPI Scores

	Participants		
	Men (*n*=47)	Women (*n*=131)	
Characteristic/Subscale	Mean (*SD*)	Mean (*SD*)	*t*
Pain Duration	8.78 (10.09)	7.14 (06.71)	1.14
Total Pain Sites	3.06 (01.81)	3.33 (01.83)	-0.85
Total Pain Conditions	1.19 (1.12)	1.60 (01.19)	-2.06**
PLOC			
Internal	47.72 (12.17)	44.96 (11.30)	1.41
Chance	34.91 (10.71)	31.27 (10.68)	2.01*
Powerful Others	40.22 (14.27)	38.51 (13.33)	0.74
WHYMPI			
Interference	4.06 (00.94)	3.89 (00.88)	1.07
Pain Severity	4.03 (01.35)	4.17 (01.16)	-0.67
Life-Control	4.29 (01.39)	4.31 (01.29)	-0.07
Affective Distress	3.78 (01.30)	3.97 (01.37)	-0.81

*$p<.05$

Table 8 reviews findings regarding employment status. Sixty-five percent of participants reported they were not working due to their pain. Those not working as a result of pain endorsed significantly longer duration of pain than participants who were working. In addition, participants who did not work endorsed significantly more pain sites than participants who worked. Furthermore, participants who did not work reported significantly more pain conditions than participants who did work.

Table 8

Differences in Employment Status of Patiends with Chronic Pain and Their Endorsement of Pain Characteristics and PLOC and WHYMPI Subscales

	Participants		
Characteristic/Subscale	Employed (*n*=62) Mean (*SD*)	Unemployed (*n*=115) Mean (*SD*)	*t*
Pain Duration	5.85 (4.89)	8.51 (8.92)	-2.01*
Total Pain Sites	2.71 (1.63)	3.56 (1.87)	-3.01**
Total Pain Conditions	1.03 (.89)	1.76 (1.25)	-4.05**
PLOC			
Internal	46.87 (9.76)	44.94 (12.40)	1.06
Chance	30.89 (9.70)	32.97 (11.33)	-1.22
Powerful Others	37.63 (11.24)	39.66 (14.72)	-0.94
WHYMPI			
Interference	3.46 (.94)	4.18 (.76)	-5.46**
Pain Severity	3.71 (1.29)	4.35 (1.10)	-3.45**
Life-Control	3.65 (1.33)	4.65 (1.16)	-5.14**
Affective Distress	3.55 (1.52)	4.10 (1.21)	-2.61**

$^*p<.05$; $^{**}p<.01$

WHYMPI and PLOC Characteristics

The Affective Distress subscale is calculated by considering responses to the following items: “Rate your mood overall during the past week,” How much has your pain changed your relationship with your spouse, family, or significant other, and “How attentive is your spouse (significant other) to you because of your pain.” The item “how attentive is your spouse (significant other) to you because of your pain?” was accidentally omitted from the questionnaire due to misunderstanding about what items contributed to affective distress, and thus the Affective Distress scale was not calculated according to standard protocol. Rather, WHYMPI items with face validity were used to compute the Affective Distress scale. The following items from the WHYMPI inquiring about overall mood, irritability, and anxiety during the past week were used: “Rate your mood during the past week,” “During the past week how irritable have you been,” and “During the past week how tense or anxious have you been?” Only the item regarding mood over the past week is used in the standardized scoring procedure. The internal consistency for the WHYMPI subscales with the present sample ranged from .72 to .80. Cronbach’s alpha for individual scales were .72 for the Interference subscale, .72 for the Pain Severity subscale, .74 for the Life-Control subscale, and .80 for the revised Affective Distress subscale. The mean scores for the WHYMPI subscales of Interference, Pain Severity, Life Control, and Affective Distress subscales were 3.94 (*SD* =.99), 4.14 (*SD* =1.21), 4.31 (*SD* =1.31), and 3.92 (*SD* = 1.35), respectively.

There were no significant differences between men and women on their mean subscale scores for the WHYMPI (Table 7). Regarding medication use, there were significant differences between participants who used medications and those who did not on all of the subscales of the WHYMPI, with those endorsing medication use scoring significantly higher on all subscales of the WHYMPI (Table 4).

Correlational analyses for the subscales of the WHYMPI and pain characteristics are reviewed in Table 9. The Pain Severity subscale was significantly and positively correlated with pain duration ($r = .14, p < .05$). The Life-Control subscale was significantly and positively correlated with pain duration ($r = .20, p < .01$). The Affective Distress subscale was significantly and positively correlated with pain duration ($r = .15$, $p < .05$). Thus, the longer the duration of the pain experience the more debilitating impact as evidenced by increased pain severity, greater affective distress, and greater perception that pain has control over one's life. Regarding employment status, participants who did not work scored significantly higher than participants who did work on all scales of the WHYMPI (Table 7).

The internal consistency for the PLOC from the current sample ranged from .82 to .88. Individual Cronbach's alphas were .82, .83, and .88 for the Internal, Chance, and Powerful Others subscales of the PLOC, respectively. The means for the Internal, Chance, and Powerful Others subscales of the PLOC were 45.69 (*SD* = 11.56), 32.23 (*SD* = 10.78), and 38.96 (*SD* = 13.57) respectively. There were no significant differences between men and women on the Internal and Powerful Others subscale of the PLOC (see Table7). However, men endorsed a higher belief in chance on the PLOC ($M = 34.91$, $SD = 10.71$) than women ($M = 31.27$, $SD = 10.68$), $t\,(176) = 2.01, p = .046$, suggesting men endorse a more external locus of control. Regarding medication use, participants who

Table 9

Bivariate Correlations for Pain Characteristics and Questionnaire Subscales

Characteristic/Subscale	1	2	3	4	5	6	7	8	9	10
Age	--									
Pain Duration	0.10	--								
Total Pain Sites	0.06	0.27**	--							
Total Pain Conditions	0.26**	0.18*	0.46**	--						
WHYMPI-Interference	-0.03	0.25**	0.33**	0.32**	--					
WHYMPI-Pain Severity	-0.20**	0.14*	0.45**	0.23**	0.68**	--				
WHYMPI-Life Control	-0.04	0.20**	0.41**	0.31**	0.71**	0.80**	--			
WHYMPI-Affective Distress	-0.19**	0.15*	0.39**	0.20**	0.53**	0.69**	0.62**	--		
PLOC-Internal	-0.00	-0.01	0.00	0.04	0.15*	-0.13*	-0.07	-0.04	--	
PLOC-Chance	-0.06	0.04	0.13*	0.06	0.09	0.17*	0.21**	0.13	0.20	--
PLOC-Powerful Others	-0.03	-0.01	0.18**	0.16*	0.29**	0.19**	0.24**	0.22**	0.24**	0.22**

$^{*}p<.05$, $^{**}p<.01$

used pain medications endorsed significantly higher belief in powerful others (*M* = 41.04, *SD* = 13.51), suggesting a higher external locus of control when compared to participants who did not use medication to manage their pain (*M* = 33.68, *SD* = 12.31), *t* (175) = 3.39, *p* = .001(Table 4). There were no significant differences between pain medication use and non-medication use on the Internal and Chance subscales of the PLOC. Regarding employment status, there were no significant differences between participants who worked and those who did not on the PLOC subscales (Table 8).

Bivariate Correlations

Demographics

Table 9 presents bivariate correlations. Correlational analyses were conducted to determine whether there was a relationship between age and pain characteristics, locus of control as measured by the PLOC, and pain outcomes as measured by the WHYMPI. Age was not significantly correlated with pain duration or total pain sites. However, age was significantly correlated with number of total pain conditions, $r = .26, p < .01$. Regarding the relationship between age and pain locus of control, age was not significantly correlated with any of the subscales on the PLOC. Age was significantly and negatively correlated with the Pain Severity subscale ($r = -.20$, N= 176, $p < .01$) and the Affective Distress subscale ($r = -.19, p < .01$) of the WHYMPI. Age was not significantly correlated with the Interference, or Life-Control subscales of the WHYMPI. Bivariate correlational analyses revealed that pain duration was significantly and positively correlated with total pain sites ($r = .27, p < .01$) and total pain conditions ($r = .18, p < .05$).

Locus of Control and Pain Outcome

All bivariate correlations analyzing locus of control and pain outcomes are summarized in Table 9. Analyses revealed no significant correlations between PLOC subscales and pain duration. Internal locus of control was found to be significantly correlated with the Interference ($r = .15, p < .05$) and Pain Severity subscales ($r = -.13, p < .05$) of the WHYMPI. Thus, higher internal locus of control was associated with higher pain interference but lower report of pain severity. Internal locus of control was not significantly correlated with Life-Control, although the relationship was in the expected direction.

The Chance subscale of the PLOC was found to be significantly and positively correlated with total pain sites ($r = .13, p < .05$) revealing that a greater belief in chance is associated with significantly more pain sites. The Chance subscale was also positively and significantly associated with the Pain Severity subscale of the WHYMPI ($r = .17, p < .05$) and the Life Control subscale of the WHYMPI ($r = .21, p < .01$). Thus, similar to existing findings a greater belief in chance was associated with greater pain severity and greater perception that pain has control over one's life.

The endorsement of reliance on Powerful Others was significantly and positively correlated with total pain sites ($r = .18, p < .01$) and pain conditions ($r = .16, p < .05$). Powerful Others was also significantly and positively correlated with Pain Interference ($r = .29, p < .01$), Pain Severity ($r = .19, p < .01$), and perceived Life Control ($r = .24, p < .01$) as well as Chance ($r = .22, p < .01$). An unexpected finding was the positive significant correlation of reliance on Powerful Others with endorsement of an internal locus of control ($r = .24, p < .01$).

Hypotheses

A series of stepwise hierarchical regressions were conducted to test the hypotheses that older individuals with chronic pain would endorse higher levels of external locus of control when compared to younger individuals, as defined by their endorsement on the both the Powerful Others and Chance factors of external locus of control. It was also hypothesized that age would moderate the relationship between locus of control and pain outcomes, such that for younger adults, the endorsement of an external locus of control would be associated with poorer health outcomes in the areas of pain severity, perceived disability, and affective distress and for older adults, endorsing an external locus of control would not be significantly related to pain outcomes. Tables 10 through 13 review these findings. First, interaction variables between age and PLOC subscales were created in order to examine whether age was a moderator. Separate regression analyses were run for each dependent variable, including pain interference, pain severity, life control, and affective distress. Age, Internal Locus of Control, Powerful Others, and Chance were entered into the regression equations first, and the interaction terms were entered second.

When examining Pain Interference, a significant model emerged with age and the PLOC subscales accounting for 9.0% of the variance, $F(4, 171) = 4.21, p < .01$. Table 10 provides results for the predictor variables entered into the model. The only significant predictor of Pain Interference was endorsement of Powerful Others. The second step of the model resulted in non-significant change in R^2. Adding the interaction terms did not contribute significant variance in predicting pain interference. Thus, age was not a moderator between locus of control and Pain Interference.

Table 10

Regression Analysis Summary for Pain Locus of Control Subscale and Interaction Variables Predicting Pain Interference Subscale Score of the WHYMPI

Variable	*B*	*SEB*	β
Step 1			
Age	0.00	0.00	-0.03
PLOC-Internal	0.01	0.01	0.08
PLOC-Chance	0.00	0.01	0.03
PLOC-Powerful Others	0.02	0.01	0.26**
Step 2			
Age X Internal	0.00	0.00	-0.18
Age X Chance	0.00	0.00	0.08
Age X Powerful Others	0.00	0.00	-0.36

Note: $R^2 = .09$; **p* <.05, ***p*<.01; $\Delta R^2 = .01$, ns

When examining Pain Severity a significant model also emerged with age and the PLOC subscales accounting for 13% of the variance in Pain Severity, $F(4, 171) = 6.12$, $p<.01$. Table 11 provides information for the predictor variables. Age was negatively associated with Pain Severity as was internal locus of control. The belief in powerful others was positively associated with Pain Severity. The second step of the model resulted in non-significant change in R^2. The addition of the interaction terms did not contribute to significant variance in predicting pain severity. Thus, age was not a moderator in the relationship between locus of control and Pain Severity.

Table 11

Regression Analysis Summary for Pain Locus of Control Subscale and Interaction Variables Predicting Pain Severity Subscale Score of the WHYMPI

Variable	*B*	*SEB*	β
Step 1			
Age	-0.02	0.01	-0.19**
PLOC-Internal	-0.02	0.01	-0.19**
PLOC-Chance	0.02	0.01	0.14
PLOC-Powerful Others	0.02	0.01	0.20**
Step 2			
Age X Internal	0.00	0.00	-0.49
Age X Chance	0.00	0.00	0.05
Age X Powerful Others	0.00	0.00	-0.40

Note: R^2= .11; *p<.01; Δ R^2= .04, p=.05

Regarding Life-Control, a significant model also emerged with age and the PLOC subscales accounting for 11% of the variance in Life Control, $F(4, 170) = 5.10, p < .01$. Table 12 provides information for the predictor variables and interaction terms entered into the model. The belief in powerful others was significantly and positively associated with Life Control. The second step of the model did not result in a significant change in $R^{2.}$

Table 12

Regression Analysis Summary for Pain Locus of Control Subscale and Interaction Variables Predicting Life Control Subscale Score of the WHYMPI

Variable	*B*	*SEB*	β
Step 1			
Age	0.02	0.03	0.23
PLOC-Internal	0.01	0.02	0.10
PLOC-Chance	-0.04	0.03	-0.29
PLOC-Powerful Others	0.07	0.02	0.71**
Step 2			
Age X Internal	0.00	0.00	-0.40
Age X Chance	0.00	0.00	0.65
Age X Powerful Others	0.00	0.00	-0.64

Note: R^2- .11; *p<.05; **p<.01; Δ R^2= .04, p=.05

When examining Affective Distress, a significant model also emerged with age and the PLOC subscales accounting for 10% of the variable in affective distress, *F*(4, 170)= 4.66, *p*<01. Table 13 provides information for the predictor variables entered into the model. Age was significantly and negatively associated with Affective Distress and Powerful Others was significantly and positively associated with Affective Distress. The second step of the model resulted in non-significant change in R^2. Adding the interaction terms did not contribute to significant variance in predicting Affective Distress. Thus, age was not a moderator between locus of control and Pain Interference.

Table 13

Regression Analysis Summary for Pain Locus of Control Subscale and Interaction Variables Predicting Affective Distress Subscale Score of the WHYMPI

Variable	*B*	*SEB*	β
Step 1			
Age	-0.02	0.01	-0.18*
PLOC-Internal	-0.01	0.01	-0.11
PLOC-Chance	0.01	0.01	0.09
PLOC-Powerful Others	0.02	0.01	0.22**
Step 2			
Age X Internal	0.00	0.00	-0.47
Age X Chance	0.00	0.00	0.44
Age X Powerful Others	0.00	0.00	-0.23

Note: $R^2 = .10$; *p<.05; *p*<.01; Δ $R^2 = .02$, ns

CHAPTER 4

DISCUSSION

The present study examined the effect of age on the chronic pain experience, specifically in the realm of locus of control. The construct of locus of control is vital to understanding the pain process, as it is strongly related to coping strategies that individuals utilize to manage their pain. Previous research has suggested there may be age differences in locus of control orientation in regard to chronic pain. Specifically, findings suggest that older individuals may endorse a more external locus of control as compared to younger adults (Gibson & Helme, 1999). There are also findings to suggest that the general construct of locus of control may lead to different outcomes depending on age. Specifically, an external locus of control may not necessarily be associated with negative pain outcomes for older individuals (Blanchard- Fields & Irion, 1988). However, the previous literature has been inconclusive as to the nature of age differences in the chronic pain experience, and the present study is largely consistent with this pattern. For example, there are mixed findings on the presentation of pain with older individuals (Cook & Chastain, 2001; Corran, Farrell, Helme, & Gibson, 1997). Even the most recent studies assert that far more research is necessary in order to fully understand the pain experience among aging adults due to the variability in findings. Further, these inconsistencies throughout the literature make it difficult to integrate findings in a meaningful way (Gagliese, 2009). Thus, the present study sought to elucidate the relationship between locus of control and pain, and the possible moderating effects of age.

Previous literature, utilizing predominately younger adults, has suggested an internal locus of control is associated with positive pain outcomes (less pain intensity, lower perceived disability, less affective distress, less functional impairment) when compared to an external locus of control orientation. In the present study, a broad range of ages were represented in the participants. Consistent with the literature, current results showed that an internal locus of control orientation was associated with less pain severity. However, contrary to expectation, an internal locus of control orientation was found to be linked with greater pain interference. There are several explanations for this unexpected finding. First, internal locus of control is a multifaceted construct and has been suggested to be comprised of sub-factors including illness perception, illness management, self-blame, and self-mastery (Marshall, 1991). These varying components of internal locus of control have not been widely studied in the context of chronic pain. It has also been argued that internal locus of control is "necessary but not sufficient" for appropriate health behavior and subsequent health outcomes (Wallston, 1991). An individual must not only feel responsible for his or her health, but perceive him or herself as capable of carrying out the proper actions to influence health behavior. Thus, the individual must perceive control in his or her particular situation. It has been argued that an individual must not only believe his or her actions can influence his or her health status, but he or she must also believe in his or her own capacity to carry out these behaviors that will influence health outcomes. It has been proposed that locus of control is merely a subset of perceived control. Perceived control is the perception that modes of control are available, whereas locus of control refers to the source of the modes of control. These modes of control can be within the individual's control (internal) or outside of the individual's control (external) (Wallston, 1992). Therefore, an individual may endorse an internal locus of control but also may experience substantial pain interference in their life if perceived control is low. Pain locus of control was also only associated with pain severity and not Life-Control or Affective Distress. This is likely attributed to the nuances of the present sample (e.g. largely general medicine). Internal locus of control was also significantly and positively associated with a Chance locus of control orientation. Although this appears contradictory, it is widely held in the locus of control literature that the internal and external locus of control orientations are not mutually exclusive and an individual can endorse elements of each. This further supports the multifaceted nature of the construct of locus of control.

The literature has also suggested that an external locus of control is associated with more negative pain outcomes. As expected, bivariate correlations revealed that a chance locus of control orientation was associated with increased pain sites, pain severity, and the perception that pain had control over one's life. An endorsement of powerful others was associated with total pain sites, total pain conditions, increased pain interference, increased pain severity, affective distress, and increased perception that pain has control over one's life. However, when examining internal and external locus of control components in a single predictive model, only the powerful others component of external locus of control contributed significantly to the variance in negative pain outcomes.

The present study sought to determine whether there was a significant effect of age on locus of control and pain outcomes, specifically, that there would be a significant interaction of age with locus of control in predicting pain outcomes. Overall, the present study did not support this hypothesis, as there were no relationships found between age and internal or external locus of control. In addition, the hypothesis that age would moderate the relationship between an external locus of control and pain outcomes was not supported. It was hypothesized that age would be associated with younger adults, the endorsement of an external locus of control would be associated with poorer health outcomes in the areas of pain severity, perceived disability (pain interference and life-control), and affective distress and for older adults, endorsing an external locus of control would not be significantly related to pain outcomes. This was not supported, as age was not associated with an external locus of control.

There are several explanations for the lack of association between age and locus of control. It has been proposed that pain locus of control is a multidimensional construct, comprised of control over effects of pain, control over life, active pain control, lack of pain control, control over pain, and pain control without additional medication (Tan et al., 2002). Although the measures utilized in the present study are standard measures to examine pain locus of control and pain outcomes, it is possible that they are merely examining a portion of the aspects of the pain experience and locus of control due to broader limitations in the existing literature.

Further, some have asserted that perhaps the application of locus of control to the chronic pain experience strays from the originally proposed social learning theory, bringing into question the comprehensive applicability of the theory to a specific health condition, such as chronic pain. Rotter, himself, argued in a publication several years following his original proposal of social learning theory that many researchers are utilizing the Internal-External locus of control distinction in a manner without considering all of the facets of the theory, which was the conceptual basis of locus of control (Rotter, 1975). In other words, there are many other facets of social learning theory that can be applied to health behavior, and specifically to chronic pain and the pain experience, beyond locus of control. It has been argued the construct of locus of control plays a far less significant role in predicting health-directed behavior than do other constructs that impact a perception of control, such as self-efficacy, self-mastery, or perceived competency. Further, it has been asserted that health locus of control should only be utilized to predict the potential for an individual engaging in a health behavior, not necessarily the actuality of the health outcome. Another explanation for inconsistent findings is that the pain experience is a subjective and multifaceted experience that is not fully understood through the developmental lifespan. Further, there are a number of psychosocial variables introduced in the present study that may have an impact on the pain experience (e.g., rural, underserved, lower education, unemployed). It is difficult to disengage locus of control from the plethora of other variables related to the pain experience and this is a challenge of the literature base as a whole, not necessarily the present study, in and of itself.

Further, an individual's health status can influence an individual's internal health locus of control. Social learning theory asserts an individual's orientation is a product of past experiences, which would include appraisals of health status (Wallston, 1991). Therefore, for the present study, instead of stating an internal locus of control is associated with decreased pain severity, it can also be conceptualized as increased pain severity is associated with less endorsement of an internal locus of control. The average duration for the pain experience in the present study was 7.5 years, which is a significant enough period of time to impact an individual's locus of control orientation (Wallston, 1991).

Previous research regarding the association between age and pain experiences has been inconclusive. However, there were notable age differences in the pain experience identified in the present study. Although age was associated with more pain conditions than younger participants, age was not associated with pain duration or total pain sites. Perhaps the most notable findings were those related to age and pain severity. There was a relationship between age and pain severity reports in that as age increased, a decrease in pain severity was reported. Several studies suggest that older individuals report greater pain severity when compared to younger individuals (Yates et al, 2002). Results of other studies have suggested that there are no age related differences in pain severity (Green et al., 2004). Previous literature has also revealed findings that suggest older individuals are more willing to tolerate their pain when compared to younger individuals. This could be, in part, a product of the age attribution. The present study also revealed that older individuals with chronic pain endorsed less affective distress than younger participants with chronic pain. Age was not significantly associated with pain interference or the perception that pain had control over one's life. Thus, despite no age differences in pain interference and the perception that pain has control over one's life, age was associated with less pain severity and affective distress. This finding could be explained by unique characteristics of the sample as well. For instance, the majority were from general medical clinics in a rural setting.

Previous literature has asserted that pain presentations differ with age. Several potential pain presentations have been identified in the literature. The present study supports the pain presentation that Corran, Farrell, Helme, and Gibson (1997) identified among the majority of their older participants. This presentation was characterized by lower pain severity, lower functional impairment, and fewer depressive symptoms. However, this pain presentation was not unique to the older participants in their study. Cook and Chastain (2004) identified a presentation, unique to older individuals, characterized by less affective distress and pain of longer duration. Although the present study did not find that older individuals endorsed pain of longer duration, it does support previous findings of a pain presentation with less affective distress. Thus, the present study supports age differences in pain presentations and pain outcomes consistent with previous literature.

There are several other explanations for the inconsistent findings regarding age-related differences in the chronic pain experience. The subfield of pain and aging is in its infancy, and it is difficult to integrate findings across studies in a meaningful way due to methodological issues, challenges inherent to gerontological research, and actual age-related patterns in the pain presentation (Galgiese, 2009). Methodological issues include small samples sizes, use of non-standardized or problematic pain tools, failure to control for confounding variables, variability in the definition of chronic pain, and even the operational definition of "older" adults. Additionally, discrepant results may accurately reflect non-uniform age-related effects. Gagliese (2009) asserts that it is not realistic to assume that all types of pain change in a comparable fashion with age because different psychosocial and pathophysiological mechanisms may be involved. Further, pain is multidimensional and there are various biopsychosocial factors at play in the pain experience that create numerous potential interactions and outcomes. Thus, even if the outcomes do not differ in the pain experience, the processes of the pain experience may differ drastically among different age groups. This is suggested with the present study as there were no age differences in locus of control orientation or pain outcomes, but notable differences in the pain experiences and subsequent presentation.

Several specific limitations of the study are noteworthy. First, one of the outcome variables (Affective Distress) was not calculated based on standard protocol. However, the methods utilized to correct for this error proved to be a valid and reliable means to calculate the variable based on the resulting psychometric properties. Second, the study also has potentially low power, which would be corrected by addition of more participants. Due to limited amount of research conducted on pain locus of control and aging, the effect sizes in the existing literature ranged from small to medium. The sample size for this study was determined, in part, by constraints on recruiting large numbers of pain patients. It is possible that a larger sample size would have resulted in more significant findings. However, confidence can be placed in the findings that were significant, as they were found to be significant with limited power. It is also important to consider that not finding an age- related difference does not necessarily warrant the conclusion of no age-related changes in the pain experience. For example, the power may not have been large enough to detect subtle differences that may exist.

Additionally, although substantial effort was made to recruit participants of older age, only 30 participants were over the age of 65. The correlational nature of the study was thought to capture relationships between age and pain outcomes, but with a modest number of individuals truly of older age, these relationships may not have been evident. Further, there are particular challenges with gerontological research that may have impacted the findings of the present study. There are substantial recruitment challenges when examining older populations, making a representative sample difficult to obtain. Older individuals are less likely than younger people to consent to participate in research. Those that do consent may not be representative of the older population as those with the most severe pain, impaired health, or reduced quality of life are less likely to consent for participation in research. There is also a widely held belief by older individuals, their families, and even providers that pain is a normal, expected part of aging. This pervasive belief permeates healthcare and presents a significant barrier to research. Older individuals are sent the message that pain is normal and expected so they should not "complain" or be "bad patients." Such expectations will be particularly pervasive if there is a strong belief in powerful others as the previous research and the present study suggests. Thus, older individuals are less likely to report their pain or they may report it as less severe because they are taught to "tolerate" the pain that is "normal for their age." These beliefs are detrimental for patients, providers, and researchers. Another limitation of the study is the variability in recruitment locations. Participants from two pain specialty clinics and two general medical clinics were combined in analyses and there are a number of potential confounding variables and differences among sites that could be at play.

A strength of the present study is that most of the sample was recruited from two primary care settings, where individuals were not seeking specialized treatment for their chronic pain and may not have been seeking treatment for their pain at all. Previous research has identified that older individuals are underrepresented in specialty clinic settings, with older individuals represent only 7-10 % of pain clinic patients (Corran & Melita, 1998). Due to their comparatively lower numbers in pain clinics, they are underrepresented in research studies. Thus, the findings are particularly generalizable and reflect an accurate picture of what pain may look like in a general medial setting. Further, it is well-known that a number of individuals initially present for treatment to their primary care providers rather than specialists. This is particularly true in rural settings, where the majority of participants in this study were recruited.

There are a number of important considerations for future research. First, most extant studies have been cross-sectional in nature. Ideally, a longitudinal design with a substantial data collection period would be best to examine the relationship between aging and locus of control. Further, particular attention to recruiting older individuals is necessary. This would be the only way to distinguish between a cohort or generational effects or actual developmental differences in the chronic pain experience. Perhaps taking a more comprehensive approach to operationalizing locus of control in a comprehensive manner would be helpful in determining nuances of locus of control that may not have been detected in the present study. It may also be fruitful to examine the relationship between locus of control and perceived control more closely. Further research should continue examining age-related differences in the community-based setting. More specifically, implementing a study with a home-based primary care program would be most beneficial as it would capture older individuals who would otherwise not be given the opportunity to be involved with research.

There are several clinical implications based on the present study that would be helpful to consider. Perhaps the strongest clinical implication is to consider the individual when treating chronic pain and what biopsychosocial variables are present that contribute to their pain experience. Perhaps, it would be helpful to administer a locus of control measure, such as the PLOC and then discuss with the patient their beliefs about their individual pain and their conceptualization of locus of control. This would identify an individual's general orientation, but also provide the opportunity to understand the nuances of locus of control that may not be captured in the measure itself. Due to the variability in findings with regard to locus of control in the literature, particular consideration should be made when treating older individuals and discussing possible age attributions openly and providing psychoeducation on the pain experience. For example, the clinician might want to challenge counteracting the belief that pain is a normal part of the aging process and that patients should tolerate their pain without complaint. Education should also take place with providers, staff, patients, and family members as the age attribution is a belief deeply ingrained in the health care system. Perhaps when this dialogue has started, the foundation can be laid for a more thorough understanding of the pain experience for older adults. This dialogue would open the door and begin to remove barriers in gerontological research. It is imperative to understand how individuals, young or old, experience their pain in order to more effectively treat them. In addition, the endorsement of Powerful Others was a predictor of all poor pain outcomes. This could potentially be a product of the rural underserved area, and further research is warranted to determine if finding is consistent. Nonetheless, the present study suggests that education and outreach to emphasize collaboration between providers and patients is essential. The present study reveals that a belief or reliance on powerful others is detrimental to pain outcomes and this likely has a substantial impact on treatment of chronic pain.

In conclusion, the findings of the present study are consistent with the variability in the existing literature on pain and aging. Further, this research offers important considerations for the subfield of pain and aging as it demonstrates the challenges of researching older populations and suggests there are notable age differences in pain presentation. Overall, the hypotheses for age-related differences in pain locus of control were not supported. However, the failure to find age-related findings in locus of control in the present study does not necessarily mean that there are no age-related differences in locus of control and subsequent pain outcomes. It is also important to consider that locus of control is only one cognitive factor influencing the pain experience. Current results did identify age differences in pain outcomes and pain presentations. Thus, the pain experience is highly subjective and is a complex interplay between biological, psychological, and sociocultural variables, with age likely being one contributor of that complexity.

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APPENDIX A: MEDICAL AND DEMOGRAPHIC QUESITONNAIRE

Please answer the following by checking your response

Age:
    Years

Gender:
    Male
    Female

Race/Ethnicity:
    Caucasian
    African-American
    Hispanic American
    Asian American
    Native American
    Bi-racial
    Other

Highest level of education completed:
    Less than high school
    High school or GED
    College or beyond

Marital Status:
    Single
    Married
    Divorced
    Separated
    Widowed

Please answer the following questions by circling your response

Yes No I am currently taking prescription pain medication

If yes, please indicate what pain medication (s)

Yes No I am currently experiencing pain.

If yes, please check how long you have experienced this pain
- Months
- Years

If you are currently experiencing pain, please check all of the places where you are currently experiencing pain:
- Back
- Face
- Dental
- Headache
- Stomach
- Chest
- Arms or Legs
- Hip
- Knee
- Other (please specify):

If you are currently experiencing pain, please check any of the following conditions you have been diagnosed with
- Fibromyalgia
- Rheumatoid Arthritis
- Osteoarthritis
- Peripheral Neuropathy
- Diabetic Pain
- Cancer Pain
- Degenerative Disc Disease
- Migraines
- Other (please specify):
- I do not know my diagnosis/ I have not been diagnosed

Yes No I am working

Yes No My pain is a result of a work-related injury.

Yes No I am currently involved in a lawsuit related to my pain difficulty

APPENDIX B: PLOC

This is a questionnaire designed to determine the way in which different people view pain and what makes it worse or better (relieves it). Each item is a brief statement with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with the statement. The more strongly you agree with a statement, then the higher will be the number you circle. The more strongly you disagree with a statement, then the lower will be the number you circle. Please make sure that you answer every item and that you circle only one number per item. This is a measure of your personal beliefs. There are no right or wrong answers.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. If my pain gets worse, it is my own behavior which determines how soon I will get relief.	1	2	3	4	5	6
2. No matter what I do, if my pain is going to get worse, it will get worse.	1	2	3	4	5	6
3. Having regular contact with my physician is the best way for me to avoid my pain getting worse	1	2	3	4	5	6
4. Most things that affect my relief of pain happen to me by accident.	1	2	3	4	5	6
5. Whenever my pain gets worse, I should consult a medically trained professional.	1	2	3	4	5	6
6. I am in control of relieving my pain.	1	2	3	4	5	6
7. My family has a lot to do with my	1	2	3	4	5	6

pain getting worse or better.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

8. When my pain gets worse I am to blame.	1	2	3	4	5	6
9. Luck plays a big part in determining how soon my pain is relieved.	1	2	3	4	5	6
10. Health professionals control relief of pain.	1	2	3	4	5	6
11. When my pain is relieved, it is largely a matter of good fortune.	1	2	3	4	5	6
12. The main thing which affects relief of my pain is what I myself do.	1	2	3	4	5	6
13. If I take care of myself, I can relive my pain.	1	2	3	4	5	6
14. When my pain is relieved; it's usually because other people (for example, doctors, nurses, family,friends) have been taking good care of me.	1	2	3	4	5	6
15. No matter what I do, my pain is likely to get worse.	1	2	3	4	5	6
16. If it's meant to be, I will have relief from pain.	1	2	3	4	5	6
17. If I can take the right actions, I can relieve my pain.	1	2	3	4	5	6
18. Regarding relief of my pain, I can only do what my doctor tells me to do.	1	2	3	4	5	6
19. If my pain gets worse, I have the power to relieve it.	1	2	3	4	5	6
20. Often I feel that no matter what	1	2	3	4	5	6

I do, if the pain is going to get worse,
It will get worse.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

21. If I see an excellent doctor regularly, my pain is less likely to get worse.	1	2	3	4	5	6
22. It seems that relief from pain is greatly influenced by accidental happenings.	1	2	3	4	5	6
23. I can only relieve my pain by consulting health professionals.	1	2	3	4	5	6
24. I am directly responsible for relief of my pain.	1	2	3	4	5	6
25. Other people play a big part in whether my pain gets better or worse.	1	2	3	4	5	6
26. Whatever makes my pain worse is my own fault.	1	2	3	4	5	6
27. When my pain gets worse, I just have to let nature run its course.	1	2	3	4	5	6
28. Health professionals relieve my pain.	1	2	3	4	5	6
29. When I have relief from pain, I am just plain lucky.	1	2	3	4	5	6
30. My relief from pain depends on how well I take care of myself.	1	2	3	4	5	6
31. When my pain gets worse, I know it is because I have not been taking care of myself properly.	1	2	3	4	5	6
32. The type of care I receive from other people is what is responsible for how much my pain is relieved.	1	2	3	4	5	6

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

33. Even when I take care of myself, its easy for my pain to get worse.	1	2	3	4	5	6
34. When my pain gets worse, it's a matter of fate.	1	2	3	4	5	6
35. I can pretty much relieve my pain by taking good care of myself.	1	2	3	4	5	6
36. Following doctor's orders to the letter is the best way for me to relieve my pain.	1	2	3	4	5	6

APPENDIX C: WHYMPI

Instructions: The following questions are designed to help us learn more about your pain and how it affects your life. Under each question is a scale to mark your answer. Read each question carefully and then circle a number on the scale under that question to indicate how that specific question applies to you.

1. Rate your level of your pain at the present moment.

0	1	2	3	4	5	6
No pain						Very Intense pain

2. In general, how much does your pain interfere with your day-to-day activities?

0	1	2	3	4	5	6
No Interference						Extreme Interference

3. Since the time your pain began, how much has your pain changed your ability to work? (___ Check here, if you have retired for reasons other than your pain).

0	1	2	3	4	5	6
No Change						Extreme Change

4. How much has your pain changed the amount of satisfaction or enjoyment you get from taking part in social and recreational activities?

0	1	2	3	4	5	6
No Change						Extreme Change

5. Rate your overall mood during the past week.

0	1	2	3	4	5	6
Extremely Low						Extremely High

6. How much has your pain interfered with your ability to get enough sleep?

0	1	2	3	4	5	6
No Interference						Extreme Interference

7. On the average, how severe has your pain been during the past week?

0	1	2	3	4	5	6
Not at all Severe						Extremely Severe

8. How able are you to predict when your pain will start, get better, or worse?

0	1	2	3	4	5	6
Not at all Able to predict						Very able To predict

9. How much has your pain changed your ability to take part in recreational and other social activities?

0	1	2	3	4	5	6
No Change						Extreme Change

10. How much do you limit your activities in order to keep your pain from getting worse?

0	1	2	3	4	5	6
Not at all						Very Much

11. How much has your pain changed the amount of satisfaction or enjoyment you get from family-related activities?

0	1	2	3	4	5	6
No Change						Extreme Change

12. During the past week how much control do you feel that you have had over your life?

0	1	2	3	4	5	6
No Control						Extreme Control

13. On an average day, how much does your pain vary (increase or decrease)?

0	1	2	3	4	5	6
Remains the Same						Changes a lot

14. How much suffering do you experience because of your pain?

0	1	2	3	4	5	6
No Suffering						Extreme Suffering

15. How often are you able to do something that helps you reduce your pain?

0	1	2	3	4	5	6
Never						Very often

16. How much has your pain changed your relationship with your spouse, family, or significant other?

0	1	2	3	4	5	6
No Change						Extreme Change

17. How much has your pain changed the amount of satisfaction or enjoyment you get from work? (Check here, if you are not presently working).

0	1	2	3	4	5	6
No Change						Extreme Change

18. During the past week how much do you feel that you've been able to deal with your problems?

0	1	2	3	4	5	6
Not at all						Extremely Well

19. How much control do you feel you have over your pain?

0	1	2	3	4	5	6
No control At all						A great deal Of control

20. How much has your pain changed your ability to do household chores?

0	1	2	3	4	5	6
No Change						Extreme Change

21. During the past week, how successful were you in coping with stressful situations in your life?

0	1	2	3	4	5	6
Not at all Successful						Extremely Successful

22. How much has your pain interfered with your ability to plan activities?

0	1	2	3	4	5	6
No Change						Extreme Change

23. During the past week how irritable have you been?

0	1	2	3	4	5	6
Not at all Irritable						Extremely Irritable

24. How much has your pain changed or interfered with your friendships with people other than your family?

0	1	2	3	4	5	6
No Change						Extreme Change

25. During the past week how tense or anxious have you been?

0	1	2	3	4	5	6
Not at all Tense or Anxious						Extremely Tense or Anxious

APPENDIX D: INFORMED CONSENT MVH

Informed Consent Pain and Aging Study- Miami Valley Hospital

You are invited to play a part in a research study by Karen Elliott, who is a doctoral student from the Psychology Department at Indiana State University. Ms. Elliott is doing this study for her doctoral dissertation. Dr. Jennifer Boothby is her faculty sponsor for this project. This information sheet contains elements of informed consent and your completion of the questionnaires is evidence of your consent to participate and is considered voluntary action. Your part in this study is entirely voluntary. You should read the information below and ask questions about anything you do not understand, before choosing whether or not to participate. You are being asked to help in this study because you are getting treatment at the pain center or the pain rehabilitation program at Miami Valley Hospital. Regardless of whether you choose to participate, you will not be contacted again by the investigators.

PURPOSE OF THE STUDY

The purpose of this study is to gain a better understanding of how people experience chronic pain. We hope to use what we learn from the study to make suggestions for the treatment of chronic pain.

PROCEDURES

If you volunteer to participate in this study, we will ask you to do the following:

1. Fill out several short questionnaires that will take about 30-45 minutes to finish. If you choose to participate, please place the questionnaires in the envelope that is provided for you, seal it, and return it to the receptionist.
2. Fill out the entry form for the $50 Walmart gift certificate drawing if you choose and place it in the envelope before sealing it.
3. The questionnaires include questions about your age, race, gender, and pain condition. Furthermore, the questionnaires ask about your experience with pain and attitudes you may have about pain.
4. Return the sealed envelope with the questionnaires and the entry form to the receptionist.

POTENTIAL RISKS AND DISCOMFORTS

We expect that any risks, discomforts, or inconveniences to you will be minor. However, there may be minor distress due to some of the questions on the questionnaire. You can contact the hospital administration at the Department of Consumer Relations (937) 208-2666 if you have any questions concerning your rights with regards to the research or if you have a research related injury.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

It is not likely that you will benefit directly from participation in this study other than the chance to win a $50 Walmart gift certificate, but the research should help us learn how to improve the treatment of pain. This study does not include treatment for your pain.

CONFIDENTIALITY

Any information that is gathered in this study will remain confidential. Your name will in no way be associated with your responses. We will not use your name in any of the information we get from this study or in any of the research reports. There will be no information obtained that could identify you individually. Do not put your name on any of the materials. This information will not be shared with the staff or doctors at the pain clinic or pain rehabilitation center. No one involved in this study will have access to your medical records.

PARTICIPATION AND WITHDRAWAL

You can choose whether or not to be in this study. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you do not want to answer. There is no penalty if you withdraw from the study. If you do not want to be in the study your treatment at the pain clinic will not be affected.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact

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RIGHTS OF RESEARCH SUBJECTS

If you have any questions about your rights as a research subject, you may contact the Indiana State University Institutional Review Board (IRB) by mail at Indiana State University, Office of Sponsored Programs, Terre Haute, IN 47809, by phone at (812) 237-8217, or e-mail the IRB at irb@indstate.edu. You may also contact the Miami

Valley Clinical Research Center, IRB by mail at One Wyoming Street, Dayton, OH 45409, or by phone at (937)208-4437. You can discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community and the Miami Valley Hospital community, as well as lay members of the community not connected with ISU or Miami Valley Hospital. The ISU IRB and the Miami Valley IRB have reviewed and approved this study.

ISU IRB #8048	Approval Date: 12/03/07	Expiration Date: 11/28/09
MVH IRB #07-0122	Approval Date: 12/03/07	Expiration Date: 12/02/08

APPENDIX E: MVH INSTRUCTION SHEET

Please put the following questionnaires in the attached envelope, seal it, and return it to the receptionist.

APPENDIX F: RECURITMENT FLYER MVH

Want a Chance to

Win $50 to Walmart?

Here's what you need to do:

1. Ask your nurse or the receptionist for a research packet
2. Take about 30 minutes while you wait to fill out the questionnaires, or return it at your next appointment.
3. Fill out the entry form for the drawing and place it with the questionnaires in the envelope and seal it
4. Return sealed envelope to receptionist

Drawing will be held on July 1, 2008

APPENDIX G: REGISTRATION FORM

Optional Entry Form for $50 Gift Certificate to Walmart Drawing

First Name:

How would you like to be contacted if you win (telephone, e-mail, standard mail):

APPENDIX H: RECRUITMENT FLYER FMC

Do you have Pain that has lasted at least 6 months?

If so, you are eligible to take part in a research study and enter a drawing to

Win $50 to Walmart

Here's what you need to do:

1. Ask the receptionist for a research packet
2. Take about 30 minutes to fill out the questionnaires while you wait or return them at your next appointment
3. Fill out the entry form for the drawing and place it with the questionnaires in the envelope and seal it
4. Return the sealed packet to the receptionist.

APPENDIX I: INFORMED CONSET FMC

Informed Consent Pain and Aging Study- Family Medicine Center

You are invited to play a part in a research study by Karen Elliott, who is a doctoral student from the Psychology Department at Indiana State University. Ms. Elliott is doing this study for her doctoral dissertation. Dr. Jennifer Boothby is her faculty sponsor for this project. You may take part in this study if you have had pain for 6 months or more. This information sheet contains elements of informed consent and your completion of the questionnaires is evidence of your consent to participate and is considered voluntary action. Your part in this study is entirely voluntary. You should read the information below and ask questions about anything you do not understand, before choosing whether or not to participate. You are being asked to help in this study because you have a diagnosis involving chronic pain. Regardless of whether you choose to participate, you will not be contacted again by the investigators.

PURPOSE OF THE STUDY

The purpose of this study is to gain a better understanding of how people experience chronic pain. We hope to use what we learn from the study to make suggestions for the treatment of chronic pain.

PROCEDURES

If you volunteer to participate in this study, we will ask you to do the following:

1. Fill out several short questionnaires that will take about 30-45 minutes to finish. If you choose to participate, please place the questionnaires in the envelope that is provided for you, seal it, and return it to the receptionist.
2. Fill out the entry form for the $50 Walmart gift certificate drawing if you choose and place it in the envelope before sealing it.
3. The questionnaires include questions about your age, race, gender, and pain condition. Furthermore, the questionnaires ask about your experience with pain and attitudes you may have about pain.
4. Return the sealed Envelope with the questionnaires and the entry form to the receptionist.

POTENTIAL RISKS AND DISCOMFORTS