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Expressed Support, Perceived Support and  
Physical Ability in Chronic Pain Patients

Louise Patrick

A thesis submitted to the School of Graduate Studies of the  
University of Ottawa as partial fulfilment of the requirements for  
the degree of doctor of Philosophy.

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## Abstract

This study investigated the relationship between social support within the marital context, and physical ability in chronic pain patients. Fifty patients diagnosed with chronic pain and their spouses participated in the study. Each patient was asked to exercise on a stationary bicycle, with his/her spouse present. The interactions between patient and spouse were videorecorded and the spouse's behaviour was rated for the amount of task-related and emotional support expressed. The relationships among the spouse's behaviour, the patient's perception of that behaviour and the patient's physical ability were examined. Marital adjustment, depressive symptomatology and the spouse's perception of the patient's physical limitations were investigated as predictors of expressed and perceived support.

Zero-order correlations replicated the previously demonstrated positive relationships among the patient's report of spouse support, pain intensity and marital adjustment. Using hierarchical regression to control for the patient's depressive symptomatology and marital adjustment, it was found that observed spouse support was positively related to the patient's physical ability, accounting for 13% of the variance. When pain severity was also entered into the equation, results indicated that pain intensity was the only significant predictor and was negatively related to the patient's physical ability, accounting for 43% of

the variance. No significant predictor of the spouse's expressed support was identified, while the patient's marital adjustment was positively related to his/her perception of support.

Descriptive reports by patients of their perception of support during the physical ability task indicated that patients experienced task and emotional support differently. The majority of patients reported that emotional support was experienced as supportive and helpful, but task-related support was not.

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## Introduction

### Chronic Pain: An overview

The International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey, 1986). This definition reflects the complexity of pain. Historically, a direct linear relationship was posited between the amount of tissue damage and the amount of pain experienced, as reflected by the Specificity and Pattern theories of pain (Barber, 1959). The Specificity theory of pain proposed that specific pain receptors in body tissue, when stimulated, projected to a pain centre in the brain. The Pattern theory of pain alternatively proposed that pain messages were transmitted to the brain by non-specific receptors, based on a particular modulation pattern of the stimulus. The models formulated in the Specificity and Pattern theories were based on a direct-line communications system from tissue to brain (Melzack & Wall, 1965). As pain research advanced in the 1950's and 1960's, it became apparent that tissue damage, while commonly associated with pain, is neither a necessary nor sufficient condition for pain to be experienced. This knowledge was reflected in the Gate-Control theory of pain (Melzack & Wall, 1965). This theory proposed that pain perception is determined by interactions among afferent and efferent communications systems between the brain and the body, and that pain perception

is not exclusively a function of tissue damage. For example, there are extremely painful experiences, such as tension headaches, in which tissue damage is typically absent.

Conversely, the initial phases of cancer, in which major tissue damage occurs, are typically painless (Melzack & Wall, 1988).

Pain is classified into two global categories, acute or chronic. These global classifications are based on the amount of time a person has pain, not on its severity. Acute pain is typically short-term pain resulting from illness or injury that diminishes and disappears as healing and recovery occur. Examples of acute pain include pain following injury, post-surgical pain, dental pain, and pain accompanying childbirth.

Chronic pain is subclassified into a number of different types, each with different characteristics (Turk, Meichenbaum, & Genest, 1983). The one commonality among subclassifications of chronic pain is that, in all probability, the pain will continue for the duration of the individual's life. It is this characteristic which distinguishes chronic from acute pain.

Chronic periodic pain is due to a known systemic physiological abnormality, such as migraine or arthritic pain. Patients with more than one or two episodes of pain per month are likely to continue to have episodes of pain throughout their lives. However, these episodes vary in terms of frequency, duration and intensity. These disorders may or may not involve tissue damage, and medication is typically provided to abort or treat the underlying cause of the pain, or to manage the pain

itself. *Chronic progressive pain* is associated with tissue damage and malignancies, such as cancer pain. Typically, the pain increases in frequency, duration and intensity until death. This type of pain is most likely to be managed with analgesics, with increasing dosages as the pain intensifies.

*Chronic intractable, benign, pain* (typically called "chronic pain") is defined as pain that persists for more than six months and does not respond to conventional medical treatments. The adjective "intractable" indicates the probability that the pain will continue for the rest of the individual's life. The term "benign" indicates that the pain, and the cause of the pain (when known), are not likely to threaten the individual's life expectancy. The term "benign" does not imply that the consequences of this type of pain are insignificant in terms of the individual's global well-being. Chronic pain can develop without apparent injury or, if injury-related, can persist after the known injury has healed. In these cases, the pain is not a signal of a life-threatening disorder. While there may be organic findings, such as disc degeneration, the degree of degenerative changes is not well correlated with the presence or intensity of pain (Melzack & Wall, 1988). Concomitant with chronic pain are many life changes, such as loss of employment income, disruption of social and familial functioning, depression, and drug dependency (Turk, Meichenbaum, & Genest, 1983).

Traditionally, chronic pain was viewed from a sensory-

physiological perspective, as pain was believed to be linked to organic phenomena exclusively (Barber, 1959). Investigations of pain-experience correlates thus focused on physiological variables, such as tissue damage and organ pathology. Chronic pain was subsequently conceptualized dichotomously, as either *real* if organic findings were identified, or *psychogenic*, if organic findings were absent or if pain reports were viewed as disproportionate to apparent tissue damage. Chronic pain came to be viewed from a psychiatric perspective (Grzesiak, 1980). From this perspective, investigations of pain-experience correlates focused on personality variables and psychiatric disorders.

More recently, chronic pain has been viewed from a behavioral perspective. Behaviorally-oriented psychologists have proposed that because pain is a subjective experience, behavioral manifestations of pain (i.e., pain behaviours), which are observable, are the construct of interest (Fordyce, 1976). Based on this approach, investigations of pain-experience correlates have focused on variables hypothesized to predict behaviour, namely reward and punishment contingencies (e.g. the actions of others, exemption from work and receiving financial compensation). Chronic pain has also been viewed from a cognitive perspective, which views pain as derived from physiological or psychological phenomena that are influenced by cognitive variables, such as beliefs, attitudes and expectations (Holzman, Turk & Kerns, 1986). From this perspective, investigations of pain-experience correlates have focused on

aspects of patients' idiosyncratic appraisals of their condition, such as their sense of mastery or beliefs about the "meaning" of pain.

The rehabilitation perspective regards chronic pain as influenced by all aspects of the individual's existence, including socio-economic, family, vocational and emotional variables, in addition to cognitive ones (Gottlieb, 1977). Central to the concept of rehabilitation are the definitions of physical *impairment*, *disability* and *handicap*. The World Health Organization (WHO) has proposed a taxonomy to conceptualise the relationships among impairment, disability and handicap. Impairment is defined as any disturbance or abnormality of psychological, physiological, anatomical structure or function, whether or not disease or structural damage is present. Disability represents an alteration in behaviour and/or functional performance that an individual experiences as a result of the impairment. Disability has been defined as any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being (WHO, 1980). A handicap is the disadvantage for a given individual, resulting from a disability, in terms of the fulfillment of a role. For example, if a person loses a finger, the missing finger represents the physical impairment and compromised dexterity represents the disability. The resulting handicap will vary with the idiosyncratic nature of the individual's life. For a concert pianist, the handicap may be

great, whereas for a farmer, the handicap may be minimal. For individuals with chronic pain, reported pain intensity is most accurately classified as the impairment, reduced physical functioning as the disability, and the impact of the reduced functioning on social role performance as the handicap. These constructs, however, have been used interchangeably in much of the research to date (Frey, 1984). For example, in the chronic pain literature, Maruta, Swanson, and Swensen (1979) have defined disability in terms of medication consumption, while Fordyce (1976) has defined it in terms of illness behaviours displayed. Results have thus been difficult to interpret in terms of the World Health Organization (WHO) framework.

Rehabilitation interventions, in general, have emerged to minimize the impact of physical disability associated with the impairment that medical interventions cannot cure. The goals of rehabilitation are to ameliorate the consequences of chronic illness or injury, including restoration of a person's autonomy and sense of self-worth. Of crucial importance in reaching these goals is improving the patient's level of physical independence. The restoration of physical abilities and stamina, either directly or through the use of orthotics or prosthetics, is predominant in rehabilitation because it is essential to aspects of every day life, such as personal care and locomotion (Alexander & Fuhrer, 1984). A patient's ability to perform such activities of daily living largely defines his/her level of disability (Halpern & Fuhrer, 1984).

The rehabilitation approach, applied to chronic pain patients, shares the same goals as for other physically disabled groups. Given the strong positive relationships among level of physical functioning, level of independence, and level of psychosocial adjustment in chronic pain patients (Naliboff, Cohen, Swanson, Bonebakker & McArthur, 1985), the rehabilitation of patients with chronic pain aims to improve the patient's physical ability, general activity level and increase his/her independence. Health and Welfare Canada (1990) defines the objectives of chronic pain centres as "reducing the disability associated with pain by improving physical functioning levels, teaching healthy behaviours and reducing reliance on drugs".

Although substantial progress has been made in the management of chronic pain over the last 15 years, many patients remain disabled and rehabilitation professionals do not yet have a thorough understanding of the factors affecting the disability status of patients (Frey, 1984). Pain management specialists have consistently reported that the extent of disability and handicap that chronic pain patients experience from their physical impairment varies significantly among patients (Aronoff & Evans, 1982; Maruta, Swanson, & Swensen, 1979; Painter, Seres, & Newman, 1980). On the basis of research conducted to date, it has not been possible to identify variables which correlate with the disability status of chronic pain patients (Hamburgen, Jennings, Maruta, & Swanson, 1985; Chapman, Brena, & Bradford, 1981). Many factors contribute to this difficulty, including the

fact that the etiology of the pain is typically not clear. Even when organic pathology is identified, it is not necessarily related to the degree of pain reported. In turn, the amount of pain reported has not been found to be consistently related to patients' reports of their physical limitations (Melzack & Wall, 1985). A second factor is the fact that the constructs of impairment, disability and handicap have not been explicitly defined, or consistently operationalized, and have been used interchangeably in much of the research to date (Burk, 1967; Frey, 1984). Relatedly, as much of the chronic pain research has not been conducted from a rehabilitation perspective, or a single perspective, findings have not been directly comparable or interpretable, in accordance with the World Health Organization taxonomy.

Approaches to measuring disability in rehabilitation populations are still in a state of infancy and involve the measurement of behaviours relevant to disability (Frey, 1984). Such behaviours are the actions of the body, which occur on a hierarchical continuum, ranging from leg lifts to complex sequences of behaviour such as going shopping or doing housework. Measures of physical disability vary according to the level at which they enter the continuum of behaviour (Alexander & Fuhrer, 1984). The level chosen for measurement is usually related to the specific goals of rehabilitation. According to Frey (1984), the most frequent assessment methods are the measurement of physical functioning (such as muscle strength or range of

motion), of composite body movements (walking, lifting, cycling, throwing), and of performance on set tasks related to activities of daily living (e.g., ability to bathe oneself or cook meals).

Currently, there is no standardized way of measuring the physical disability status of chronic pain patients (Naliboff et al., 1985). Disability status has most often been defined as and assessed by one of the following: patient self-report of general activity level or activities of daily living (Moore, Beck & Nypaver, 1984), aspects of physical fitness (Chapman, Brena & Bradford, 1981; Hallett & Pilowsky, 1982), medication consumption (Chapman et al., 1981; Maruta et al., 1979), and illness behaviours (Fordyce, 1976). Employment status has also been used and defined as an index of disability status (Guck, Meilman, Skultety & Sowd, 1986; Hamburggen, Jennings, Maruta & Swanson, 1985). Viewed from the World Health Organization taxonomy, however, these measures represent different constructs. Employment status and general activity level, for example, represent the handicap construct. Disability, as defined by the World Health Organization, has not been extensively examined in chronic pain patients.

As with other populations, the rehabilitation of chronic pain patients largely focuses on increasing physical abilities and improving psychological well-being (Turk and Holzman, 1986). The assessment of pain patients' physical abilities is important to an understanding of the chronic pain experience, its moderators, and to remediation issues.

### Correlates of Pain-related Disability

Given that organic findings (e.g. tissue damage) are not well correlated with reported pain levels or disability status (Beecher, 1959; Melzack and Wall, 1982), researchers have investigated several other categories of variables as potential correlates of the disability status of chronic pain patients. Studies to date have not consistently identified such correlates.

Patient status variables. One attempt to predict patients' disability status was conducted at the Mayo Clinic of Rochester, Minnesota (Maruta et al., 1979). These researchers examined the relationships among disability level, pain intensity, number of pain-related operations, duration of pain, duration of out-of-work status, medication dependence, and scales 1 and 3 of the Minnesota Multiphasic Personality Inventory (MMPI). Disability level was defined in terms of medication consumption. Patients consuming more than two analgesics per day, and who were not motivated to reduce their consumption, were classified as disabled. According to Maruta et al. (1979), the above outlined variables accurately classified 86% of patients categorized as disabled and 71% of patients categorized as not-disabled. Several studies have since failed to replicate these findings (Hamburger et al., 1985; Aronoff & Evans, 1982; Reich, Stewart, Tupin, & Rosenblatt, 1985).

A number of studies have examined patient demographic variables (such as age, gender and employment status) in an

attempt to identify variables which could predict the disability status of patients with chronic pain (Guck, Meilman, Skultety, & Dowd, 1986). Some studies have reported that variables such as age, the incidence of compensation, education level, employment status and medication usage were related to the patient's pain intensity (Guck et al., 1986; Aronoff & Evans, 1982; Tait, Chibnall, & Krause, 1990). However, Moore, Berk and Nypaver (1984) and Chapman, Brena and Bradford (1981) found that there were no differences in the age, duration of pain, employment status and the number of surgical operations among patients categorized as either disabled or not disabled, as measured by their level of physical fitness and ability to perform activities of daily living (ADLs).

Characterological variables. Characterological variables have also been investigated as correlates of disability status. Here again, results have been inconsistent. Some researchers (Moore, Berk & Nypaver, 1984) have obtained negative correlations between disability status (defined as the patient's degree of reliance on others for his/her daily needs, as judged by an occupational therapist) and scores on scales 1 (hypochondriasis), 3 (hysteria), and 9 (hypomania) of the MMPI. Other studies (Painter et al., 1980; Reich, et al., 1985) have not obtained significant correlations between MMPI scores and patient self-reports of physical limitations. Moreover, the validity of the type of dimensions assessed by the MMPI has been questioned. The hypochondriasis and hysteria scales are made up of items tapping

physical symptoms and, as such, the merits of using these scales with individuals with physical difficulties has been questioned (Grzesiak, 1980).

The key variables that may explain differences in the degree of disability which patients experience from chronic pain have been difficult to identify. There are still no theoretical models to explain the relationship between the chronic pain experience and degree of disability (Turk & Holzman, 1985). In the absence of a theoretical framework and consistent conceptual and operational definitions, the search for correlates of disability status has been constricted. The identification of variables related to the disability experienced by chronic pain patients would further an understanding of this population. In turn, improved understanding would contribute to more effective therapeutic developments and eventually help improve the well-being of chronic pain patients.

#### Social Support and Chronic Illness

In this area of research, the term "*social support*" has been used to describe a number of different aspects of social relationships. It has been defined in terms of the existence or quantity of social relationships in general, or of a particular type, such as marriage. Social support has also been defined in terms of the structure and/or the function of relationships, such as the degree to which affect and emotional concern are involved (House & Kahn, 1985). Social support has, in other studies, been

defined in cognitive terms, as the perception of feeling cared about by others (Kaplan, 1983).

Few studies have examined the area of chronic pain and social support. Using descriptive reports (Payne, 1973), clinicians have noted that spouses of pain patients can become enmeshed in their partner's pain condition. The lives of patients and spouses can become dominated by the pain until eventually, couples can grow apart because of the pain. A decrease is often reported in the amount of social interaction, including sexual relations, that couples engage in. Payne (1973) has further noted that many spouses report a gradual deterioration in the affective quality of their relationships, and feel angry and frustrated with their partners.

Investigations in the area of chronic pain and social support may be advanced by considering related literatures. Studies of other types of chronic illnesses have primarily applied models of coping as an investigative framework (House & Kahn, 1985; Cohen & Syme, 1985; Medalie & Golbourn, 1976).

Empirical investigations have revealed a consistent pattern of positive associations between social support and physical well-being in people with chronic illnesses (Kaplan, 1983). For example, patients' reports of favourable love relationships have been related to reduced symptoms in angina pectoris (Medalie & Golbourn, 1976) and increased longevity in cancer patients (Carter & Glick, 1970). Patients with greater numbers of friends and higher frequencies of social involvement had faster

recoveries from myocardial infarction (Finlayson, 1976; Garrity, 1973) and people who reported having someone they can confide in had a lower incidence of migraine headache (Miller & Ingham, 1979).

Social support has also been shown prospectively to predict psychological adaptation to chronic illness, ruling out the possibility that low levels of social support are consequences of prior illness (Kessler, Price & Wortman, 1985; Cohen & Syme, 1985). Several prospective studies investigated the role of social support in illness outcome, while controlling for the initial level of illness chronicity. Results suggest that social support is predictive of a positive outcome. For example, Williams, Ware and Donald (1981) demonstrated a negative relationship between baseline social support levels (number of social resources available and frequency of contacts) and level of depression at one-year follow-up. This study used a multiple regression model that controlled for baseline levels. Turner (1981) found that perceived social support predicted psychological well-being in a population of young adults with hearing loss onset. Results indicated that perceived social support accounted for 5% of the variance in anxiety, 9% of the variance in depression and 9% of the variance in anger.

#### Social Support and Chronic Pain

Given that social support is associated with both the physical and psychological status of patients with various types

of chronic conditions, literature examining the relationship between social support and the physical status of chronic pain patients was reviewed. To date, few studies have been conducted in this area. The research that has been done has tended to focus on the relationship between social support and impairment exclusively, and results have been mixed.

Social support and pain reports. Eight studies have examined the relationship between social support and pain intensity. Reisbord and Greeland (1985) evaluated the incidence of chronic back pain and various demographic variables (age, occupation, marital status, income, gender, education) in the general population. They found that marital status was most strongly associated with the incidence of back pain, with the highest frequency of back pain (45%) observed in non-married individuals.

Feuerstein, Sult, and Houle (1985) investigated the relationships among pain intensity, psychological distress and family interaction in 33 chronic pain patients matched for age, gender and socio-economic status with healthy control subjects. Results indicated that family conflict was positively correlated with reported pain levels. Conversely, Block and Boyer (1984) found that pain patients who reported higher levels of pain severity also reported greater marital adjustment and spousal support. Flor, Turk and Rudy (1989) studied the relationship between pain intensity and patients' reports of spouse support. In line with their results, this study found that for patients

who reported being happily married, support (defined as solicitous responses by the spouse e.g. paying attention to overt expressions of pain) accounted for 19% of the variance in pain intensity. However, the variance accounted for by spouse support was not significant for the maritally dissatisfied patients. Other investigators have also reported that higher levels of marital adjustment in patients were positively correlated with greater expressions of pain, and negatively correlated with activity levels ( Block, Kremer, & Gaylor, 1980; Gil, Keefe, Crisson, & Van Dalfsen, 1987; Flor, Kerns, & Turk, 1987).

Social support, pain reports and depression. Further evidence of a positive relationship between social support and mood in chronic pain patients was provided by Beutler, Daldrup, Engle, Guest, Corbishley, and Meredith (1988). They examined the relationships among patients' family dynamics (perceived quality of the family relationship, expression of affect and aspects of family organization), patients' pain intensity and depressive symptoms. Result indicated that familial dissatisfaction was positively associated with both higher levels of depression and greater reported pain intensity. In an attempt to understand the impact of depression, separate from the impact of chronic pain, Mohamed, Weisz, and Waring (1978) examined the family dynamics of chronic pain patients as compared to the family dynamics of depressed individuals without pain. This research indicated that pain patients reported lower levels of marital adjustment than did patients with depression, and that the extent of pain

reported was negatively correlated with the level of social support reported.

Other studies have obtained inconsistent findings with regard to the relationships among marital adjustment, pain intensity and depression. For example, Flor, Turk, and Scholz (1986) reported that a patient's marital adjustment was inversely correlated with his/her level of depression and positively correlated with his/her level of pain severity.

Social support as a treatment variable. Two studies have investigated the effect of social support as a treatment variable with chronic pain patients. Litt (1986) studied the effect of therapist "support" level on treatment outcome. Results indicated that headache patients treated with higher levels of support (expressions of caring and acceptance) showed significant reductions in headache frequency and significantly less relapse at follow-up, as compared to a group treated with low levels of support. Weinberger, Hiner, and Tierney (1986) conducted a social support intervention with osteoarthritis patients. The intervention consisted of a nurse telephoning patients weekly, with expressions of caring such as "just calling to let you know I'm thinking of you and to see how you are". They reported that patients' physical disability (measured in terms of activities of daily living), psychological distress, and pain intensity improved significantly following the intervention, compared to controls, as well as to subjects' own baseline levels, reversing the usual functional deterioration typically observed in people

with arthritis.

These two studies, which defined and measured social support in terms of emotional support, have found that social support is negatively associated with reported pain intensity and positively associated with reported physical functioning status. However, the support expressed in these intervention studies was provided by the health care practitioner and not by a person in the patient's own social network, such as their spouse.

#### Evaluation of the literature

An analysis of the studies described in this section reveals that when social support is measured in terms of marital adjustment, it is inconsistently associated with self-reports of pain levels (impairment), in that both negative and positive associations have been reported. However, marital adjustment is consistently and positively associated with self-reports of pain behaviours, such as verbal expressions of suffering, facial grimacing, limping and high levels of resting. Fordyce (1976) has suggested that because pain behaviours are the only observable dimension of chronic pain, these behaviours themselves constitute the disability of patients with chronic pain. Paradoxically, most assessments of pain behaviours have been based on patient self-reports (pain behaviour diaries) or on information collected during interviews (Flor, Turk, & Rudy, 1987). The relationship between patients' level of marital adjustment and objective measures of patients' physical

disability levels was not investigated in these studies.

The results of some research (Block & Boyer, 1984; Watt-Watson, Evans, & Watson, 1988) suggest that assessing social support exclusively in terms of marital status or marital adjustment may not be appropriate in chronic pain populations because spouses are themselves impaired emotionally by their partner's illness. It is hypothesized that this emotional impairment may impede spouses' ability to act supportively. Studies that have investigated the impact of chronic pain on the spouses of patients revealed that these spouses exhibit significantly greater emotional and physical symptoms than control spouses (Flor, Turk, & Rudy, 1987; Shanfield, Heiman, Cope, & Jones, 1979; Block & Boyer, 1984). A frequently reported finding is that significant numbers of spouses are depressed and maritally dissatisfied (Kerns & Turk, 1984; Flor, Turk, & Scholz, 1986). Thus, marital measures, as indices of social support, may only be proxy measures of social support and may be more representative of potential, rather than actual, support.

Paradoxically, even in instances where spouses are not depressed and have good intentions to act supportively, their actions may not be interpreted as supportive by the patient. For example, the patient may be feeling burdensome to his/her spouse with each offer of support and/or may feel demeaned. Drawing from the literature on social support and chronic illness, DiMatteo and Hays (1985) have reported that many cancer, stroke, and orthopaedic patients indicate feeling belittled by the

attention of others. Alternatively, patients' attributions regarding their spouses' behaviour may be affected by their marital adjustment and level of depression.

House (1983) has argued that researching the role of social support in patients with chronic conditions requires a measure of perceived social support. Social support is likely to be effective only to the extent that it is perceived as supportive. Cobb (1976) also suggested that social support is a personal experience and not a set of objective circumstances. In chronic illness studies, where multidimensional assessments of social support have been used, results have shown that of all social support dimensions, perceived support is the best predictor and, in many instances, the only predictor of well-being (Blazer, 1982; Henderson et al., 1981; Turner, 1983; Funch, Marshall, & Gebhardt, 1986). It was not clear whether this finding would be replicated in a chronic pain population. The literature cited has not addressed the relationships among perceived social support, patients' marital adjustment and spouses' expressions of support in chronic pain population.

Interpreting the results of the research cited, in terms of the relationship between chronic pain and disability is further complicated by several factors. Most studies have investigated the relationship between social support and subjective pain levels (impairment), with no measure of disability included. For example, of the studies reviewed here, most assessed pain severity exclusively (Aronoff & Evans, 1982; Painter et. al.,

1980; Maruta et. al., 1979; Reich et. al., 1985; Reisberg & Greenland, 1985; Feuerstein et. al., 1985; Beutler et. al., 1988; Mohamed et. al., 1978; Flor et. al., 1987; Block, Kremer & Gaylor, 1980). Relatedly, social support and disability status have frequently been assessed with self-report measures exclusively (Keefe et al., 1986; Block, Kremer, & Gaylor, 1980).

Understanding the inter-relationships between pain severity, physical ability, activity level and psychological adjustment requires that these domains be evaluated simultaneously (Naliboff et. al., 1985). This is especially important in social support research with pain patients because many of them are depressed. As such, reliance on self-report data exclusively may yield a problem of simultaneity in the data (reciprocal causality effects between mood, perceptions of support and perceptions of physical functioning), jeopardizing the validity of the research. The overall pattern of findings to date suggested that social support is not a uniform construct. In the absence of studies which investigated its various components within the same sample of pain patients, the relationship between social support and aspects of the pain experience has not been clear.

#### Study Objectives and Hypotheses

Various studies have indicated that social support is associated with the disability status of patients with different types of chronic conditions. This relationship has not been thoroughly investigated with chronic pain populations. The main

purpose of this study was to examine whether social support is related to objectively measured disability in chronic pain patients.

This study also examined which aspect of the social support construct was most closely associated with disability. Both objective and subjective measures of social support (ratings of spouse expressions of support and patient perceptions of feeling supported) were taken. It was hypothesized that only perceived social support would predict the physical ability of chronic pain patients, as measured by a physical performance task.

The second purpose of this study was to investigate the extent to which spouses' expressions of support and patients' perceptions of support could be explained by the following variables, which were hypothesized to correlate with these two aspects of support.

*Depressive symptomatology and marital adjustment as correlates of patient perceptions of support.* Several studies (Rudy, Kerns, & Turk, 1988; Sullivan & D'Eon, 1990; Crisson, Keefe, Wilkins, Cook, & Muhlbaier, 1986) have found that depression is frequently associated with self-reports of pain severity. Cognitive pessimism is often associated with the incidence of depression (Beck, Rush, Shaw, & Emery, 1979). Thus, the extent to which depressive symptomatology was related to the patient's perception of his/her social support was examined. The patient's level of marital adjustment was also examined as a correlate of his/her perceptions of support. It was hypothesized

that the patient's level of depressive symptomatology and marital adjustment, and the amount of support expressed by the spouse would all account for significant portions of the variance in patients' perceptions of social support.

*Depressive symptomatology, marital adjustment and spouse perception of physical limitations as correlates of spouse expressed support.* Variables hypothesized as associated with the spouse's behaviour towards the patient included the spouse's perception of the patient's physical limitations and the spouse's marital adjustment. Block and Boyer (1984) have demonstrated that spouses differ in their cognitive evaluations of their partner's disability and that these evaluations are positively correlated with the spouse's reported marital adjustment. Rowat & Knaft (1985) interviewed and studied the behaviour of 40 spouses of pain patients. They reported that all spouses indicated not knowing how to act towards their partners; they indicated that about 50% of the spouses ignored and avoided their partners while the other 50% catered to and "overprotected" them. Thus there was empirical evidence to suggest that spouses of pain patients vary in the amount of supportive behaviour they express to their partners.

Another variable investigated as a predictor of the spouse's supportive behaviour was suggested by the work of Coyne (1976) and Gurtman (1986). They demonstrated that people react negatively (with increased hostility) to persons with depression, as compared to persons who are not depressed. Since a

significant portion of pain patients are also depressed (Sullivan & D'Eon, 1990), it was reasonable to evaluate whether or not depressive symptomatology in the patient is related to the behaviour of the spouse, curtailing his/her expressions of caring and support. The spouse's own level of depressive symptomatology was also investigated as a correlate of expressed support. Several studies (Turk et al., 1987; Flor et al., 1986; Kerns et al., 1984) have reported that spouses of chronic pain patients have a higher frequency of depression than control spouses and spouses of patients with other types of illnesses. Thus, whether or not the spouse was depressed might have explained differences in the way spouses behave towards their partners, as depressive symptomatology may inhibit one's ability to support others. It was hypothesized that the amount of support expressed by the spouse would be predicted by his/her level of depressive symptomatology, his/her appraisal of the patient's physical limitations, his/her marital adjustment, and the patient's level of depressive symptomatology.

The final goal of the study was to evaluate the measures developed to address the issue of disability and social support in this sample. As objective and systematic assessment instruments had not yet been developed to date to measure these constructs within this population, it was felt that this evaluation was required. In summary, the study hypotheses were as follows:

Hypothesis 1. The amount of support expressed by the spouse

would be predicted by his/her level of depressive symptomatology (a negative relationship), his/her marital adjustment and his/her perception of the patient's physical limitations (positive relationships).

Hypothesis 2. The patient's perceptions of support would be predicted by his/her level of depressive symptomatology (a negative relationship), his/her marital adjustment and the amount of support expressed by his/her spouse (positive relationships).

Hypothesis 3. Perceived social support and the patient's level of depressive symptomatology would predict the patient's physical ability (respectively, positive and negative relationships).

The hypothesized relationships among these variables are presented in Figure 1.

## Method

### Subjects

Sixty chronic pain patients (50 for the study proper and 10 in a control condition) and their spouses were recruited from the Chronic Pain Clinic of The Rehabilitation Centre in Ottawa. All patients on the Pain Clinic's waiting list were contacted and asked to participate in the study. The procedure was fully explained to all prospective subjects and their spouses, but the research hypotheses were not discussed until debriefing. All patients were assessed by a physiatrist, nurse, psychologist and physiotherapist. The suitability of patients for participation in the study was determined according to the admission and exclusion criteria defined in Appendix A. Only subjects who met the criteria for a diagnosis of chronic pain were included in the study.

Seventy-three couples were contacted in all. Twenty couples did not agree to participate, and three couples did agree, but then failed to show up at their scheduled time. No couple withdrew from the study.

### Measures

1. The Beck Depression Inventory (BDI) (Beck, Rush, Shaw & Emery & 1979). This is a 21-item self-report measure. Subjects were asked to rate on a Likert-type scale the extent to which each item applies to them (see Appendix B). Internal consistency is reported to be .86 (Beck, Rush, Shaw & Emery & 1979). A meta-

analysis conducted by Beck, Steer and Garbin (1988) revealed that the BDI's concurrent validity, with respect to DSM-III-R based clinical ratings, is .72 for psychiatric patients and .74 for non-psychiatric subjects. Several studies have examined the measurement of depression in chronic pain patients. The BDI has been reported to be sensitive to the detection of depression in chronic pain patients in comparison to clinician ratings using the DSM-III-R diagnosis of depression, and more sensitive than the MMPI-D and the Zung self-rating scale (Turner & Romano, 1984). Love (1987) also reported that the BDI is more sensitive than the MMPI-D and the Middlesex Hospital Questionnaire (MHQ-D) in identifying cases of depression in chronic pain patients in comparison to clinical classifications made with DSM-III-R criteria. As diagnostic interviews were not conducted, the BDI derived scores reflect the incidence of depressive symptomatology. Depression, per se, was not assessed in this study.

2. The Physical Ability Measure. The Schwinn Air-Dyne (model 3-ad) stationary bicycle is an ergometric exerciser, designed to provide simultaneous upper and lower body conditioning. It utilizes the resistance of the air wind on the wheel to provide a composite workload measure in Kilopond meters. This score corresponds to the amount of work required to lift one kilogram, one meter per minute. It thus generates a single score based on three components: the amount of time cycled, the cycling speed and the resistance involved. The score obtained is a cumulative composite measure computed by the computer on the

bicycle. This score takes into account variations in effort within a given cycling session. This device thus permitted an objective method of assessing total body physical ability, and of comparing individual performances across patients. It is noteworthy that the physical ability status of patients represents a unique aspect of disability and a unidimensional measure of disability status. The extent to which there is concordance among the different aspects of disability is, at this time, unclear (Halpern & Fuhrer, 1984; Naliboff et al., 1985).

In order to assess the construct validity of this measure, its relationship to patients' self-reports of general activity was computed by having both patients and spouses complete Scale 13 (general activity level) of the Multidimensional Pain Inventory (MPI) (see Appendix C). The patient and spouse versions are identical with the exception that spouses are requested to complete the scale in terms of the patients' activity level. Correlations between general activity scales and the physical ability measure were computed. The construct validity of the physical ability measure was further investigated by computing its relationship to patient reports of pain severity.

3. The Multidimensional Pain Inventory (MPI) (Kerns, Turk, & Rudy, 1985). The MPI is a widely used self-report instrument, composed of 52 items, answered on a 7-point scale. The MPI consists of 12 empirical scales, which assess various dimensions of the pain experience, responses of significant others to

communications of pain, and patient activities. Internal consistencies range between .70 to .90 across scales and stability coefficients are reported to range between .72 and .91 (Kerns, Turk & Rudy, 1985). When developed, the validity of the MPI scales was assessed by correlations with scores on nine scales of other well-known instruments. These included the McGill Pain Questionnaire (Melzack, 1975), the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Depression Adjective checklist (Lubin, 1965), the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Luchene, 1970), the Multidimensional Health Locus of Control Scale (Wallston, Wallston & Devellis, 1978) and the Marital Adjustment Scale (Locke and Wallace, 1959). The correlations were factor analyzed and the construct validity assessed by means of factorial validity. Converging evidence for internal and external construct validity of the MPI scales was derived (Kerns, Turk, & Rudy, 1985). For this study scale 3 (pain severity), scale 5 (support), and scale 13 (general activity level) were used. The reliability and stability coefficients of these scales are .72 and .82, .78 and .89, and .75 and .87, respectively (Kerns et. al., 1985).

The MPI is also available in a spouse version (MPI-S). The spouse version is identical to the patient version, except that spouses answer the questions about the patients. Subscales of the MPI-S have an internal consistencies ranging from .63 to .92, test-retest stabilities ranging from .76 to .95 and are all

significantly correlated with the corresponding scales of the patient version of the MPI (Flor, Kerns & Turk, 1987; Flor, Turk & Sholz, 1987). Spouses also completed scale 5 (support) and scale 13 (general activity level).

4. The Perception of Social Support Scale. This instrument measures, using a 5-item Likert-type scale, the extent to which patients felt supported by their spouse during their exercise session (see Appendix D). Subjects indicated on a 10-point scale the extent to which each item reflected their perception of their spouse's behaviour during the exercise. The scale items were derived from modifications of the Provisions of Social Relations Scale (Turner, 1983). The language of the items was simplified, in keeping with the average educational level of chronic pain patients and as per patients' comments during the pilot investigation.

Patients were also asked to name specific behaviours which they found helpful and not helpful. The internal consistency of the five-item scale was computed, using Cronbach's alpha, prior to data analysis and found to be .94. In order to assess the relationship between patient perception of support during the task to patient perception of support in general (for construct validity purposes), patients also completed Scale 5 of the MPI, the social support scale (see Appendix E).

5. Observers Ratings of Expressed Support. The pooled ratings of two independent observers, based on the videotaped recordings of the spouse's behaviour towards his/her partner

during the exercising session, were obtained. Raters made their ratings individually and at different times to prevent contamination. Raters were asked to count how many times they observed spouses engaging in any of the behaviours detailed on The Supportive Behaviours Checklist (see Appendix F), and to make separate counts for emotional and task-related support behaviours. This checklist of supportive behaviours was derived, in part, from the Classification Scheme of Informal Helping Behaviours (Gottlieb, 1978; 1984) as operationalized by Barrera, Sandler and Ramsay (1981). The frequency counts of the observed support behaviours were each divided by the duration, in minutes, of the videotaped sessions in order to account for differences between patients in cycling time. Each of the two scores obtained thus represented a global unidimensional assessment, and was not designed for sequential or content analyses.

Given that the scores obtained were based on a continuous scale, and not categorical data, the inter-rater reliability was assessed using both Intra-class and Pearson correlation coefficients. Both type of correlations represent the degree to which the ratings of both judges are proportional when expressed as deviations from their means. The inter-rater agreement was also computed, representing the extent to which both judges tended to give subjects the same absolute scores.

In addition to the frequency based scores, observers were asked to separately rate spouses on their overall supportiveness, using a 5-point continuous scale, based on their clinical

impressions. The inter-rater reliability of the observers' global ratings was also assessed in the same manner as for the frequency scores. The raters were blind to the experimental hypotheses. They included a clinical psychologist (Dr. K. Wilson) and a graduate student in psychology (Ms. K. Edgley), both affiliated with The Rehabilitation Centre. Raters were trained with the five videotapes from the pilot study. A higher reliability (.81 and .80 versus .68 and .71) was obtained with the global qualitative ratings than with the frequency-based ratings. Frequency-based ratings failed to yield reliability coefficients greater than .80. Thus, it was decided to use the global ratings in the analyses of the study hypotheses. This finding of superior reliability obtained with global, observer-impression ratings is consistent with previous research demonstrating that both reliability and predictive power is greater with rater impressions than with coding-system derived scores (Reid, Bauske & Brummett, 1981). The construct validity of this measure was investigated by computing its relationship to the patient and spouse reports of support in general.

6. The Spouse's Perception of Limitations (SPOL) (Block & Boyer, 1984). The Spouse's Perception of Disease instrument is composed of 15 items scored on a 6-point scale, ranging from "strongly agree" to "strongly disagree". The 15 items divide into three distinct empirical factors and scales. For this study, only one scale was used, the spouse perception of limitations

(SPOL) (see Appendix G). This scale is designed to measure to extent to which the patient's physical disability is credible to the spouse. This instrument was designed for and normed on a chronic pain population. The construct validity of the Limitations scale was investigated by Block and Boyer (1984) by means of its correlations with aspects of spouses' emotional adjustment. Significant relationships were obtained with marital adjustment ( $r = .64$ ) and the Global Symptom Index (GSI) of the SCL-90 ( $r = -.36$ ). The internal consistency of the instrument overall is reported to be .56. The internal consistency of this scale was therefore initially recalculated for this study. As the reliability obtained was less than .80, the internal consistency was investigated with an item-by-item analysis, until an acceptable reliability was obtained. Maximum consistency (.77) was obtained using the first four items. Scores used in the analyses were thus derived from these four items exclusively.

7. The Locke-Wallace Marital Adjustment Scale (Locke & Wallace, 1959). This is a 15-item self-report measure of marital adjustment. Subjects are asked to indicate the extent to which each item applies to them (see Appendix H). Internal consistency for this instrument is .90. Validity research conducted with 236 couples revealed that the instrument correctly identified 96% of couples who were known to be maritally distressed. The decision to use this measure instead of other commonly-used measures, such as the Dyadic Adjustment Scale (Spanier, 1976), was made for two

reasons. First, the Locke-Wallace Scale is the most frequently used instrument with chronic pain patients. For example, of the studies mentioned in this review, all measured marital adjustment with the Locke-Wallace scale. Second, according to Fredman and Sherman (1989), the high correlation (.86) between the DAS and the Locke-Wallace, in effect, suggests that the DAS is an alternate form of that classic test, but takes longer to complete.

8. The Spouse's Estimate of his/her Behaviour. This is a 5-item Likert-type scale which measures how supportive spouses believed themselves to have been during the patient's cycling session (see Appendix I). The internal consistency of the scale was computed on this sample, using Cronbach's alpha, and found to be .87. In order to assess the construct validity of this measure, the relationship between spouses' estimates of their supportiveness during the task and estimates of their supportiveness in general was computed. Spouses thus completed Scale 5 (spouse supportive behaviour scale) of the Multidimensional Pain Inventory - Spouse version (MPI-S) (see Appendix J).

### Procedure

The primary investigator telephoned all potential subjects to ask for their participation in the study. Each individual had previously received a letter (see Appendix K) outlining the

project and informing them that they would be contacted by phone. The project was outlined and couples were asked if they would like to participate in the project. Couples who agreed to do so were scheduled to meet with the investigator for a 1.5 hour session. Subjects and their spouses were requested to sign a consent form prior to beginning their sessions (see Appendix L).

Patients and their spouses were first asked to complete the following self-report questionnaires: the Beck Depression Inventory, the Locke-Wallace Marital Adjustment Scale and Scales 13 (General Activity Level) and 5 (Support) of the MPI. Spouses also completed the Spouse Perception of Physical Limitations. Spouses and patients completed the questionnaires in separate rooms. Patients and spouses completed questionnaires in the order of their choice. No formal counterbalancing procedure was used.

After completing the questionnaires, the spouse was escorted to a waiting area, while the patient's physical ability was assessed. Participants were informed that their performance was videotaped in order to examine the behaviour of people with pain during a physical performance task. Patients were then asked to exercise on the bicycle, as fast as they could, without becoming uncomfortable, until they felt tired and/or in excessive pain, or up to a maximum of 15 minutes, whichever occurred first. The cumulative workload measure of their entire exercise session was recorded.

Patients were then given a 30 minute rest period, during

which time they joined their spouse in the waiting area. Patients were not provided with the opportunity to lie down, but were provided with seating. Patients were asked not to consume anything other than water during the rest period. A rest period of 30 minutes was provided to allow lactic acid levels in muscles to return to normal, preventing muscle fatigue and discomfort. For moderate exercising (of less than one hour in duration and requiring less than 370 calories of energy), a rest period of a few minutes is sufficient to restore lactic acid levels (Steindler, 1970). The conservative choice of a 30 minute rest was selected to safeguard patients against possible fatigue. A first cycling session was provided to facilitate patients' adaptation to the task, as per the recommendation of a senior physiotherapist specializing in working with chronic pain patients. After the rest period, spouses were escorted to the exercise room and instructed to motivate their partner during the second exercise session, to facilitate their performance on the bicycle. Patients then re-entered the room and were asked to exercise a second time, with their spouse at their side. A pilot study ruled out evidence of carry-over effects (fatigue and/or practice) between the two performance sessions.

The exercising during the second session was terminated in the same manner as the first session, and was also videotaped. The video camera was located approximately four feet away from the couples and in a fixed position, at a 30-degree angle to the bicycle. In order to ensure the safety of the patients the

researcher remained in the room during both sessions, as per the stipulation of The Rehabilitation Centre's ethics committee. However, during taping, the researcher had his/her back to the couples and was approximately five feet away from them. When the second exercise session was finished, spouses left the room while patients completed the Perceived Social Support Scale. Spouses then rated their own estimates of how supportively they behaved. The investigator subsequently debriefed each couple. After ensuring that patients were properly rested, the study was concluded.

Two researchers (one male and one female) collected the data, each testing 22 and 28 couples respectively. Each researcher tested equal numbers of male and female patients.

## Results

Results are presented in six sections. These include the sample description, analysis of experimenter effects, instrumentation validity analyses, replication of previous findings, tests of the hypotheses and relationship of patient and spouse responses.

### Sample Description

The sample of patients was comprised of 27 males and 23 females. The mean age of patients was 43.2 years ( $SD = 9.8$ ). The average duration of pain for the entire sample was 4.02 years ( $SD = 4.56$ ). Eighty percent of patients reported suffering from low back pain; 14% from neck and shoulder pain and 6% reported total body pain. Using a criterion of 16 on the Beck Depression Inventory (Beck et. al. 1988), 40% of patients and 11% of spouses reported moderate to severe levels of depressive symptomology. Using a criterion of 100 on the Locke-Wallace Marital Adjustment Scale (Locke & Wallace, 1959), 27% of patients and 44% of spouses were found to be maritally distressed. Table 1 presents the means, standard deviations and the ranges of values for all variables assessed in the sample.

### Analysis of Experimenter Effects

Two researchers participated in this study. One tested 22 couples, the other 28 couples. Each researcher tested equal

numbers of male and female patients. In order to rule out possible experimenter effects,  $t$ -test analyses were conducted on all dependent measures, by experimenter group. Results indicated no significant differences on any measure [ $t(48) = 1.64$ , n.s. for physical ability;  $t(48) = .15$ , n.s. for task support;  $t(48) = .59$ , n.s. for perceived support;  $t(48) = .82$ , n.s. for spouses' own estimates of support; and  $t(48) = .86$ , n.s. for emotional support].

#### Instrumentation Validity Analysis

As several measures were developed for this study, reliability and validity analyses were conducted. These analyses were conducted for the following measures: physical ability, perceived support during the task, observer ratings of task and emotional support and the spouses' own estimates of support during the task.

Physical ability. The test-retest reliability of this measure was initially computed with ten control subjects over two trials. A  $t$ -test analysis indicated no significant differences between trials, with  $t(8) = .12$ , n.s. Further such analyses were computed with the data of the study proper. A  $t$ -test analysis indicated no significant difference between trials, with  $t(48) = 1.13$ , n.s. The mean physical ability scores for trials 1 and 2 were, respectively, 12.33 and 11.32. The correlation between Trial 1 and Trial 2 scores was found to be  $r(48) = .98$ ,  $p < .001$ .

In order to assess the construct validity of this measure,

the correlations between physical ability and (1) spouse and patient reports of patient general activity level, and (2) pain severity were computed. The obtained coefficients were respectively  $r(48) = .18$ , n.s.;  $r(48) = .05$ , n.s. and  $r(48) = -.64$ ,  $p < .001$ . Although only one of these coefficients was significant, the significant relationship between pain severity and the physical ability measure suggests that the physical ability measure is a reliable and valid index of disability. Based on the World Health Organization taxonomy, impairment (pain level) and disability (physical ability) are theoretically related to each other. Impairment represents a disturbance at the physical (or psychological) level, whether or not disease or structural damage is present. According to the WHO (1980), examples of impairments include intellectual disturbances, language difficulties and sensory disturbances. Disability represents the associated restriction in one's ability to perform a physical activity. Examples of disabilities include restrictions in communication ability, locomotion and in physical ability.

The lack of a relationship between the MPI general activity level and the physical ability measure suggests that these measures do not assess the same construct. This is also consistent with the World Health Organization's concept of handicap (as an individual's inability to perform role expectancies), which theoretically, is not related to impairment or disability.

Perceived social support. The internal consistency of this scale was computed with Cronbach's alpha and found to be .94. The construct validity of this measure was investigated by computing its correlation with the Patient Perception of Spouse Support in general (MPI, scale 5). The obtained coefficient was  $r(48) = .12$ , n.s. These results suggest that this scale is reliable but that its validity has not been established. An examination of the Perceived Support data revealed that scores did not vary extensively across the 50 patients. Only 17% of patients obtained a mean score below five (on the 10-point scale). Scores, overall, ranged from 2 to 10, but were skewed in the high end of the scale. The skewed nature of the scores would make it more difficult to obtain a significant correlation with the other measures.

When asked to itemize aspects of their spouse's behaviour, if any, which they found supportive, 84% of patients described emotional support behaviours and 8% described task-related support behaviours. When asked to describe which behaviours, if any, they found not supportive, 10% percent of patients described items representing encouragement to continue with the task.

Observer ratings of support. The inter-rater reliability of these scores was computed separately for the task and emotional support components. Both Pearson and intra-class correlation coefficients were computed. The inter-rater agreement was also investigated separately for task and emotional scores. Table 2 presents the obtained values. Results indicated that the

obtained coefficients ranged from .79 to .89, indicating that the scores were reliable.

The construct validity of the global ratings used in the analyses of the study hypotheses was investigated by computing their correlations with the spouses' reports of support in general and the patients' reports of spouse support in general. Table 3 presents the obtained values. The correlations ranged from .03 to .31. The global task support score was significantly related to patient report of support in general while global emotional support was not significantly related to the criteria. Overall results indicated that the global observed support scores were reliable, but that their construct validity was not uniformly established. Evidence of construct validity was obtained for the global task support component but not for the global emotional support component. As such, results using these measures are interpreted with caution.

Spouses' own estimates of support during the task. The internal consistency of this scale was investigated with Cronbach's alpha and found to be .87, demonstrating that the measure is reliable. The construct validity of the scale was investigated by its correlation with the spouses' own reports of support in general and patients' reports of spouse support in general. The obtained coefficients were  $r(48) = .25$ , n.s. and  $r(48) = .32$ ,  $p < .05$ ., respectively. Thus, the validity of this measure was not fully established and related findings are interpreted with caution.

### Replication of Previous Findings

Zero-order correlations were initially computed between pain severity, marital adjustment, depressive symptomatology, patient report of support in general and patient report of activity level, to determine the extent to which the results of this study replicated previous findings. Several findings were consistent with previous reports. These included:

- (1) A significant correlation between pain intensity and patient report of support in general ( $r(48) = .41, p < .05$ ).
- (2) A significant correlation between patient report of support in general and patient marital adjustment ( $r(48) = .46, p < .05$ ).
- (3) A significant inverse correlation between spouse depressive symptomatology and spouse marital adjustment ( $r(48) = - .38, p < .05$ ).
- (4) A significant correlation between patient and spouse marital adjustment ( $r(48) = .38, p < .05$ ).

### Tests of the hypotheses

Hierarchical multiple regressions, using a forced-entry approach for each variable, were performed to analyze the data. Alpha was set at .05, and the effect size at .25. The power values for each regression are noted on tables 4 through 8, and ranged from .68 to .73. Variations among the degrees of freedom across tables reflect the existence of missing values for the Pain variable. Fourteen percent of pain scores were missing.

Hypothesis 1. The first regression predicted the spouse's

expressions of support from his/her depressive symptomatology score, the patient's depressive symptomatology score, the spouse's perception of physical limitations and the spouse's marital adjustment, after controlling for the patient's marital adjustment. Given that previous studies had found that marital adjustment was correlated with the other independent variables in the regression (Block, 1981; Flor et. al., 1986), marital adjustment was controlled for in the regression. The result of this regression was not significant (see Table 4). The relationship between these same variables and observed spouse task-related support was also examined by hierarchical regression. The result of this regression was also not significant (see Table 5).

Hypothesis 2. This regression predicted the patient's perception of support from the spouse's expressed support scores and the patient's depressive symptomatology and marital adjustment scores, after controlling for the spouse's perception of physical limitations, marital adjustment and level of depressive symptomatology. These three variables were controlled for because they have been found to be correlated with the patient's level of depression and marital adjustment (Block & Boyer, 1984). Results revealed a significant regression, indicating that the patient's marital adjustment explained 18% of the variance in the patient's perception of support during the task. An examination of the beta weights showed that higher reports of marital adjustment were associated with higher ratings

of spouse support (see Table 6). The relationship between perceived social support and patient marital adjustment is further highlighted in Figure 2.

Hypothesis 3. This regression predicted the patient's physical ability from the patient's depressive symptomatology level, perception of social support and the spouse's expressed supports, after controlling for age, gender and duration of pain since onset. These variables were entered first in order to control for their possible effects on individual differences in physical ability, as some researchers (Guck et. al., 1986; Tait et. al., 1990) have reported significant relationships between these variables and level of physical fitness. The regression analysis also served to identify the proportion in physical ability variance attributable to each measure of support, helping to identify which aspect of the social support construct (perception of or availability) is more closely related to physical ability.

The results of this significant regression indicated that emotional support expressed by the spouse was the only significant predictor of patient physical ability. An examination of the beta weights suggested that the more emotional support expressed by the spouse, the more physically able was the patient. Emotional support accounted for 12% of the variance in physical ability (see Table 7).

This regression was re-examined with pain severity entered into the equation first, to examine the extent to which social

support variables predicted physical ability beyond what could be accounted for by pain intensity. Results of this regression indicated that pain severity was now the only significant predictor, accounting for 36% of the variance in patient physical ability. The beta weights suggested that the less pain the patient reported, the greater was his/her physical ability (see Table 8). The relationship between physical ability and pain intensity is further highlighted in Figure 3.

#### Relation of Patient and Spouse Responses

The correlation found between spouse and patient responses varied with the question asked (see Table 9). A moderate correlation emerged between patients' and spouses' reports of how supportive the spouse is in general ( $r(48) = .45, p < .01$ ). On the other hand, no significant relation was found between patients' and spouses' reports of patient activity level ( $r(48) = .13, n.s.$ ). The relation between patients' perceptions of support and the spouses' own estimates of support during the physical ability task was also non-significant, ( $r(48) = .14, n.s.$ ). The patients' perceptions of support during the bicycle task were significantly correlated only with patients' marital adjustment ( $r(48) = .36, p < .05$ ).

The relationship between patients' perceptions of support in general and their self-reports of general activity was not significant,  $r(48) = -.13$ . The relationship between perceptions

of support and physical ability during the bicycle task was also non-significant,  $r(48) = -.13$ .

## Discussion

The discussion is organized into five sections: (1) replication of previous findings; (2) key findings of this study; (3) social support and physical ability; (4) the relationship between expressed support, perceived support and their correlates; and (5) directions for future research. The limitations of the study will be discussed in the relevant sections.

### 1. Replication of Previous Findings

Several findings of this study replicated results of previous research, regarding perceptions of support and marital adjustment.

Perceptions of support. Flor et al. (1987) reported a significant and positive relationship between pain severity and patients' reports of spouse support in general. This same relationship was replicated by Flor et al. (1989). These findings are consistent with the significant relationship between pain reports and reports of support in general found in this study. Interestingly, behaviourally-oriented researchers have interpreted these correlations as indicative that spouse support reinforced pain behaviours and reports of higher pain intensity, and thus contributed to patient disability. The nature of spouse involvement in behaviourally-oriented interventions reflects this implicit assumption. However, as the relationship between spouse

support and disability level has not been investigated experimentally, it is equally probable that patients who have more pain require more support and assistance. Alternatively, patients who receive support may be more comfortable expressing their pain.

Marital adjustment. Flor et al. (1986) reported a significant relationship between a patient's report of spouse support in general and that patient's marital adjustment. This is consistent with the significant positive relationship obtained in this study, between these same variables and with the significant relationship obtained between a patient's marital adjustment and his/her perception of support during the cycling task. Block and Boyer (1984) reported a significant relationship between spouse depression and spouse marital adjustment. This is consistent with the significant relationship between spouse marital adjustment and spouse depressive symptomatology obtained in this study.

Block and Boyer (1984) reported a significant positive relationship between patient and spouse marital adjustment. This is consistent with the positive relationship between these variables obtained in this study. Results of this study thus further support the finding that significant numbers of both patients and spouses are maritally distressed.

These findings indicate that the psychological well-being of pain patients is, in part, related to their marital adjustment and to how cared-about by their spouses they feel. We can

hypothesize that patients derive feelings of being cared-about from their interpretations of their spouses' behaviour. Spouses' own estimates of how supportively they behaved during the task and patients' perceptions of those behaviours were unrelated. Thus, perhaps such discrepancies between what spouses do and what pain patients want, in terms of support, can help explain why a substantial number of pain patients and their spouses are maritally dissatisfied.

## 2. Key Findings of the Study

Pain intensity and physical ability. A key finding of this study was the strong relationship obtained between pain levels and an objective measure of physical ability. Based on previous research using self-report data exclusively, it has been suggested that pain levels are not related to patient level of disability (Turk and Holzman, 1985; Fordyce, 1976; Moore et. al., 1984). Non-significant relationships between pain severity and disability have been reported in studies where disability was measured with patients' self-reports of either general activity, employment status or medication consumption. Consistent with these studies, the patient's report of activity level was not correlated with the physical ability measure or with pain, as measured in this study.

Viewpoints questioning the legitimacy of chronic pain as a physical disability began with difficulties in identifying organic factors responsible for pain. In the absence of organic

factors, the etiology of pain was thought to be psychological (Engel, 1959). As researchers failed to find correlations between pain levels and self-reports of disability status, the view that pain-related disability was psychogenic in origin received increasing support (Sternbach, 1974). The relationship found between pain intensity and physical ability has implications for legitimizing chronic pain as a "real" physical disability. Relatedly, this finding suggests that the World Health Organization's taxonomy may be a useful framework from which to conceptualize the chronic pain experience. Most of the chronic pain research to date has been conducted atheoretically (Jensen & Karoly, 1991). Thus, identifying relevant variables for investigation has been a difficult task. This finding provides empirical support for the conceptual taxonomy proposed by the World Health Organization, and may help define a starting point from which theoretical models of pain experience may emerge.

One of the challenges facing rehabilitation researchers has been the measurement of disability. There are currently no standardized methods of assessing disability. In all probability disability is a multidimensional construct. The extent to which there is concordance among the various domains of this construct remains to be investigated. Self-reports of general activity levels, illness behaviours or employment status have most often been used as indexes of disability. The significant correlation between pain reports and an objective measure of physical ability

(a specific domain of disability) found in this study raises the question of whether disability has been adequately assessed with self-report measures. As previously mentioned, this finding suggests that self-report measures of general activity may better represent the handicap, rather than disability construct. According to the World Health Organization (1980), non-significant relationships between pain levels and handicap are conceptually coherent, as are significant relationships between pain levels and disability. The finding that patients' and spouses' reports of patient activity level were not significantly correlated raises questions about the validity of self-reports of disability status, suggesting a need to standardize assessments. This proposition is further substantiated by previous reports of significant discrepancies between the observations of spouses and medical staff and patients' self-reports of medication consumption and social functioning (Jensen and Karoly, 1991; Ready et.al., 1982).

Task-related support experienced as not supportive.

Another key finding of this study is that the majority of patients did not experience task-related support as supportive. This has implications for treatment interventions involving the spouse. Although little research has examined the effect of spousal involvement in chronic pain rehabilitation outcome, results to date have suggested that spouse involvement in treatment is not beneficial (Payne & Norfleet, 1986; Moore & Chaney, 1985). Most approaches have focused on behavioural

techniques, teaching spouses not to attend to expressions of pain and "illness behaviours", and to reinforce "well" behaviours, such as physical activity. Patients did not experience such encouragements as helpful or supportive. The finding of this study may help elucidate why spouse involvement in behavioural treatment has not been successful to date. As patients reported finding emotional support helpful and supportive, overt emotional expressiveness may be more beneficial in facilitating treatment response.

Social support interventions, based on overt expressions of caring by health care professionals (Litt, 1986; Weinberger et al., 1986), have yielded significant treatment effects. Whether or not these same beneficial effects would be observed in chronic pain patients, when spouse emotional expressiveness was the treatment variable remains to be investigated.

Marital adjustment and perceived support. Results of the multiple regression analysis indicated that marital adjustment accounted for 18% of the variance in perceptions of support during the physical ability task. Although this finding is interpreted with caution, as the validity of the perceived support measure was not established, it suggests that the overall character of patients' relationships may provide the framework from which spouse behaviour is interpreted. Patients may interpret a given behaviour based on their overall impressions of the quality of their relationships and on their expectations of their spouses' actions. Thus, regardless of how spouses actually

behave, their actions may be interpreted as supportive by patients who are maritally satisfied, but as unsupportive by patients who are not satisfied. This may also help explain why spousal involvement in treatment has yet failed to prove beneficial. It may be that the benefits of spousal involvement are not ubiquitous across all patients and need to be investigated with marital adjustment from an interactional framework, with consideration of the couple's level of marital adjustment.

### 3. Social Support and Physical Ability

Perceived social support. Results of the multiple regression analysis did not support the hypothesis that patients' perceptions of support would predict their physical ability. This result can be interpreted in several different ways: (1) The perceived social support measure is not valid, (2) perceived social support is not relevant to physical ability, (3) perceived social support is itself a multidimensional construct and a dimension not assessed in this study is relevant to physical ability.

(1) *The perceived social support measure is not valid.* The validity of the perceived support measure was not established. It is possible that patients' reports of perceived support were affected by a reactive assessment or a social desirability phenomenon, as scores were skewed in their distribution (Kazdin, 1980). The relationship between perceived support and physical

ability may not have been adequately tested. Thus, all further interpretations of the relationship between perceived support and physical ability are made very cautiously.

(2) *Perceived social support is not relevant to physical ability.* The predicted relationship between perceived social support and physical ability was based, from a theoretical point of view, on the premise that living with chronic pain is stressful. The extent to which patients have the necessary resources to cope effectively affects their stress levels, in turn their level of perseverance, and ultimately their physical ability. However, it is possible that the impact of perceived social support on chronic pain patients is different from the impact of perceived social support on patients with other types of chronic illnesses. Given that chronic pain is not a degenerative condition susceptible to immunological function (as is cancer or arthritis), the benefits of stress reduction derived from perceptions of support may be less significant to the physical ability of pain patients as compared to patients with progressive conditions (Lazarus and Folkman, 1984; Turk et al., 1983; Cobb, 1976; Kaplan and Cassell, 1977).

(3) *Perceived social support is itself multidimensional.* It may be that it is the meanings patients derive from perceptions of support, rather than perceptions *per se*, which are related to disability. For example, Coyne (1990) has suggested that perceptions of support may entail threats to self-esteem, by suggesting that the recipient is less than self-sufficient or

competent.

Although patients rated their perceptions of support on a global and unidimensional scale, when asked to describe what aspects of their spouses' behaviour they found supportive and helpful, 65% of patients described emotional support items exclusively. Only 24% of patients reported experiencing task-related support as supportive and 10% reported experiencing task-support as unsupportive. This descriptive finding suggests that emotional and task-related support were experienced differently by patients. Given these results, having assessed perceived support with a global measure is a limitation of this study.

It is possible that the spouse's support behaviour in general is geared to "doing for" the patient, as opposed to encouraging the patient to "do for him/herself". A patient reporting on how supportive his/her spouse is may hold a different definition of "support" than the one used in this study. This would create a discrepancy in patient perceptions of support during the task and in general, possibly explaining the non-significant relationship obtained between these two variables.

Which of these alternative interpretations best explains the finding is not clear. Based on this study's data alone, the first interpretation regarding the validity of the perceived support measure, is most parsimoniously supported. However, when these findings are evaluated within the broader context of social support research to date, it is likely that all the

interpretations outlined above are contributing to the results obtained.

#### 4. Expressed Support and its Correlates

This study also aimed to investigate whether or not the spouse's level of depressive symptomatology, marital adjustment and perception of patient limitations would predict his/her expressed support. While it had been hypothesised that each variable would predict the spouse's behaviour, none of the variables were significantly related to the amount of support expressed. As the validity of the expressed emotional support measure was not established, interpretations are made with caution. The spouse's expressed support was not significantly related to his/her marital adjustment. This suggests that these measures may represent different constructs and are not interchangeable. This suggestion is consistent with the argument proposed by Block and Boyer (1984) and Watt-Watson et al. (1988) that marital status or marital adjustment do not necessarily measure social support in chronic pain populations. However, because the validity of the observed support measures was not firmly established, further investigation of this hypothesis is required.

In order to understand this result, it is useful to consider the relationship between these same variables and patient reports of spouse support in general. The spouse's level of depressive symptomatology was also not related to either the patient's or

the spouse's own report of support in general. The reason for this finding is not clear. It is possible that the measure of support-in-general (the MPI, scale 5) is very specific to support, in terms of the spouse's reaction to the pain condition. This index of support may thus reflect a specific dimension of the support construct. While it had been hypothesized that depressive symptomatology may impede one's ability to support others, as behavioral apathy is a frequent concomitant of depression (Beck et. al., 1979), results did not support this contention.

Consistent with previous research, the spouse's marital adjustment was positively related to both his/her own report and the patient's report of spouse support in general (Block & Boyer, 1984). Yet, spouse marital adjustment was not related to observed spouse support in this study. Something particular to the physical ability task used in this study may account for the discrepant finding. It is possible that the kind of supportive and helpful behaviours appropriate to facilitating a physically challenging task are different from the kind of supportive behaviours spouses usually engage in. The spouse's marital adjustment may be related to supportive behaviours which involve "doing for" or caring for the patient, but not to behaviours which encourage the patient to do for him/herself. Alternatively, it is possible that the spouse's behaviour during the task was not representative of their usual behaviour with their partners. The analogue nature of the paradigm used in this

study may have failed to elicit spouse behaviours typical of everyday life. As such, the ecological validity of the paradigm is open to question. One reason to question the ecological validity is because the paradigm failed to elicit negative or punishing behaviours from spouses. This is important in that there is evidence that satisfaction with personal relationships and psychological well-being are more strongly associated with negative interpersonal behaviours than positive, supportive ones (Pagel, Erdly, & Becker, 1987; Rook, 1984). Some of the non-significant relationships obtained may be due to the fact that only neutral and positive behaviours were elicited. It is also possible that the cycling task was not sufficiently interpersonal in nature, and did not provide a context capable of eliciting support behaviours for many of the spouses.

##### 5. Directions for Future Research

A key finding of this study was the strong relationship between reported pain intensity and an objective measure of physical ability. Only one other study (Naliboff et. al., 1985) has examined this relationship and its results were contradictory to those of this study. The reason for this is not clear, but differences in the measurement of physical ability may account for the contradictory results.

Given the relevance of this question to the conceptualization of chronic pain, and potential treatment implications, further investigation of this relationship is

warranted. A study which encompasses several different objective measures of physical disability (i.e. walking tests, cycling tests, strength and flexibility) could examine the convergent validity of such measures, and determine if results of this study can be replicated.

The need to develop standardized measures of disability and handicap is suggested. Findings to date in chronic pain research have been inconsistent (Aronoff & Evans, 1982). The extent to which measurement difficulties contribute to discrepant results cannot be underestimated. As the patient and spouse reports of patient general activity level (handicap) were not significantly correlated, (1) it is unclear what construct was measured, (2) whether the patient's or the spouse's report was inaccurate, and (3) the validity of self-report measures of handicap is questionable. However, it is also possible that handicap is a personal and subjective experience, which occurs within a context specific to an individual. Handicap assessment methods require further investigation.

The finding that chronic pain patients did not experience the task-related encouragements of spouses as supportive suggests some important consideration for future directions. As discussed in Section 2, this finding suggests that overt emotional support by spouses may be perceived more positively than task-related encouragements, in behaviourally-oriented treatments involving spouses. It may be that the reason why spouse involvement has not been found useful to date is because the nature of spouse

involvement has been inconsistent with patients' expectations. Thus, the spouse's participation in treatment has actually not been reinforcing for patients. The descriptive finding suggests that if spouses are to be involved in rehabilitation-oriented treatments where the main goal is to increase patients' physical ability, patients may need to reframe their interpretations of task-related encouragements and spouses may need to be more overtly emotionally expressive, if patients are to feel cared about and supported.

Patient perceptions of support were related to their marital adjustment. Thus, it may be that involving spouses in treatment would yield different experiences for maritally-satisfied than for maritally-dissatisfied patients. Marital adjustment may need to be addressed in treatment designs involving spouses, if their participation is to be perceived as beneficial by patients and/or therapeutic. Including a marital therapy component in intervention designs may facilitate communication between couples. This may help patients to express to their spouses what constitutes help and support for them, and ultimately improve treatment outcome.

In conclusion, whether the relationship between pain intensity and objectively-measured disability can be replicated is an important question for future research. To what extent this relationship is maintained across different objective measures of disability is equally important. An examination of the convergent validity of cycling tests, walking endurance

tests, and tests of strength and flexibility within the same sample of patients is warranted. Investigating the relationship between pain intensity and these different measures would facilitate an understanding of the impairment-physical ability relationship.

The relationships among social support, impairment, disability and handicap require further investigation. This study demonstrated the current difficulties inherent in the measurement and definition of these constructs. Findings suggest that the World Health Organization's taxonomy may provide a starting point towards a beneficial theoretical framework from which to examine these interrelationships. To date, such a framework has been absent in the chronic pain research. Findings of this study suggests however, that the relationships among impairment, disability and handicap may not be ubiquitous across pain patients. For example, the nature of the relationships may vary with patients' level of marital adjustment.

Table 1

Means, Standard Deviations and Ranges of Values of all Variables

	Mean	Standard deviation	Low	High
Age	43.27	9.89	23	68
Pain duration (years)	4.02	4.56	1	12
Physical ability (Kpm)	12.92	19.46	0	90
Spouse BDI	7.44	5.91	0	21
Spouse Locke- Wallace	104.00	26.53	48.00	153
SPOL	14.24	4.73	4.00	20.00
MPI-Scale 13	2.62	0.82	0.78	2.07
MPI-S-Scale 13	4.36	1.01	2.33	6.00
Spouse estimate of support during task	5.80	2.26	2.00	10.00
Task-related support	1.42	1.05	.00	4.00
Emotional support	1.94	1.06	.00	4.00
Patient BDI	14.07	8.16	3.00	42.00
Patient Locke- Wallace	114.54	26.13	43.00	151.00
Perceived support	8.00	2.38	1.00	10.00
MPI-Scale 3	49.72	8.85	28.28	64.50

Note. BDI=Beck Depression Inventory. SPOL=Spouse perception of patient physical limitations. MPI-S-Scale 13= Spouse report of patient general activity level. MPI-Scale 13= Patient self-report of general activity level. MPI-Scale 3= Pain intensity.

Table 2

Inter-rater Reliability Coefficients for the Observed Support Scores

	Intra-class	Pearson	% Agreement
Emotional support (Global)	0.88	0.81	55
Emotional support (Frequency)	0.82	0.71	54
Task support (Global)	0.89	0.80	59
Task support (Frequency)	0.79	0.68	65

Note. The intra-class correlation coefficients were computed, based on the assumptions that raters were randomly selected. The formula used was thus:

$$\frac{BMS-EMS}{BMS+(k-1)EMS+K(JMS-EMS)/n}$$

BMS=Between target variance. EMS=between judges error.  
JMS=between judges variance. n= number of targets. K=2.  
(Shrout & Fleiss, 1979).

Table 3

Correlations of Support in General with Observed Support Scores

Criteria	Observed support	
	Task support	Emotional support
MPI-S Scale 5	.03	.20
MPI Scale 5	.31*	.11

Note. MPI-S-Scale 5= Spouse report of support in general. MPI-Scale 5=Patient report of support in general.

\*  $p < .05$ .

Table 4

Multiple Regression Predicting Spouse Emotional Support Behaviour

Predictor	Beta	R	R <sup>2</sup> change	Sig. of F
1 Patient Locke- Wallace	.162	.109	.011	.341
2 Patient BDI	-.021	.110	.001	.892
3 Spouse Locke- Wallace	-.252	.226	.050	.160
4 Spouse BDI	-.080	.230	.002	.647
5 SPOL	.088	.243	.007	.601

Total equation :  $R^2 = .059$ ,  $F(5,42)$ ,  $< 1.00$ .

Note. The power of this regression was computed to be .75, according to the method outlined by Cohen (1977).

Table 5.

Multiple Regression Predicting Spouse Task-related Support Behaviour

Predictor	Beta	R	R <sup>2</sup> change	Sig. of F
1 Patient Locke- Wallace	.225	.123	.015	.187
2 Patient BDI	.084	.150	.007	.593
3 Spouse Locke- Wallace	-.117	.193	.003	.508
4 Spouse BDI	-.031	.212	.008	.858
5 SPOL	-.161	.256	.002	.341

Total equation :  $R^2 = .256$ ,  $F(5,42) < 1.00$ .

Note. The power of this regression was computed to be .75, according to the method outlines by Cohen (1977).

Table 6

Multiple Regression Predicting Patients' Perceptions of Support

Predictor	Beta	<u>R</u>	<u>R</u> <sup>2</sup> change	Sig. of <u>F</u>
1 Spouse Locke- Wallace	-.179	.095	.009	.276
2 Spouse BDI	.086	.129	.007	.581
3 SPOL	-.023	.131	.001	.882
4 Observed task support	.149	.274	.050	.389
5 Observed emotional support	-.012	.274	.000	.993
6 Patient BDI	.278	.319	.002	.058
7 Patient Locke- Wallace	.547	.531	.180	.029*

Total equation:  $R^2 = .281$ ,  $F(7,40) = 2.24$ ,  $p < .050$ .

Note. The power of this regression was computed to be .73, according to the method outlined by Cohen (1977).

\*  $p < .05$ .

Table 7

Multiple Regression Predicting Patient Physical Ability

Predictor	Beta	R	R <sup>2</sup> change	Sig. of F
1 Age	.317	.187	.035	.190
2 Gender	.191	.342	.080	.229
3 Duration (years)	.030	.348	.000	.848
4 Patient BDI	-.125	.379	.020	.391
5 Perceived support	-.103	.385	.000	.490
6 Observed task support	-.185	.399	.010	.327
7 Observed emotional support	.457	.534	.120	.012*

Total equation:  $R^2 = .29$ ,  $F(7,39) = 2.29$ ,  $p < .05$ .

Note. The power of this regression was computed to be .73, according to the method outlined by Cohen (1977).

\*  $p < .05$ .

Table 8

Multiple Regression Predicting Patient Physical Ability with Patient Pain Severity Entered in the Equation

Predictor	Beta	R	$R^2$ change	Sig. of F
1 Age	.044	.162	.026	.788
2 Gender	.164	.331	.080	.249
3 Duration (years)	-.087	.331	.000	.576
4 Pain intensity	.578	.678	.350	.0008*
5 Patient BDI	-.095	.689	.010	.495
6 Perceived support	-.117	.692	.000	.397
7 Observed task support	.059	.712	.020	.757
8 Observed emotional support	.175	.722	.010	.344

Total equation:  $R^2 = .52$ ,  $F(8,30) = 4.09$   $p < .001$ .

Note. The power of this regression was computed to be .68, according to the method outlined by Cohen (1977). As the overall regression was significant, and as the non-significant coefficients did not approximate significance, the probability of a type II error was judged to be acceptable.

\*  $p < .001$ .

Table 9

Zero-order Correlations between Patient and Spouse Responses


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	1	2	3	4	5	6	7	8	9
1		.45*	-.13	.32	.31	.11	.31*	.11	-.05
2			-.33*	.03	.24	.04	-.03	-.20	-.11
3				.13	.03	.27	.24	.11	-.05
4					.02	.00	.13	.11	.17
5						.13	.09	.11	-.34*
6							.23	.15	-.13
7								.58**	.00
8									.35*

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Note. 1= Patient perception of support in general (MPI-scale 5). 2= spouse report of own support in general (MPI-S - scale 5). 3= patient report of general activity level (MPI-scale 13). 4= spouse report of patient general activity level (MPI-S - scale 13). 5= spouse estimate of support during task. 6= patient perception of support during task. 7= observed spouse task-support during task. 8= observed spouse emotional support during task. 9= Physical ability of patients.

$p < .05$ . \*\* $p < .01$ .

Figure 1. Hypothesized Relationships Among Study Variables

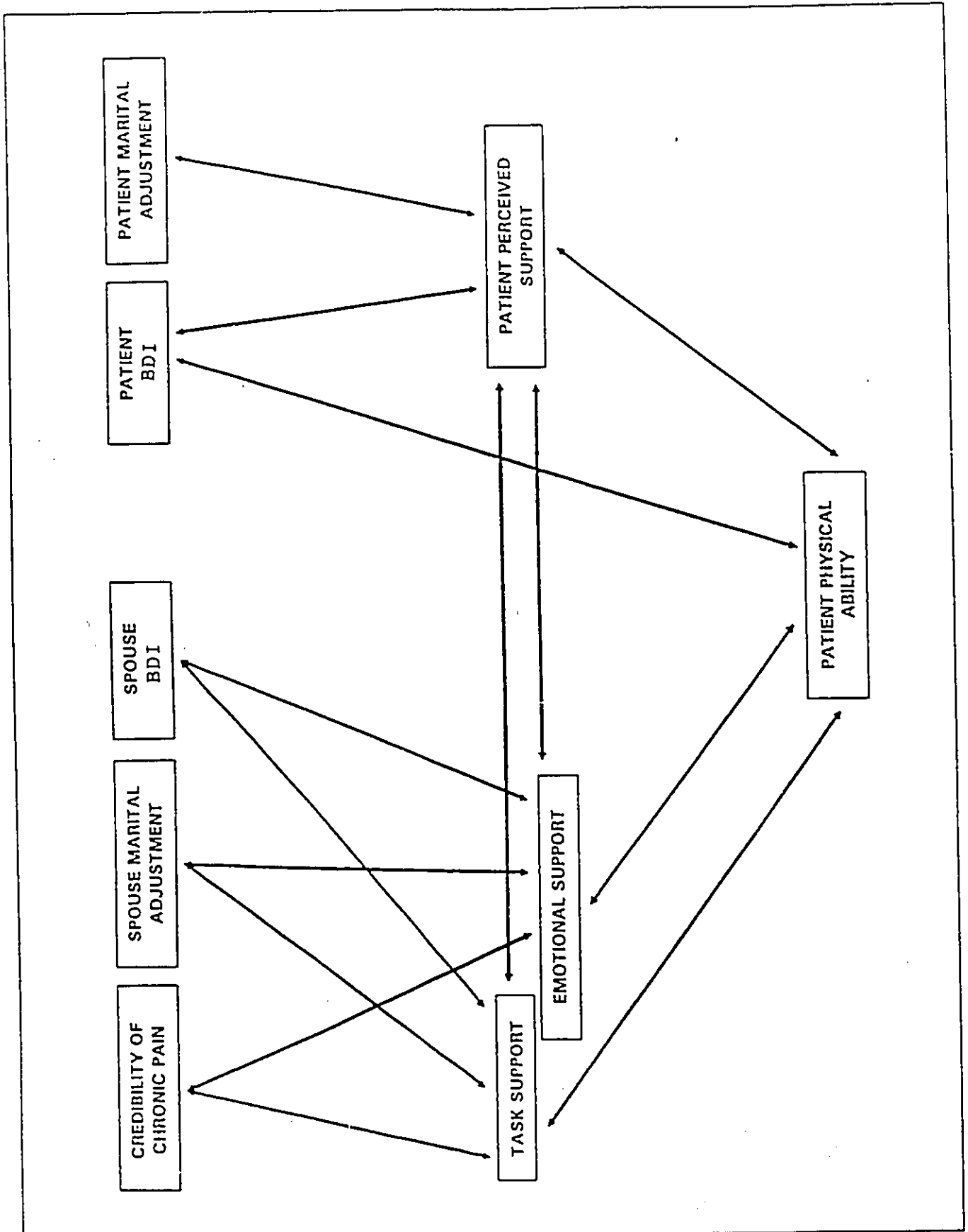
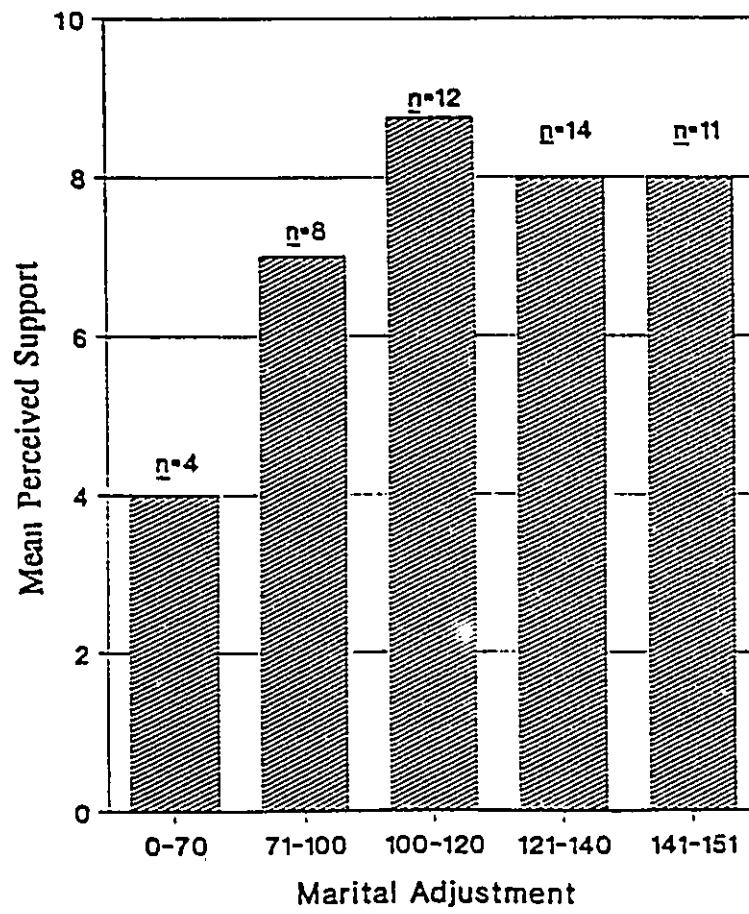
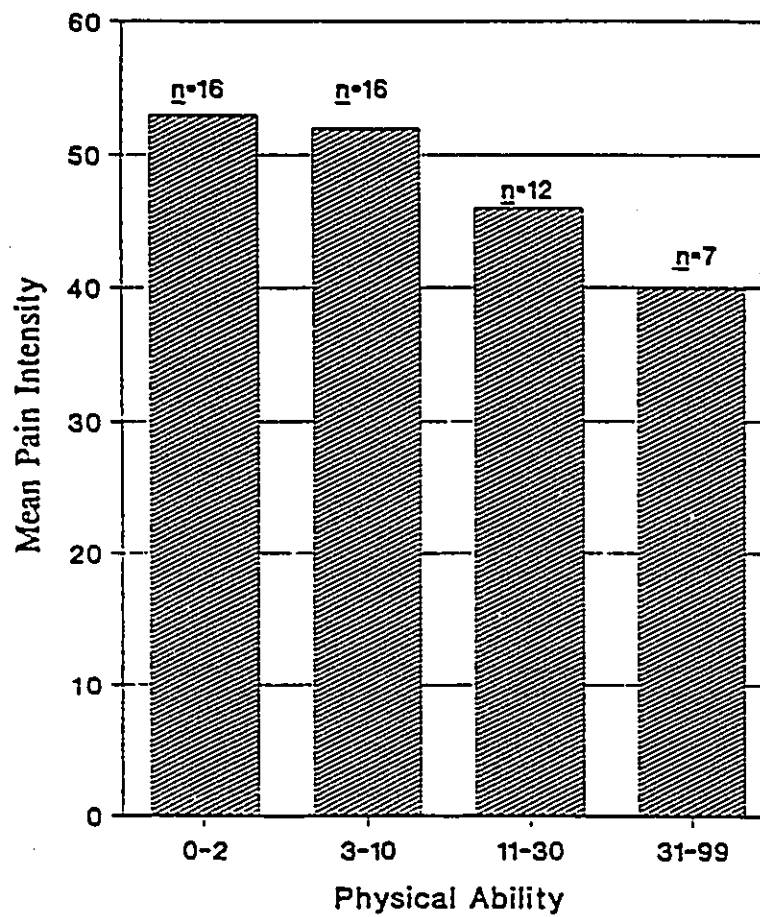


Figure 2. Mean Perceived Social Support as a Function of Marital Adjustment



**Figure 3.** Mean Pain Intensity as a Function of Physical Ability



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## Appendices

## Appendix A

### Inclusion and exclusion criteria

#### Inclusion criteria

1. Medically appropriate, as determined by a physiatrist and a physiotherapist.
2. Candidates must be willing to undergo physical assessment.
3. Candidates meet the criteria for a diagnosis of chronic pain.
4. Psychologically appropriate, as determined by a clinical psychologist with experience in the assessment of chronic pain patients.
5. Candidates must be married or living with a common law spouse.

#### Criteria for chronic pain diagnosis

Candidates must have pain that a) has been continuous for longer than six months b) that has been appropriately investigated as determined by a physiatrist and that has not responded to conventional medical intervention, and c) is not associated with a life threatening disease.

#### Exclusion criteria

A patient who demonstrates severe cognitive and/or emotional dysfunction, as assessed by a psychologist, will not be considered for this study. This includes patients considered at high risk for suicide, patients with deficits related to a head injury or a stroke and patients actively psychotic. These patients will be recommended for treatment elsewhere.

APPENDIX B

BECK DEPRESSION INVENTORY

NOT MICROFILMED FOR COYRIGHT REASONS

## APPENDIX C

## SCALE 13 - MPI SPOUSE

Listed below are 19 daily activities. Please indicate, by circling a number on the scale, how often you (your spouse) engage in one of these activities. Please complete all 19 items.

1. Wash dishes.

0 1 2 3 4 5 6  
 Never Very Often

2. Mow the lawn (\_\_\_\_\_ Check here, if you do not have a lawn to mow.)

0 1 2 3 4 5 6  
 Never Very Often

3. Go out to eat.

0 1 2 3 4 5 6  
 Never Very Often

4. Play cards or other games.

0 1 2 3 4 5 6  
 Never Very Often

5. Go grocery shopping.

0 1 2 3 4 5 6  
 Never Very Often

6. Work in the garden (\_\_\_\_\_ Check here, if you do not have a garden).

0 1 2 3 4 5 6  
 Never Very Often

7. Go to a movie.

0 1 2 3 4 5 6  
 Never Very Often

8. Visit friends.

0 1 2 3 4 5 6  
 Never Very Often

9. Help with the house cleaning.

0 1 2 3 4 5 6

Never

Very Often

10. Work on the car (\_\_\_\_ Check here, if you do not have a car).

0 1 2 3 4 5 6

Never

Very Often

11. Take a ride in a car or bus.

0 1 2 3 4 5 6

Never

Very Often

12. Visit relatives.

(\_\_\_\_ Check here, if you do not have relatives within 100 miles).

0 1 2 3 4 5 6

Never

Very Often

13. Prepare a meal.

0 1 2 3 4 5 6

Never

Very Often

14. Wash the car (\_\_\_\_ Check here, if you do not have a car).

0 1 2 3 4 5 6

Never

Very Often

15. Take a trip.

0 1 2 3 4 5 6

Never

Very Often

16. Go to a park or beach.

0 1 2 3 4 5 6

Never

Very Often

17. Do the laundry.

0 1 2 3 4 5 6

Never

Very Often

13. Work on a needed household repair.

0 1 2 3 4 5 6

Never

Very Often

19. Engage in sexual activities.

0 1 2 3 4 5 6

Never

Very Often

## APPENDIX D

PATIENT'S PSS

FOR EACH OF THE QUESTIONS BELOW, PLEASE CIRCLE THE NUMBER ON THE SCALE THAT BEST DESCRIBES HOW YOU FEEL YOUR SPOUSE WAS TOWARDS YOU, WHILE YOU WERE EXERCISING THE BICYCLE.

1. How supportive of you was your spouse while you exercised?

Not at all Very Much

1      2      3      4      5      6      7      8      9      10

2. How caring towards you was your spouse while you exercises?

Not at all Very Much

1      2      3      4      5      6      7      8      9      10

3. How helpful to you was your spouse while you tried to exercise?

Not at all Very Much

1      2      3      4      5      6      7      8      9      10

4. How much did your spouse motivate you to try your best on the bicycle?

Not at all Very Much

1      2      3      4      5      6      7      8      9      10

5. How much of a positive influence did your spouse have on you in getting you to do your best on the bicycle?

Not at all Very Much

1      2      3      4      5      6      7      8      9      10

Please write down what your spouse did that you found helpful:

1.

2.

3.

Please write down what your spouse did that you found not helpful:

1.

2.

3.



BEHAVIORAL ITEM LIST1. Supportive - Verbal

- . Humour
- . Encouragement or direction
- . Positive Affect
- . Conversation (neutral)
- . Understanding or empathy

2. Supportive - Non-verbal

- . Physical contact
- . Eye contact
- . Smiling at patient
- . Monitoring patient's performance
- . Listening attentively

3. Punishing - Verbal

- . Complaints
- . Criticisms
- . Bringing up problems/arguments unrelated to task at hand
- . Escalating patient's negative affect
- . anger, frustration or irritability

4. Punishing - Non-verbal

- . Negative gestures
- . Unresponsiveness
- . Solitary activities
- . Psychological absenteeism

Appendix G

THE S.P.O.D. SCALE

FOR EACH OF THE FOLLOWING ITEMS, PLEASE CIRCLE THE NUMBER THAT BEST DESCRIBES HOW MUCH YOU AGREE OR DISAGREE THAT THE STATEMENT MADE APPLIES TO YOUR SPOUSE.

1. There are many activities which my spouse should avoid to prevent further harm coming to him/her.

Disagree						Agree
0	1	2	3	4	5	

2. I feel that my spouse is capable of doing a lot more than he/she actually does.

Disagree						Agree
0	1	2	3	4	5	

3. I feel that my spouse is not pushing himself/herself hard enough.

Disagree						Agree
0	1	2	3	4	5	

4. I often feel that my spouse is overexerting himself/herself.

Disagree						Agree
0	1	2	3	4	5	

5. I often have to push my spouse to get him/her to do any activity at all.

Disagree						Agree
0	1	2	3	4	5	

## Appendix H

## The Locke-Wallace Marital Adjustment Scale.

1. Check the dot on the scale line below which best describes the degree of happiness, everything considered of your present marriage. The middle point, "happy" represents the degrees of happiness which most people get from marriage, and the scale gradually ranges on one side to those few who are very unhappy in marriage, and on the other, to those few who experience extreme joy or felicity in marriage.

0	2	7	15	20	25	35
.	.	.	.	.	.	.
<hr/>						
Very Unhappy	Happy				Perfectly Happy	

State the appropriate extent of agreement or disagreement between you and your mate on the following items. Please check each column.

Always Agree	Almost Always Agree	Occasionally Disagree	Frequently Disagree	Almost Always Disagree	Always Disagree				
5	4	3	2	1	0				
<hr/>									
2. Handling family finances				5	4	3	2	1	0
<hr/>									
3. Matters of recreation				5	4	3	2	1	0
<hr/>									
4. Demonstrations of affection				8	6	4	2	1	0
<hr/>									
5. Friends				5	4	3	2	1	0
<hr/>									
6. Sex relations				15	12	9	4	1	0
<hr/>									
7. Conventionality (right, good, or proper conduct)				5	4	3	2	1	0
<hr/>									



Appendix I

SPOUSE'S OWN SUPPORT ESTIMATE

FOR EACH OF THE QUESTIONS BELOW, PLEASE CIRCLE THE NUMBER ON THE SCALE THAT BEST DESCRIBES THE WAY YOU WERE DURING THE EXERCISE SESSION.

1. How supportive were you while your spouse was exercising?

Not at all Very much  
 1      2      3      4      5      6      7      8      9      10

2. How caring were you while your spouse was exercising?

Not at all Very much  
 1      2      3      4      5      6      7      8      9      10

3. How helpful to your spouse do you believe you were while he/she was exercising?

Not at all Very much  
 1      2      3      4      5      6      7      8      9      10

4. How much were you able to motivate your spouse to try his/her best on the bicycle?

Not at all Very much  
 1      2      3      4      5      6      7      8      9      10

5. How much of a positive influence do you believe you had on your spouse in getting him/her to do his/her best on the bicycle?

Not at all Very much  
 1      2      3      4      5      6      7      8      9      10

## APPENDIX J

## MPI SPOUSE - SCALE 5

Please circle the number on the scale that best describes your situation, for each of the 4 items below.

1. How worried are you about your spouse's pain problem?

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

2. How attentive are you to your spouse's pain problem?

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

3. How angry do you get with your spouse because of his/her pain problem?

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

4. How frustrated do you get with your spouse because of his/her pain problem?

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

## Appendix K

A research project is under way at The Rehabilitation Centre. In this study, we will be looking at the nature of your pain, how you deal with it, your activity level and how you and your spouse feel. We would like to request your participation, and that of your spouse, in this project. This study will help us to learn more about chronic pain and how we can best help people with pain and their spouses.

You will be telephoned in the near future, by the researchers on this project, to ask if you are willing to participate in the study. If you are willing and able to help us, by agreeing to participate, you and your spouse will be scheduled to meet with one of the researchers at the Centre, for about one hour. You will both be asked to complete questionnaires regarding how you feel and how you deal with pain. The person with pain will then be request to exercise twice on a stationary bicycle. You, as a couple, will receive \$25 compensation for any inconvenience or expense you incur in coming to the Centre.

Agreement or refusal to participate in this study will not affect your treatment at The Rehabilitation Centre in any way. If you have any questions about this project, please do not hesitate to ask them when one of the researchers telephones you.

Sincerely,

Dr. R. Fisher, MD, FRCPC,  
Physiatrist-in-Chief

## Appendix L

## Consent Form For Couples

**Project Title:** Physical Functioning and Chronic Pain

**Investigators:** Louise Patrick, M.A.  
Ph.D. Candidate, University of Ottawa

Joyce D'Eon, Ph.D., C. Psych.  
Department of Psychology

The purpose of this study is to assess how activity level is related to pain, how a person deals with pain, and how they feel. How the spouse of a person with chronic pain feels and deals with the person in pain will also be investigated. This study will help us to better understand factors that affect the physical functioning of people with chronic pain.

If you both agree to participate, the research will take from 1 to 1 1/2 hours of your time. First, you will both fill out some brief questionnaires about the way you feel about yourself and others. Then the person with pain will be asked to exercise on a stationary bicycle, followed by a 30-minute rest period, and then asked to exercise again. Both exercise sessions will be videotaped.

Your answers to the questionnaires will be kept strictly confidential and used only for research purposes. The videotapes will also be kept confidential, and eventually erased. These tapes will be made available only to the investigators and research assistants on this project.

Agreement or refusal to participate in this research will not affect any aspect of your treatment at the Rehabilitation Centre in any way. You may withdraw from this study at any time if you wish.

Our signatures indicate that we have been informed about and understand the purpose of the research and agree to participate in the project and to the videotaping procedure.

---

Patient's Signature

---

Witness's Signature

---

Spouse's Signature

---

Date

## Appendix M

## Consent Form

Project Title: Physical Functioning and Chronic Pain

Investigators: Louise Patrick, M.A.  
Ph.D. Candidate, University of Ottawa

Joyce D'Eon, Ph.D., C.Psych.  
Department of Psychology

The purpose of this study is to assess how activity level is related to pain, how a person deals with pain, and how they feel. This information will help us to better understand the factors that affect physical functioning in people with chronic pain.

If you agree to participate, the research will take about 1 hour of your time. First you will be asked to complete some brief questionnaires. Then you will be asked to exercise on a stationary bicycle, followed by a 30-minute rest period and then asked to exercise again. All information will be kept strictly confidential and used only for research purposes.

Agreement or refusal to participate in this research will not affect any aspect of your treatment at the Rehabilitation Centre in any way. You may withdraw from this study at any time, should you so desire.

My signature indicates that I have been informed about and understand the purpose of this research and agree to participate in the project.

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Participant's Signature

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Witness's Signature

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Date

## Appendix N

## THE EXPRESSED SUPPORT SCORING MANUAL

- . Scoring system description
- . Behavioral item guidelines
- . Item list definitions
- . Scoring record sheets

## THE EXPRESSED SUPPORT SCORING SYSTEM

This scoring system is based on a frequency count of supportive behaviours (both task-related and emotional support) observed in the patients' spouses, for each one minute time blocks. Each couple's videotape is approximately three to twelve minutes long.

The objective of this scoring method is to obtain a global tally of observed supportive behaviours. Attached is a list of behaviours (derived in part from Gottlieb, 1984) to be used as a guideline (definitional) for the scoring of support. The classification of specific behaviours into specific categories is not required, as no sequential or behavioral content analysis will be performed on the data. The goal of the scoring method is strictly to obtain a total count of observed behaviours. The behaviour list is thus provided only to facilitate the observer's ratings, by providing general guidelines of behaviours to be considered supportive.

Support behaviours which are to be tallied are classified into (1) task-related and (2) emotional support behaviours. Each total frequency count is divided by the duration of the videotape session. Each spouse thus gets two tally scores. The counts obtained are also used to help raters formulate a global support measure, based on a five-point scale. Separate global measures are made for task-related and emotional support. These global support scores are used in the final regression analysis of the main study hypothesis.

Each observed behaviour gets a count of one. All behaviours are scored equally, as no differential weights are used. Although it is likely that some behaviours (e.g. touching) are experienced as more supportive than others (e.g. smiling), the observer's global rating will serve to account for such unquantifiable effects.

Behaviours falling under the category of "Other" are also tallied, and raters are to factor their occurrences into their global estimates of support.

## BEHAVIORAL ITEMS LIST

## A. Support behaviours

1. Task-related support behaviours

- . Encouragement to go on
- . Reinforcement
- . Task-related conversation
- . Monitoring patient's performance

2. Emotional support behaviours

- . Standing close to the bicycle
- . Making eye contact
- . Physical contact
- . Smiling
- . Expressing empathy, positive affect or general conversation of a positive tone
- . Listening attentively when patient is talking

## B. Other behaviours

3. Encouragement to stop4. Psychological absenteeism

- . Engaging in solitary activity
- . Doing and saying nothing

ITEM LIST DEFINITIONS

A. Task-related support behaviours

1. Encouragement to go on: Any statement or action designed to help the patient cycle longer or faster. Statement or actions can be used by spouse to motivate the patient, provide a helpful suggestion. Examples include statements such as "try to go a bit longer", "Can you do it any faster?" or "could you do it longer, if you just used one arm instead?" action examples include motioning with hand the signal GO.

2. Reinforcement: Any statement or action designed to let patient know he/she is doing well, or to make him/her feel good about performance to date. examples include "You're doing great" "You'd be half way to Montreal by now!". Examples of actions include thumb up in the air signal, or the O.K. Signal.

3. Task-related conversation: Any conversation (question or statement) related to the task, but which is not an encouragement or reinforcement. Examples include such comments as "Do you like that bicycle?" "Now I know what to get you for your birthday!" "does the wind feel good?" "How many minutes have you gone so far?" This also includes any humorous remarks made by the spouse about a particular aspect of the situation(e.g., look at those legs go!).

B. Emotional support items

1. Close proximity : If the spouse approaches the bicycle, stands near the patient or walks around the bicycle to have a better look at it. Each time the spouse approaches (if he/she comes back and forth from the bike).

2. Eye contact: Anytime the spouse looks directly into the patient's eyes, and the contact is acknowledged by patient, regardless of patient's reaction to it.

3. Physical contact: Anytime the spouse actually touches the patient in some way to express care or concern. For examples, the spouse places his/her hand on patient's hand, or rubs patient's back. Do not count if contact is hurtful, such as a slap or hit.

4. Expressing empathy, positive affect: Any understanding that the spouse appreciates the demands of the patient's task, or that the patient is in pain and that the spouse empathises with his/her situation. Or anytime spouse expression any affection. Examples include "I know this is hard for you" "I'll help you walk later, or give you a rub".

5. General conversation of a positive tone: Any time the spouse engages in conversation, not directly related to the task, but which is either neutral or positive in tone. Examples include "Gee, it's bright in here?" or "did you hear what Bob said at the party?"

6. Listening attentively: Anytime the spouse is "engaged" with the patient, without the spouse actually speaking. As long as there is indication that the spouse is paying attention or listening to the patient (e.g. says "Hem" "Yes" or "Oh", indicating that he/she is attending the patient's talking).

### C. Other behaviours

1. Encouragement to stop: Any action or statement designed to discourage the patient from continuing with the cycling. This can be either positive or negative in tone. Examples of positive tones are " Slow down, I don't want you to wear yourself out" or "Make sure you don't do too much and make your pain worse". Negative toned examples include " You know you can't do anything physical, why bother?" or "do go too much longer, or i'll never hear the end of it tomorrow!". Score as a P or a N on the frequency tally.

### D. Psychological absenteeism

1. Engaging in solitary activity: Anytime the spouse is engaged in doing something totally unrelated to the patient. Examples include reading, fiddling in one's purse or briefcase, cleaning one's eyeglass, paying attention to something in the room (mirror, cupboards) and not responding to patient's questions or remarks.

2. Doing and saying nothing: Anytime the spouse ignores the patient, but without necessarily doing something else. For example just sitting there silent and immobile.

## Appendix O

## Scoring system I for Expressed Support.

The pooled ratings of two independent observers, based on the videotaped recordings of the spouse's behaviour towards his/her partner during the exercising session were obtained. Raters were asked to count how many times they observed spouses engaging in any of the behaviours detailed on The Supportive Behaviours Checklist (see Appendix F). This checklist of supportive behaviours has been derived in part from the Classification Scheme of Informal Helping Behaviours (Gottlieb, 1978 and 1984) as operationalized by Barrera, Sandler and Ramsay (1981). Raters were also asked to count how many times they observed spouses engaging in any of the behaviours outlined on the punishing behaviours checklist (see Appendix F). This checklist has been derived in part from the punishing items list outlined by Krokoff, Gottman and Duffin-Hass (1989). The support and punishing behaviours frequency count were each divided by the duration, in minutes, of the videotaped sessions, in order to account for differences between patients in cycling time. Each of the two scores obtained for spouses thus represents a global unidimensional assessment, and is not designed for sequential or content analyses of support and/or punishing behaviours.

A pilot study using this method was conducted with five couples. Given that the scores obtained are based on a continuous scale, and not categorical data, the inter-rater reliability was assessed using Pearson product-moment correlation coefficients. This method of reliability measurement for frequency-based

observational data is outlined by Krokoff, Gottman and Duffin-Hass (1989). This method is also recommended by Harris (1975), who has demonstrated that calculating the degree of correlation between two sets of data can be computed with Pearson Product Moment coefficients, regardless of the level of measurement used to generate the data. Harris (1975) has noted that the Pearson coefficient, even when applied to categorical or other "imperfect" data, yields values practically identical to alternative methods, such as Cohen's Kappa and other non-parametric methods. Preliminary reliability analysis, conducted with pilot data, revealed that the reliability of raters for support scores was .895. The reliability of raters for punishing scores (only 2 spouses evidenced punishing behaviours) was .94. In addition to the frequency-based scores, observers were also asked to separately rate spouses on their overall supportiveness, using a five-point continuous scale, based on their clinical impressions. The inter-rater reliability of observers' clinical ratings was also assessed with Pearson product moment correlation coefficients, as outlined by Naliboff, Cohen, Swanson, Bonebakker and McArthur (1985) and Hooley (1986). Pilot data analysis of the clinical ratings yielded a reliability of .896. Inter-rater reliability was examined again in this fashion, at the completion of data collection. Pearson product-moment correlations was used to compute the reliabilities, based on a method outlined by Krokoff, Gottman and Duffin-Hass (1989). The reliability of raters for support scores was .50,  $p < .001$ . Observers were also asked to rate spouses on their overall supportiveness, based on their clinical judgement, using a five-point Likert-type scale.

The reliability of the clinically-derived ratings was .65,  $p < .001$ . The correlation between clinical and quantitative ratings was .60,  $p < .001$ . Although it is acknowledged that there are no fixed guidelines for what represents a reasonable level of reliability between observers when using Pearson correlations, beyond statistical significance and shared variance (Krokoff et al., 1989), given that the reliability obtained was less than predicted from the pilot investigation, the scoring system was modified (see Appendix N) and the videotapes were rescored by two new raters.