Studies and Research Projects

**MSDs
The Impact of Health, Illness,
Pain and Recovery-Strategy Representations
on the Work Rehabilitation Process**

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ABSTRACT

The occupational health and safety problem and specific objectives: Musculoskeletal disorders (MSDs) affect a large number of workers in Québec and generate major human, social and financial costs. A significant number of workers are left with persistent effects as a result of these disorders. In order to return to work safely and in good health, these workers often require a rehabilitation process. The reactivation/return-to-work (RTW) process is not necessarily linear. Workers often go through phases characterized by a physical, psychological and social progression that is positive at times and negative at others. These phases also have an impact on the attainment of the RTW objective. The main psychosocial components of these phases appear to be health, illness, and pain representations. The **general objective** of this study is therefore to document these representations and the strategies implemented with a view to achieving recovery and a return to work.

The **specific objectives** are as follows: (1) to explore the different conceptual frameworks that exist concerning illness and pain representations; (2) to conduct a survey of the tools used to measure representations; and (3) to describe health, illness, pain and recovery-strategy representations, and their progression during the work rehabilitation of individuals experiencing their first episode of long-term absence from work due to an MSD. **Method.** With regard to the first objective, a critical review was conducted of the literature from the 1960s to the present within the main bibliographic databases on health, health/safety and psychology. For the second objective, a survey of measurement methods and tools was conducted, also using databases. A multiple-case study design was retained for the third objective. A case was defined as a worker on long-term absence from work due to an MSD and having been admitted to an interdisciplinary work rehabilitation program. Case observation was longitudinal and performed on the basis of a series of interviews.

Results obtained: Our critical review of the different representation models highlighted the importance of adopting a multidimensional approach if we are to understand workers' representations. In terms of personal experience, this approach must include the person's cognitive and emotional representations, as well as the interactions between the person and his or her environment. Our survey of the tools used to measure representations revealed that few such tools exist and that they have not been adapted to or validated in a rehabilitation context. Based on the results of our content analysis of the worker interviews conducted, we observed, with regard to the health and illness representations described, that (1) there was convergence and stability; (2) they fell into action/inaction and functional/dysfunctional polarities; and (3) most of the workers did not refer to themselves as "sick" and often defined the components of their illness in the same terms as they used to define their current state (i.e. condition at the time of the interview). Regarding pain and adaptive strategy representations, the workers who were back at work by the end of the rehabilitation process (1) mentioned clear, specific aims geared toward a return to work; (2) reported using active pain-management strategies, which they regarded as effective; (3) adopted strategies that changed and were gradually refined, and (4) experienced a reduction in their pain signal during their rehabilitation. Regarding the workers who were not back at work, (1) they perceived themselves as having little control over their pain, and (2) their goals remained general and unclear, such as the need to be believed or the need to endure the pain.

Benefits of this study: This study highlights the importance of the role played by representations in the adjustments made in the trajectories of workers with MSDs. It therefore appears essential that health professionals working in this field systematically assess these representations in order to adjust their own interventions in a more personalized manner and thus improve the quality of care delivered. Moreover, where a clinician is more closely attuned to a worker's representations, the worker appears to stand a better chance of progressing toward a return to activity.

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1.   STUDY CONTEXT

1.1 Importance of the subject

Musculoskeletal disorders (MSDs) affect a large proportion of Québec workers. In 2001, they accounted for 38% of all compensated work-related injuries and generated sizeable human, social and financial costs [($578 million en 2001); (CSST, 2002a, 2002b)]. These disorders leave persistent and recurring effects (sequelae) in a significant proportion of workers, roughly 8%, who are responsible for half of all compensation costs (CSST, 2002a, 2002b). The occupational reintegration of these workers with MSDs is a priority in the context of the CSST's policy of maintaining the employment relationship. This worker population often requires a rehabilitation process in order to return to work safely and in good health.

An assessment of the results of recent studies, particularly those conducted in Québec, has revealed major advances in our understanding of the dynamics of work disability and occupational reintegration (Baril, 2002). A number of studies, which we either led or collaborated in, have shown that the occupational reintegration of workers is a reality involving a set of factors. These factors pertain to the workers' psychosocial and sociodemographic characteristics, the workplace, and the medical, administrative and legal processes involved (Baril, Martin, Lapointe, & Massicotte, 1994; Loisel et al., 1997; Loisel et al., 2001). Yet the impact of the different factors and their interactions on the rehabilitation process of workers with MSDs remains a subject that has been little studied to date.

1.2 Rationale for the research

In order to act more effectively on this set of factors (e.g. workers, workplace, healthcare interventions and administrative processes), and to coordinate efforts to manage workers undergoing rehabilitation, interdisciplinary approaches based on the most recent evidence-based data have been developed in Québec. The PRÉVICAP[1] program of the Centre d'action en prévention et réadaptation de l'incapacité au travail (CAPRIT) has been a leader in training different teams (M. J. Durand, Vachon, Loisel, & Berthelette, 2003; Loisel et al., 1997). A specific research project was carried out in the context of this clinical program and brought to light one facet of the occupational reintegration process of workers with MSDs that has not been documented to date. That project was entitled *"Decision-making to facilitate a return to work – Exploratory study of the aspects of decision-making in an interdisciplinary work rehabilitation team"* and was financed by Healnet and the IRSST. Through secondary analysis, which was qualitative in nature, of the raw material obtained from the study, four types of trajectories illustrating workers' progress through the rehabilitation process were identified. This process was inspired by the work of Weber (1965, cited in Gerhardt and Kirchgassler (Gerhardt & Kirchgässler, 1987) and of Baril et al. (Baril et al., 1994)). The following four trajectories were observed: (1) return-to-work trajectories with no obstacles, (2) return-to-work trajectories with obstacles, (3) non-return-to-work trajectories with episodes of progress, and (4) non-return-to-work trajectories with no episodes of progress. These trajectory types were constructed on the basis of the various factors observed, such as duration of work absence, level of psychological distress, heavy job demands, poor collaboration from the attending physician, lack of progress

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[1] This program is described in IRSST Report R-489 (Durand et al., 2007).

during work conditioning activities, recurrence of pain during exposure to work and lack of openness on the part of the workplace.

The return-to-work trajectory with no obstacles and the non-return-to-work trajectory with no progress were the exceptions. The majority of cases experienced non-linear periods en route to their occupational reintegration. Based on our observations, these episodes of stagnation, regression or acceleration during the rehabilitation process were caused by different types of potential triggers, including ambiguous diagnoses, the announcement of the gradual return to the work, the reception given in the workplace, individual physical and psychological factors and factors related to the social environment. According to the clinicians involved in the study, these episodes were often accompanied by physical and psychological reactions, such as an increase in anxious and depressive mood, interpersonal problems, increased pain or a new event. How these reactions evolved in turn influenced the outcome of the rehabilitation program. Thus, the maintenance or aggravation of the reactions was associated more with a non-return to work (trajectories 3 and 4). The content and dynamics of such episodes are poorly understood, despite their importance in the rehabilitation and return-to-work process. We therefore deemed it important to explore these aspects. In this regard, a qualitative approach made it possible to document both their dynamics and content in detail. More specifically, through content analysis, we studied the workers' discourse about their health, illness and pain representations and the strategies they developed to work toward recovery. This gave us access, with a certain scientific rigour, to the workers' psychosocial representations of their rehabilitation experience, and hence a better understanding of the impact these representations had on their behaviours with respect to the therapeutic management initiatives taken to facilitate their occupational reintegration. Ultimately, this process helped equip the clinicians and rehabilitation counsellors to offset the potential, negative impacts of some of these representations that were hindering the return to work and job maintenance.

1.3 Current state of scientific knowledge on the subject

Only recently have studies been conducted in the field of work rehabilitation concerning workers with MSDs and persistent disabilities. The major themes that have been investigated are the identification of the predictive factors of disability, such as age, gender, MSD history, the person's ability to see him-/herself back at work, the presence of catastrophizing thoughts, the degree of disability resulting from the injury (Crook, Moldofsky, & Shannon, 1998; Lehmann, Spratt, & Lehmann, 1993; Loisel et al., 2001; T. Mayer et al., 1998; Truchon & Fillion, 2000), the effects of the program on the return to work or the person's functional state, (Bendix, Bendix, Busch, & Jordan, 1996; Jousset et al., 2004; Lindstrom et al., 1992; Loisel et al., 1997; Mayer, Polatin, & Gatchel, 1998; Mitchell & Carmen, 1994) and the cost-effectiveness or efficiency of the programs (Anema et al., 2004; Loisel et al., 2002; Yassi et al., 1995). Only a few studies have sought to understand the processes that occur during rehabilitation. Most of these have focused on the perceptions that the various stakeholders who are more or less directly involved in the rehabilitation process have of their management leverage. For example, the study conducted by Hansson et al. (Hansson, Bostrom, & Harms-Ringdahl, 2001) concerned the perceptions held by physicians and insurance representatives of their role in the rehabilitation process. Baril's exploratory study (Baril et al., 1994) of the perceptions held by the various stakeholders involved in worker rehabilitation (employers, representatives of the medical community and the CSST) revealed a set of factors that appear to facilitate the rehabilitation process. All these partners signalled the importance of the quality of the support relationship

offered to the injured worker, of personalized case follow-up and of obtaining clear and precise medical and administrative information. Similarly, the study conducted by Friesen et al. (Friesen, Yassi, & Cooper, 2001) underscored the importance placed by rehabilitation professionals on effective communication with other stakeholders, in terms of facilitating the intervention process with injured workers. Moreover, a recent study has shown that joint action by the different partners involved in the rehabilitation process (attending physician, insurer's and employer's representatives and the worker) was the key factor in a healthy return to work (M. J. Durand, Berthelette, Loisel, Beaudet, & Imbeau, 2007).

The majority of studies therefore look at factors pre- or post-dating the therapeutic process or at the perceptions held by certain stakeholders, while few investigate the process itself. The implicit assumption underlying these studies is that the reactivation process is linear, i.e. the worker progresses in a relatively stable manner toward recovery until returning to work at the end of the program. Yet the results obtained in the *"Decision-making to facilitate a return to work"* study reveal an absence of linearity in this process in the vast majority of cases. Instead, workers pass through phases that hasten or compromise their occupational reintegration and their perception that recovery is possible. At present, the factors contributing to the triggering of these phases of progression and regression are poorly understood. These factors would appear to be related to representations that, in turn, are seemingly influenced by both psychosocial characteristics and factors pertaining to the worker's medical, legal and occupational environment. The results obtained by Dionne et al. (Dionne, Bourbonnais, Fémont, Rossignol, & Stock, 2004) also point to the importance of looking at the representations workers form of their illness and of the recovery process. These authors observed, in workers with low back pain, that work-related fears and beliefs ranked among the key determinants of a non-return to work two years after injury. Self-efficacy (Bandura, 1997) in terms of the return to work, i.e. a person's belief that he or she is able to return to work successfully, is also one of the main determinants of a return to work among workers with low back pain. These different factors enter into the representations workers form of their situation and of the subsequent process (illness, pain and recovery). This non-linearity and the mechanisms controlling illness and pain representations must therefore be understood from a transdisciplinary approach. More specifically, communication must be encouraged among the different scientific fields, without seeking to differentiate between them, or to separate or oppose them (Morin, 1990).

1.4 Different disciplinary approaches to the therapeutic process

In seeking to understand the dynamics of the rehabilitation process, an examination of the literature indicates the need to call upon models developed in the fields of health psychology, medical anthropology and health sociology. Since the end of the 1960s, models were developed simultaneously in these disciplines, but most often in a compartmentalized manner. Moreover, they appear to have broached the MSD problem and worker rehabilitation only very marginally. It is therefore necessary to take stock of this knowledge and to review and document the concepts and theoretical models involved if we are to attempt a transdisciplinary rapprochement and ascertain their applicability to the rehabilitation of workers with MSDs.

Coutu et al. (Coutu et al., 2000) compiled a critical summary of the different models (biomedical, behavioural, social-cognitive, theory of planned behaviour, transtheoretical, Health Belief Model, etc.) proposed in social psychology and health psychology, and concluded that the self-regulation, or "commonsense," model (H. Leventhal, Brissette, & Leventhal, 2003)

developed by Leventhal et al. (H. Leventhal, Meyer, Nerenz, & Rachman, 1980) seemed to be the most appropriate model, even if it was developed for another study purpose, i.e. the adoption of healthy behavioural habits. The self-regulation model (H. Leventhal et al., 1980) could be considered a working tool for purposes of reference and interdisciplinary comparison, i.e. comparison with other conceptual models developed in anthropology and sociology. In a synthesized manner, the self-regulation model proposed by Leventhal et al. (H. Leventhal et al., 2003; H. Leventhal et al., 1980) states that the person is an active agent in solving his or her own problem in that he or she seeks to reduce the gap between his or her current state and the state sought (Horne, Weinman, Myers, & Midence, 1998) and that the representation the individual forms of his or her problem guides the action plan developed and adaptive strategies adopted (H. Leventhal et al., 1980). There are two levels of representations: individual and social. Individual representations are idiosyncratic and reflect a person's way of being and thinking (Massé, 1995; Toombs, 1987). Social representations encompass a set of individual representations that reflect a system of collectively shared values, norms, attitudes and beliefs (Abric, 2003; Jodelet, 1989). Individual representations may thus be constructed on the basis of a person's life experiences and interactions with others, and using thought processes, knowledge and information models conveyed through education (Jodelet, 1989). The more extensive the person's illness experience (several episodes or long illness duration), the greater the risk of the representation crystallizing and becoming difficult to change.

Regardless of its merit, a cognitive and behavioural model such as that of Leventhal et al. (H. Leventhal et al., 1980) and the appraisal of its application in scientific studies (Hagger & Orbell, 2003) pose several challenges in the context of the rehabilitation of workers with MSDs. First, this model was developed in a social psychology context in order to understand the adoption of healthy behaviours with regard to health, and not in the context of a social and occupational rehabilitation process. Second, the studies using this model examine health problems other than work-related MSDs, such as problems relating to cardiology (Coutu, Dupuis, D'Antono, & Rochon-Goyer, 2003; Meyer, Leventhal, & Gutmann, 1985; Petrie, Broadbent, & Meechan, 2003), diabetes (Glasgow, Hampson, Strycker, & Ruggiero, 1997; Skinner, Hampson, & Fife-Schaw, 2002) and various functional somatic syndromes [(e.g. fibromyalgia, chronic fatigue, and tension headaches) (Heijmans, 1998, 1999; Moss-Morris, Petrie, & Weinman, 1996; Scharloo & Kaptein, 1997)]. Third, while a meta-analysis was carried out to support the theoretical model, (Hagger & Orbell, 2003), it only retained quantitative empirical studies. Yet a number of authors in the fields of sociology and anthropology regard representations as accessible through discourse, i.e. through qualitative materials. Finally, although it would appear that the model categories and the adaptive strategies can be generalized, and, according to Hagger and Orbell (Hagger & Orbell, 2003), in relation to the expected outcomes, their use in a specific context such as the management of workers in an interdisciplinary rehabilitation centre involving several types of therapists (occupational therapist, psychologist, physician, ergonomist, etc.) and several societal stakeholders (counsellor, employer, union, etc.) has yet to be tested. The fact that this project focuses on more specific aspects, such as the reality as perceived by the worker, must not discount all the other interactions that are possible.

In summary, MSDs that persist beyond six months are among the most costly problems in terms of healthcare costs. Workers' representations and perceptions, mainly of pain, are one of the risk factors perpetuating their work disability. In fact, certain erroneous representations may lead to behaviours that are poorly adapted to reducing the work disability. If the situation persists, the representation risks crystallizing and becoming more resistant to change. To date, no study has

endeavoured to identify illness and pain representations and the adaptive strategies adopted with a view to recovery, in workers undergoing rehabilitation for a first episode of an MSD. The same applies to the mechanisms that may be associated with changing this representation during the occupational reintegration process.

1.5 Research objectives and questions

The general objective of this exploratory study was to document the psychosocial mechanisms underlying changes in workers' rehabilitation trajectories. These mechanisms appear to be associated mainly with the representations that workers form of their health, illness, pain and adaptive recovery strategies.

The following sub-objectives were defined as a means of attaining the general objective:

1. Explore the existing conceptual frameworks for illness and pain representations developed in three scientific disciplines (medical anthropology, health psychology and health sociology) and in a thematic field, specifically, MSD literature.
2. Survey and document the tools used to measure the various components of health, illness and pain representations.
3. Describe the representations formed of health, illness, pain and adaptive recovery strategies, as well as their progression during the work rehabilitation process, in workers experiencing a first episode of long-term absence from work due to an MSD.

Given that the sub-objectives entail different methods, these objectives will be described separately, each with its specific methods and results.

1.6 Objective 1 – Explore the existing conceptual frameworks for illness and pain representations developed in three scientific disciplines (medical anthropology, health psychology and health sociology) and in a thematic field, specifically, MSD literature.

1.6.1   Method

A survey was conducted of the French- and English-language literature, commencing from the 1960s, when the first writings on representations surfaced in anthropology, sociology and psychology. The following bibliographic databases were consulted: *Health and Safety (HSEline, CISDOC, INRS-bibliography)*, *Library of Congress*, *Bibliothèque nationale de France*, *PsychINFO*, *PubMed*, CINAHL, *Social Science* and *Francis*. The following keywords were used: *disease*, *illness* or *pain.* Each keyword was combined with one of the following words: *representation*, *belief*, *attitude* or *cognition* and with *model*, *phenomenology*, *hermeneutics*, *medical anthropology* or *narratives*. The bibliographic research was conducted by a librarian specialized in occupational health and safety databases. A total of 2,655 references was obtained. These references were then reduced to only those concerning an adult population; studies conducted in the palliative care, neurology, gastroenterology, cancer and psychiatry contexts were excluded. This left a total of 441 references. The abstracts for these references were then read by a research assistant, and if needed, submitted to the investigators for confirmation of their relevance. The inclusion criteria were as follows: (1) concerned with persistent pain of musculoskeletal origin; or (2) concerned with a theoretical or methodological model related to illness or pain representations; and (3) contributing a new, or substantial, understanding of the main models used to interpret and analyze data. A manual search was also done of lists of references, appropriate journals and symposium proceedings. A total of 131 articles and book chapters were selected for critical analysis. An analytical grid was developed and validated to promote rigorous content analysis.

Interrater agreement was obtained between the research assistant and one investigator at the beginning of the literature analysis, and was deemed satisfactory.

Our content analysis of these articles brought to light different theoretical models and approaches, which can be divided into three categories: (1) personal experience; (2) interactionist; and (3) sociocultural. These models and approaches are illustrated in Figure 1.

Figure 1: Theoretical Models and Approaches

Individual   Society

Personal experience   **Interactionnist**   **Sociocultural**

•Fear-avoidance model   •Sick role   • Sociocultural
•Transtheoretical model   approach   models of health
•Lay theories   and illness
  • Commonsense model   •Therapist/patient
    of self-regulation   communication/
  • Personal construct   relationship
    theory   approach
  • Biographical/illness
    trajectory approach   • Gender analysis
                                  approach

Personal Experience Models

The personal experience models provide an understanding of specific behaviours, life trajectories and therapeutic processes experienced by individuals. They include models with sometimes drastically different vantage points, but that share a common interest in representations or their components, i.e. the beliefs and attitudes underlying individuals' behaviours in relation to illness and sometimes pain. The fear-avoidance model (Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995), the transtheoretical model (Prochaska, Norcross, & Di Clemente, 1994) and lay theories have been classified in this category. Lay theories include the commonsense model of self-regulation (H. Leventhal et al., 1980), the personal construct theory (Kelly, 1955) and the biographical/illness trajectory approach (Bury, 1982).

Fear-Avoidance Model

The fear-avoidance model has been widely used and validated in populations with an MSD in the acute or subacute pain phases (Fritz, George, & Delitto, 2001; Goubert, Crombez, & De Bourdeaudhuij, 2004; Jensen & Karoly, 1992; Jensen, Romano, Turner, Good, & Wald, 1999; Keen et al., 1999; Knish & Calder, 1999; Vlaeyen et al., 1995; Vlaeyen & Linton, 2000; Vowles & Gross, 2003; Waddell & Burton, 2005; D. A. Walsh & Radcliffe, 2002; Werner, Ihlebaek, Skouen, & Laerum, 2005; Woby, Watson, Roach, & Urmston, 2004). This model illustrates kinesiophobia, or the fear of physical movements or that they will lead to dramatic consequences caused by pain (Kori, Miller, & Todd, 1990). According to this model, based on their prior experiences, some people catastrophize their pain, thereby maintaining their fear (Vlaeyen et al., 1995; Vlaeyen & Linton, 2000; Waddell & Burton, 2005). This fear is managed by avoiding the physical activity associated with it, which in turn promotes the development and maintenance of the disability (Vlaeyen et al., 1995; Vlaeyen & Linton, 2000; Waddell & Burton, 2005). Several studies substantiate the validity of this model, observing, among other things, a change in perceptions and a decrease in physical-activity avoidance behaviours and hence, in the disability, following a rehabilitation program (Goubert et al., 2004; Vowles & Gross, 2003; D. A. Walsh & Radcliffe, 2002).

This model is mainly rooted in the so-called behavioural models and is centred on the individual. It does not, therefore, allow for associations to be made with the environment in which the individual interacts. Also, it addresses only those mechanisms associated with managing fear of movement and pain. Yet other types of emotions could explain the behaviours adopted. For example, resisting a return to work may be associated with a feeling of dissatisfaction when the work task is perceived as difficult because it is non-gratifying. The same applies if a job poses a source of frustration or interpersonal tensions, which could hinder task performance. In conclusion, this model helps provide an understanding of the development of phobic behaviours. However, it does not necessarily provide insight into the individual's interaction with his or her environment, a factor that could influence his or her behaviours.

Transtheoretical Model

The transtheoretical model focuses on the processes associated with behaviour changes (Prochaska, DiClemente, & Norcross, 1992; Prochaska et al., 1994). It identifies five stages that the individual goes through in order to initiate and maintain a change in behaviour (Prochaska & Norcross, 2001; Prochaska et al., 1994). These stages are summarized in Table 1. Most individuals who are undergoing treatment, i.e. who are in the process of change, go through these stages at relatively fast paces (Kaplan, Sallis, & Patterson, 1993). The progression from one stage to another is not linear and there are many change profiles. In fact, there may be periods of stagnation, regression to previous stages and temporary abandonment (Prochaska et al., 1994). The stages are probably the best-known component of the model, even though this component is not descriptive. However, the transtheoretical model also includes a functional aspect incorporating the processes of change that help shed light on the mechanisms which induce a person to change stages. These processes take into account the components of the representation, i.e. beliefs and attitudes.

Table 1: Stages and Characteristics of the Transtheoretical Model

Stage	Characteristics	Example
Precontemplation	The individual is not ready for or does not envisage change.	The individual does not want to return to work as long as he or she experiences pain.
Contemplation	The individual is considering the possibility of change.	The individual contemplates the pros and cons of making a gradual return to work.
Preparation	The individual develops an action plan.	The individual asks for his or her physician's opinion about a gradual return to work and requests a physical reconditioning program.
Action	The individual makes the change.	The individual does the exercises requested and collaborates with the health professional.
Maintenance	The change is integrated into the person's routine and becomes part of his or her way of functioning.	The individual has resumed his or her regular pre-injury job.

Many processes of change are identified in the transtheoretical model. These include various cognitive (e.g. clarification of beliefs) and behavioural (e.g. a gradual return to work) activities (Prochaska et al., 1992; Prochaska et al., 1994). For example, increased knowledge and awareness of the problem can help a person move from the precontemplation to the contemplation stage (Prochaska et al., 1994). Also, encouraging the person's belief in his or her ability to change can help the person move on to the action stage (Gibertini, DiClemente, & Prochaska, 1985; Prochaska et al., 1992; Prochaska et al., 1994). This concept overlaps with the concept of self-efficacy described by Bandura (Bandura, 1977, 1997). Self-efficacy is one of the best-known and most frequently investigated concepts in the field of behaviour modification in health psychology (Kaplan & Simon, 1990). It involves the belief that a person has in his or her own abilities to successfully adopt a behaviour regarded as necessary to attain a given result (Bandura, 1977, 1997). The perception of self-efficacy will affect the choices and efforts made, response to stress and persistence shown in the face of difficulties (Bandura, 1977).

According to this model, all transitions from one stage to another take place when a shift has occurred in what is called the decisional balance (Dijkstra, 2005). It involves the person's analysis of the pros and cons prior to the decision to change. However, the analysis does not include the weight that a person may place on each of the components of the analysis. Moreover, in anthropology, this type of analysis is criticized for reflecting primarily an economic logic in which the choices people make depend on purely rational criteria, when in actual fact, the analysis is not always rational (Massé, 1995).

The transtheoretical model has been adapted in the MSD field and is known as the Motivational Model of Pain Self-Management (Jensen, Nielson, & Kerns, 2003). Its key component is readiness to change. The studies conducted on populations with an MSD report that the individuals best equipped to self-manage their pain are those who show the most adaptive behaviours, such as persistence in physical effort, and fewer behaviours such as overprotecting the painful area (Jensen, Nielson, Turner, Romano, & Hill, 2004). Keller et al. (Keller, Herda, Ridder, & Basler, 2001) corroborated these results by observing that the adoption of healthy postures by subjects suffering from low back pain occurs mainly among people who are at the action and maintenance stages (Keller et al., 2001).

In order to promote a more specific understanding of the readiness for a return to work, Franche and Krause (Franche & Krause, 2002) have theoretically integrated the Phase Model of Disability (Krause & Ragland, 1994) into the transtheoretical model (Prochaska et al., 1994). The advantage of this approach is that it shifts the focus away from the individual by also incorporating factors related to the work environment and the healthcare and compensation systems.

In conclusion, the transtheoretical model, and particularly its processes-of-change component, help to identify certain factors that could explain the readiness to change. On the other hand, it does not help to document the mechanisms underlying the readiness to change, such as the factors that might alter a person's perception of his or her self-efficacy.

Lay Theories

Lay theories are illness representations constructed by a person who is seeking to give meaning to his or her illness. These representations pertain to personal, subjective experiences of illness, and to the interpretation given to the information received from health professionals or conveyed by the media and through interpersonal communication (de Ridder, de Wit, de Ridder, & de Wit, 2006; Flick, 1993; Furnham, 1994; Lawton, 2003; H. Leventhal et al., 1997; Murray, Bennett, & Weinman, 1990). Lay theories may be defined as a commonsense model that guides the development of an action strategy (Jodelet, 1989; H. Leventhal et al., 1997). They are distinguished from expert knowledge by their idiosyncratic (Massé, 1995) and informal (Jodelet, 1989) nature, and are expressed in the language specific to any given individual. Leventhal's commonsense model of self-regulation (H. Leventhal et al., 1980), the personal construct approach (Kelly, 1955) and the biographical/illness trajectory approach (Bailey & Koney, 2000; Bury, 1982; Charmaz, 1983; Good, Brodwin, Good, & Kleinman, 1992; Kleinman, 1988; Williams, 1984) all fall into the category of lay theories.

Self-Regulation Model

The self-regulation or commonsense model is based on the hypothesis that individuals are active agents in solving their own problems (Horne et al., 1998). According to this model, a representation is constructed on the basis of the person's previous experiences or those observed in others (H. Leventhal et al., 1997), and on the basis of sociocultural and contextual factors such as the family, social network, co-workers, medical professionals and media. (H. Leventhal et al., 1997). The resulting cognitive representation will elicit the emotional reaction, which could in turn lead to certain actions (H. Leventhal et al., 1980; J. T. Young, 2004). Thus, according to problem-solving principles, based on the person's cognitive representations and emotional responses to his or her illness, he or she sets goals to achieve, develops an action strategy, and lastly, compares the outcomes obtained with the goals sought (H. Leventhal et al., 1980). For example, an individual may perceive his or her pain as being different from that experienced in the past. This discrepancy will lead the person to consult different professionals, who might offer seemingly contradictory diagnoses or explanations. These factors will contribute to the construction of a representation more or less consistent with biomedical knowledge, and generate maladapted pain management behaviours. In fact, if the problem has not been well understood to begin with, there is a high risk of a maladapted solution.

The self-regulation model gives the illness representation concept a broader meaning than strictly the perception of severity or disability (Schiaffino, 1998). This model divides representations into five categories (H. Leventhal et al., 1997): (1) illness identity, i.e. the perception of the diagnosis and symptoms (H. Leventhal, Zimmerman, & Gutmann, 1984), (2) the timeline of the disease (acute, cyclical or chronic); (3) the perception of the physical, economic and social consequences (Croyle & Jemmott, 1991); (4) the causes (H. Leventhal, Diefenbach, & Leventhal, 1992) and (5) the perception of control, which includes Bandura's concept of self-efficacy (Bandura, 1977), the expectation of treatment efficacy (Bandura, 1977) as well as the skills for coping with the situation (H. Leventhal & Diefenbach, 1991). These categories are similar to the characteristics put forward by the explanatory models of illness developed by Kleinman in medical anthropology (Kleinman, 1980; Massé, 1995). These models include the definition of the problem, symptoms perceived, duration, severity, consequences perceived or expected, causes, appropriate treatment and outcomes anticipated (Kleinman, 1980; Kleinman & Seeman, 2000). Although the self-regulation model (H. Leventhal et al., 1997) takes into account the interaction between cognitive and emotional factors, this link has been the subject of little investigation (Coutu et al., 2003).

The commonsense model of self-regulation includes feedback loops in the problem-solving process (H. Leventhal, Nerenz, Straus, & Mechanic, 1982). Ideally, when there is feedback, the self-regulatory system is said to be "stable," thereby fostering the adoption of behaviours adapted to the problem (H. Leventhal, Nerenz, Straus et al., 1982). The self-regulatory system is said to be disorganized when the behaviours adopted distance the person from his or her goal. The person is thus unable to identify the major clues that signal the need for a readjustment (H. Leventhal, Nerenz, Straus et al., 1982). In the preceding example, if, based on his or her understanding, the individual believes that reducing physical activity will help reduce the pain experienced and he or she actually observes a reduction in pain in the short term, the person will maintain the strategy, which he or she regards as effective. From his or her perspective, the self-regulatory system is stable, yet seen from a health professional's perspective, the individual is functioning in a disorganized system because reducing physical activity increases the disability.

The originality of the commonsense model of self-regulation lies in the fact that it allows for a decentralizing of the individual perspective and for its relocation in the context of broader personal experience by integrating environmental factors such as work, family and social network. This model has also been studied in relation to different health problems, and the results observed substantiate the model's validity (Buick, Petrie, & Weinman, 1997; Heijmans, 1999; Moss-Morris et al., 1996; Petrie, Moss-Morris, & Weinman, 1995; Petrie, Weinman, Sharpe, & Buckley, 1996; Scharloo & Kaptein, 1997). However, these studies concentrated primarily on the individual within the medical context and did not include environmental factors as intended in the overall model. Therefore, even though the model appears promising, it has yet to be validated in other contexts that include environmental factors, such as with patients who have a work disability due to persistent pain of musculoskeletal origin. This context would allow for the integration of environmental factors, and accordingly, for study of the model in its entirety.

Personal Construct Theory

The psychology of personal constructs (Kelly, 1955) derives from the phenomenological paradigm (Blowers & O'Connor, 1996). According to this theory, the individual interprets the world as a scientist does, by forming hypotheses to explain reality. These hypotheses will be retained if they prove effective in predicting and explaining events.

The set of hypotheses formed make up the individual's personal construct system. The system helps the person organize and structure his or her perceptions, making it easier to interpret things. More specifically, a construct is a coherent way of representing an aspect of reality to oneself, by means of pairs of opposing or polarized (explicit and implicit) hypotheses for each aspect (Kelly, 1955). For example, regarding job satisfaction, a worker may have formulated the hypothesis that it is important for him or her to receive recognition from co-workers (explicit pole). Hence, recommending that the worker take breaks to manage his or her pain on a construction site would elicit the opposite hypothesis (implicit pole) in this person, i.e. that "those who take breaks are shirkers; I don't want to be seen as a shirker, so I won't take any breaks." According to this model, to help the individual change behaviours, it would be necessary to access this problematic construct and to try to shake up his or her system to reveal the implicit pole that prevents him or her from managing the pain at work.

Both poles, resulting from opposing hypotheses, are considered to be the individual's reality, rather than his or her representation of an external reality. This distinguishes the theory from the other approaches, which compare the individual's beliefs or representations to the biomedical knowledge, which might then be regarded as the "truth." This model makes it possible to describe the interpretation processes used by the individual to develop his or her personal constructs, and provides a systematic analysis framework for accessing these constructs (Blowers & O'Connor, 1996). This aspect may prove very useful if, during treatment, the individual appears resistant to change. In fact, analysis may reveal a problem within the construct system in which the individual resorts to a personal construct despite its constant invalidation (O'Connor, Gareau, & Blowers, 1994). This aspect is also similar to the feedback loops in the commonsense model of self-regulation.

The personal construct theory distinguishes itself from the self-regulation model, which constitutes a macro model that provides insight into the main principles behind the solving of a medical problem. In fact, the commonsense model of self-regulation focuses more on the impact of

representations on an individual's actions than it does on the cognitive processes related to the construction of these representations. By contrast, the personal construct theory has a micro focus: in addition to opening the door to representations, it helps to identify the opposing hypotheses implicit in these representations, which may sometimes be problematic during the course of treatment. Primarily, it makes it possible to describe how two seemingly similar elements (e.g. two situations) may elicit totally different interpretations in the same person, depending on the context and the moment when they are interpreted. For example, the "feeling pain" element may be considered normal at the end of a workday. However, the same element may become very distressing if it persists for several weeks. The individual may then choose inaction because of the implicit pole, "If I move too much, I'm going to make my condition worse." After undergoing a treatment that targets this element, the individual may be able to construct new hypotheses, such as, "If I want to get better, I must stay active," in which case his or her implicit pole becomes, "Even if it hurts, I won't injure myself."

While this model may seem to focus solely on the individual, it does not exclude the impact of the environment on the interpretation processes. This approach also gives rise to possibilities for analysis using Kelly's repertory grid techniques (Kelly, 1955), although it has been used more in clinical settings than in research. To date, this approach has not been validated in the MSD field.

Biographical/Illness Trajectory Approach

The biographical/illness trajectory approach (Bury, 1982; Charmaz, 1983; Good et al., 1992; Kleinman, 1988; Williams, 1984) seeks to reconstitute the trajectory and the meaning given to the illness by the individual. It is based on the biographical approach developed in qualitative sociology (Berger & Berger, 1972), drawing mainly on interactionist (Corbin & Strauss, 1992; Goffman, 1974; Strauss & Glaser, 1970), socioconstructivist (Berger & Luckmann, 1966) and phenomenological (Schütz, 1967) theories. The biographical approach underwent considerable development in health and illness sociology by providing deeper insight into individual trajectories and the "sickness career" (Twaddle, 1980) also known as the *"maladie-métier"* (Herzlich, 1969, 1984). The latter is defined as an illness that marks a person's identity and corresponds to a specific social role, i.e. that of a sick person, just as a person might have the role of a parent or worker (Herzlich, 1984).

From this perspective, Bury (Bury, 1982) introduces the theme of biographical disruption. This disruption implies a reconstruction of the meaning of the illness experience (Williams, 1984). Through this process, the idea of a before/after and of "loss" often appears (Charmaz, 1983), to which may correspond the loss of self-image with none other replacing it (loss of self/discovery of self in illness) (Charmaz, 1983; Lawton, 2003). Bury (Bury, 1982) showed that the personal experience of the chronically ill obliges them to find meaning in an illness which, at first glance, has none, in order to find an acceptable self-image (in their own eyes and those of others), and to adopt coping strategies that will allow them to adapt to their situation.

A number of studies conducted on populations experiencing persistent pain due to an MSD underscore this theme of loss (Beaton, Tarasuk, Katz, Wright, & Bombardier, 2001; Garro, 1994; Shaw, Segal, Polatajko, & Harburn, 2002; Söderberg, Jumisko, & Gard, 2004), based on narrative accounts of the pain experience in which the prolonged work stoppage is often described as being associated with loss of self-esteem, a feeling of uselessness and a weakening of self-image (Baril et al., 1994; Shaw et al., 2002). The prolonged work stoppage is also associated with a feeling of

having lost control over one's life (Beaton et al., 2001; Walker, Holloway, & Sofaer, 1999) and with the difficulty of reconstructing a self-image that incorporates the idea of a sick or diminished body (Garro, 1994).

Other themes central to the illness narrative concern the therapist/patient relationship, including the association between listening, understanding and satisfaction with the care received (Dean, Smith, Payne, & Weinman, 2005; Walker et al., 1999) and resistance to the psychological referral (Garro, 1994; Lillrank, 2003; Osborn & Smith, 1998; Söderberg et al., 2004). Another category of theme concerns the person's difficulty legitimizing his or her sick status in the eyes of those around him or her, largely because of the diagnostic ambiguity (Baril et al., 1994; Beaton et al., 2001; Lillrank, 2003; Osborn & Smith, 1998). A study conducted by Garro on this subject (Garro, 1994) highlights the importance of seeking a diagnosis in the medical trajectory of patients with persistent pain; for the latter, a diagnosis signifies that they are at last being taken seriously and can begin a therapeutic process, as if the mere fact of giving a name to the problem equated to the concept of "curability." Garro (Garro, 1994) shows that the attribution of a diagnosis leads to a series of problems resulting from dissatisfaction with the treatments received, and may even cause some patients to seek assistance outside the conventional healthcare system, notably through alternative types of medicine.

Somewhat like Leventhal's commonsense model of self-regulation (H. Leventhal et al., 1980), the biographical approach focuses on the person's broader life experience, i.e. the meaningful experiences that structure his or her representations and health or illness behaviours. However, the difference in the two models lies in the fact that the biographical model is characterized by the systematic recourse to life narratives, thus highlighting the contextual and sociocultural factors, whereas the latter factors remain more theoretical than operational in the studies that use Leventhal's commonsense model of self-regulation (Brown, 2004; Cameron et al., 2005; Fortune, Barrowclough, & Lobban, 2004; Heijmans, 1999; P. A. M. Leventhal, Robitaille, Leventhal, Swigar, & Leventhal, 2002; van Mens-Verhulst, van Dijkum, van Kuijk, & Lam, 2003; D A. Walsh, Kelly, Johnson, Rajkumar, & Bennetts, 2004).

Interactionist Models

While they do not run contrary to the personal experience models, the interactionist models focus on the interaction itself (Coulon, 2002; Le Breton, 2004). An interaction situation may be defined briefly as the reciprocal influence that individuals bring to bear on each other's actions when they are interrelating (Goffman, 1974). Among the vast array of studies pertaining to interactionism, some deal specifically with MSD-related themes. The sick role approach is presented first, followed by a subcomponent specifically concerning therapist/patient communication, and lastly, the gender analysis approach.

Sick Role Approach

The sick role approach was first developed by Parsons (Parsons, 1951) according to a so-called systemic or structuro-functionalist approach (Mucchielli, 1999). The sick role fits into a context of an acute illness episode, i.e. an illness with objectifiable symptoms that are treatable within a defined period of time (Glenton, 2003). The disappearance of the symptoms signifies recovery, meaning a return to "normal." The sick role therefore constitutes a temporary assignment that allows a person to temporarily back down from his or her usual obligations (e.g. work-related or domestic). As soon as the ailing person is legitimized in the sick role, he or she will benefit from the assistance of the social environment in order to facilitate his or her recovery or admission into the healthcare system. The sick role is constructed and lived in interaction with other people, in accordance with their representations of the illness and the treatment required (Massé, 1995). Taken together, all the individual representations of the acute illness episode constitute a social representation of the illness. This common reference point (Bourdieu, 1994) gives rise to certain expectations of the sick person, in which he or she must act according to certain behavioural norms that society has defined in this regard to promote recovery (Ewan, Lowy, & Reid, 1991; Glenton, 2003). Consequently, because of these elements, conceptually speaking, the model is recognized as being less pertinent for understanding the social interactions of people who suffer from a chronic or persistent condition (Bury, 1982; Ewan et al., 1991; Glenton, 2003). For example, in a context of persistent pain due to an MSD, the characteristics of this condition, including the persistence of the pain over time despite the healing of the injury and the diagnostic ambiguity, differ from those of the acute illness episode. On the other hand, the interactions between the person with the persistent pain and the people around him or her risk being coloured by the expectations arising from the social representation of acute illness, since the model forms part of a set of common reference points. Thus, persistent pain or the failure to recover or heal, with no apparent reason or justification, could tip the person in the opposite direction, away from his or her role as a legitimized sick person, i.e. toward stigmatization (Goffman, 1963; Walker et al., 1999) or sociocultural marginalization ("falling out of culture") (Ewan et al., 1991).

Stigmatization can be seen as a group's reaction to another person or group, a reaction that consists of labelling the person or group as deviant (Blumer, 1969; Bury, 1982) (e.g. an opportunist who takes advantage of the system, etc.). The sick person who is stigmatized in this way finds him- or herself outside a collective representation of illness, thereby missing out on the social mechanisms designed to "recognize" and manage the illness (Bendelow & Williams, 1996; Ewan et al., 1991; Glenton, 2003; Hilbert, 1984). In this context, depending on the person's intention and anticipation of other people's reactions, he or she could try either to disclose his or her illness or to conceal it (Hilbert, 1984; Osborn & Smith, 1998), according to which stance is more advantageous in a specific situation (Osborn & Smith, 1998). Studies concerning the concept of secondary (Edwards, O'Neill, & Zeichner, 1985) or compensatory (Reid, Ewan, & Lowy, 1991) gains, in which a person capitalizes on the fact of being ill, may fit into this perspective. In the MSD field, the literature on pain behaviours may also fit in here. However, even if conceptually the sick role approach does not apply in cases of persistent pain attributable to an MSD, it does shed light on the impact that social representations of illness have on stigmatization.

Therapist/Patient Communication/Relationship Approach

The therapist/patient communication/relationship approach is a more specific component of the sick role approach. One of the classic approaches, first developed as early as the 1950s by Szasz and Hollender (Szasz & Hollender, 1956), it consists of defining the type of relationship formed between a therapist and his or her client. Szasz and Hollender (Szasz & Hollender, 1956) defined three models of relationships according to the degree of control exercised by each of the parties in the relationship: (1) activity/passivity, (2) guidance/cooperation and (3) mutual participation. In the first model, the therapist plays an authoritarian role in delivering care, while the client has few means of control. In the second model, the client may play an active role in the relationship by cooperating with the therapist's instructions, but does not take part in the decision-making process. Lastly, in the third model, the relationship is based on mutual participation in the decision-making process; the therapist helps the client develop active strategies for controlling the symptoms. According to Szasz and Hollender (Szasz & Hollender, 1956), the third model would best suit chronic illnesses by allowing the client to develop management techniques that have a real impact in his or her daily life. This model should correct the authoritarian tendency of Parson's sick role model (Parsons, 1951), which left little room for client involvement in the decision-making process (Massé, 1995).

In the early seventies, Veatch (Veatch, 1972) proposed a similar taxonomy illustrated by figures personifying the types of relationships formed. Veatch (Veatch, 1972) identified four models: (1) engineering, (2) priestly, (3) collegial and (4) contractual. The metaphorical figures depicted by the engineer and the priest suggest power ties grounded in scientific or moral authority. Within the engineering relationship, patients identify what is causing them a problem; however, they also rely on their physicians' decisions to find the solution to their problem, placing unwavering trust in their physicians and their knowledge. The priestly relationship suggests a paternalistic rapport in which physicians make all the decisions for their patients' well-being. The contractual and collegial relationships suggest more egalitarian interactions in which therapist and patient discuss different possible modalities for healing and recovery and reach a mutual agreement on the choice of therapy and the definition of the problem to be solved (Veatch, 1972). In the collegial model, the physician and patient share the same objectives and participate jointly in the problem-solving process. Their relationship is built on reciprocal trust and confidence. The contractual model is more centred on the concept of reciprocal agreements and both the physician's and the patient's right to withdraw from the agreement, placing the relationship in a more legalistic context. The last two types of relationships have been developed in order to decentralize the power held by the therapist. In the MSD field, this type of relationship is known as the client-centred approach (Liu, Chan, & Chan, 2005).

Golin et al. (Golin, DiMatteo, & Gelberg, 1996) have examined the therapist/patient relationship by endeavouring to develop a model based on a partnership during the decision-making process. Briefly, the main elements are the establishment of an atmosphere conducive to the sharing of information, the integration and understanding of the information shared, and the negotiation of an action plan. In this regard, Heisler et al. (Heisler et al., 2003) observed a stronger sense of self-efficacy in patients when there was agreement between physician and patient on the strategies to be adopted to manage the illness. Moreover, when the therapeutic goals were similar, patients appeared to perceive their illness as being better managed (Heisler et al., 2003). In MSD-related studies, the themes of the patient's need to be heard and his or her perception of a lack of understanding from

the therapist are those most frequently reported (Bailey & Koney, 2000; Bendelow & Williams, 1996; Brown, 2003; Cook & Hassenkamp, 2000; Dean et al., 2005; Gustafsson, Ekholm, & Ohman, 2004; Ong, Hooper, & Dunn, 2004; Perreault & Dionne, 2005; Skelton, Murphy, Murphy, & O'Dowd, 1995; Thunberg, Carlsson, & Hallberg, 2001; Walker et al., 1999). In this regard, Ong et al. (Ong et al., 2004) studied the patient's process of validating his or her pain with the physician. Patients reported their main difficulty as that of translating their pain experience into more objective language (Dekkers, 1998). Some patients might therefore use biomedical terminology to describe their condition in order to hold more credibility in their physician's eyes (Ong et al., 2004). The study conducted by Ong et al. (Ong et al., 2004) is, moreover, the only one to report the use of clinical or biomedical terminology, not as a means of assimilating and understanding knowledge, but as a communication strategy.

The strength of the therapist/patient communication/relationship approach is that it highlights the particular communication and interaction mechanisms that define a clinical appointment. The main drawback of this model is the medico-centric bias, which far too often makes the therapist/patient relationship central to the illness interpretation process (Leder, 1990), thereby neglecting the other contextual, social or cultural factors that may also be significant and directive.

Gender Analysis Approach

Several studies conducted along the lines of the interactionist approaches have developed a gender-specific analysis perspective. While gender itself is a sociocultural component, this approach focuses on the impact of gender on the therapeutic process. Such is the case in certain studies of the pain and rehabilitation experience that underscore the fact that men and women do not experience pain and rehabilitation in the same way (Ewan et al., 1991; Gustafsson et al., 2004; Hamberg, Johansson, Lingren, & Westman, 1997; Johansson, 1999; Ostlund, Cedersund, Hensing, & Alexanderson, 2004). These studies bring the domestic strains placed on women to the fore, emphasizing that such strains become hindrances to the rehabilitation process (Gustafsson et al., 2004; Ostlund et al., 2004). Among others, Gustafsson et al. (Gustafsson et al., 2004) identify this phenomenon as an additional stress factor that may delay or prevent the return to work. From a different perspective, Ewan et al. (Ewan et al., 1991) and Johansson et al. (Johansson, 1999) observe that the lightening of women's domestic role may constitute a factor that alters their personal identity. Consequently, the woman's role, depending on the division-of-labour patterns in the couple, may work against the therapists' recommendations. These factors underscore the importance of thoroughly understanding the structure of the patient's family unit in order to avoid the adoption of counterproductive strategies and non-adherence to recommendations (Hamberg et al., 1997). The advantage of the gender analysis approach is that it brings out the importance of the social and cultural constructs that define social roles based on people's biological gender (McElroy, Jezewski, & Albrecht, 2003). Even if the importance of gender is now recognized in studies on the social determinants of health (IRSC, 2007; Sargent & Brettell, 1996; WHO, 2002), biases may arise when samples consist exclusively of women (Ewan et al., 1991; Gustafsson et al., 2004; Johansson, 1999). Hence, proposing to adapt clinical interventions in light of themes supposedly specific to women without the benefit of comparative male/female studies creates a risk of overestimating the constraints placed on women. It is therefore advisable to opt, as did Ostlünd et al. (Ostlund et al., 2004), for mixed samples, which allow for true gender-based comparison and a more accurate appraisal of the rehabilitation realities and barriers specific to each gender.

Sociocultural Models

Sociocultural Models of Health and Illness

The sociocultural approach to health and illness sheds light on the influence of culture and the effect of different sociodemographic variables (e.g. age, gender, education, class, ethnic group, or occupational milieu) on the construction of social representations (Herzlich, 1984; Lawton, 2003; Pierret, 2003). These variables enhance understanding of the fact that some differences in individual representations may actually denote differences in social and cultural representations (Massé, 1995). This approach has long been used in clinical research in anthropology, thanks to the groundbreaking work done by Zborowski and Zola, who compared the health- and illness-related behaviours of different American immigrant population samples in the 1950s and 1960s (Zborowski, 1952, 1969; Zola, 1966). Zborowski (Zborowski, 1969) showed mainly that the reaction to pain and the way in which assistance was sought from either professional or lay resources varied according to the ethnic origins of the persons interviewed. Thus, certain behaviours could be regarded as deviant by some people, but as normal and appropriate by others. Similar differences were noted when the propensity to say that one was sick or not was compared, again in light of the different cultural origins (Twaddle, 1969). A tendency to refer to oneself as sick would appear to correlate with the more frequent use of medical services (Twaddle, 1969). More recently, studies conducted by Bates (Bates & Edwards, 1992; Bates, Rankin-Hill, & Sanchez-Ayendez, 1997) and by Sargent (Sargent, 1984) investigated ethnic variations in the experience and representations of pain, based directly on Zborowski's work (Zborowski, 1969). By comparing the pain representations held by patients from the northeastern United States with those of patients from Puerto Rico, Bates (Bates & Edwards, 1992) identified the predominance of biomedical explanations and body/mind dualism in the first population, which led to the experience of greater stress, unlike the Puerto Rican patients, who had a more unified view of body and mind resulting in greater value being placed on the treatments that addressed pain in biopsychosocial terms. Other studies have observed differences based on social classes (Bibeau & Pelletier, 1985) or on the type of community (forestry, mining or agricultural) involved (Corin, Bibeau, Martin, & Laplante, 1990).

Some authors have emphasized the presence of social and structural factors that may exert a negative influence on the return-to-work process (Ewan et al., 1991; Gustafsson et al., 2004; Hansson et al., 2001; Ostlund et al., 2004; Reid et al., 1991; Sommer, 1998). These factors include, among others, medico-legal assessments and counter-assessments (Cheng, 1997; Ewan et al., 1991; Lippell, 1999; Reid et al., 1991; Skelton et al., 1995; Walker et al., 1999), as well as long waits before the initiation of case management (Waddell & Burton, 2005; Watson, Booker, Moores, & Main, 2004).

The pertinence of this model stems from the fact that it promotes a better understanding of the dynamics of different populations, and thus better planning of the organization and delivery of health care. This model also allows questions to be raised about methods of intervention that do not take these cultural factors into account in the way care is administered and the way the therapist/patient relationship is structured. However, an overly rigid application of this model creates a risk of stigmatization and of causing a distortion in the interpretation of individual cases (Massé, 1995).

1.6.3   *Discussion*

Our review of the literature made it possible to pool the knowledge pertaining to the concepts of illness and pain representations contributed by the fields of medical anthropology, health sociology and health psychology. A comparative table has been drawn up to summarize the main components, strengths and weaknesses of the different approaches (Appendix 1). Three levels and approaches have been included: personal experience, interactionist and sociocultural. In the personal experience model, despite the diverse methods used, the individual is the focal point of the questions concerning the relationship between cognitions, emotions and behaviours. The representation thus comprises cognitive and emotional factors that guide the person's way of understanding and constructing the illness experience and that promote the enaction of certain expressive, attitudinal or behavioural responses (A. Young, 1981).

In the interactionist model, the focus of the study of representations moves away from the individual to the interactional dynamic that leads to the construction of personal meaning (sensemaking) and its transformation. The sick role approach, the therapist/patient communication/relationship approach and the gender analysis approach thus provide greater understanding of the social and interpersonal contexts that influence individual cognitions, emotions and behaviours as well as the difficulties associated with the illness experience. The results of the analysis of individual representations, which are accessible through individual illness- or pain-experience narratives, using personal experience models, can be triangulated with those of other stakeholders having a significant impact on the life of the injured or ill person (e.g. the representations held by his or her clinician, or by stakeholders in the workplace) (Dean et al., 2005). Misunderstandings and gaps in the different stakeholders' representations can thus be identified (Dean et al., 2005).

The sociocultural model elucidates the factors lying outside the strictly personal experience framework, such as the characteristics of the institutional healthcare network (J. T. Young, 2004) or the components of the societal context (economic, political, physical and cultural environments) in which individuals construct their health and illness representations (Massé, 1995). It is in this model that cultural patterns of behaviour regarding health and illness emerge (Bates et al., 1997; McElroy et al., 2003; Zborowski, 1969; Zola, 1966).

1.7 Objective 2 – Survey and document the tools used to measure the various components of health, illness and pain representations

1.7.1 Method

The search strategy developed for the purpose of targeting measurement methods and tools is illustrated in Figure 2. The search was done in four bibliographic databases: Medline, Current contents, CINAHL (Cumulative Index to Nursing and Allied Health Literature) and PsycINFO (abstract database of psychological literature). These databases were selected because they list the main scientific periodicals in the field of health and rehabilitation intervention practices. The years consulted for this literature review were those beginning with the model of the theoretical foundation for illness representation developed by Leventhal et al. in 1980, through to May 2006. Three groups of keywords were used to select articles: (1) keywords related to the nature or type of evaluation; (2) keywords related to health states; and (3) keywords related to theoretical concepts.

Combinations were created by associating items in groups 1 and 2 with one of the items in group 3 (see Figure 2). Each combination had the following components: **[**(Nature or type of evaluation) AND (Health states)**]** AND **[**Theoretical item**]**. The item related to theoretical concepts thus changed for each combination.

The literature review was carried out in three steps. The first step consisted in selectively sorting the article titles emerging from the database search; the second involved using the titles retained from the first sort to select article abstracts likely to be connected to the research topic; and the last consisted of analyzing the articles selected. These three steps were carried out by two members of the research team, who applied the selection criteria at each step of the process. To ensure interrater agreement, a pre-test was performed by two evaluators on 117 titles. Their choices of articles were then compared and discussions were held to improve the degree of consensus between the two. Article selection began once interrater agreement was obtained.

Figure 2: Article Search Strategy

Medline, Current contents, CINAHL, PsycINFO
(1980 - Mai 2006)

Group 1 of keywords: nature/type of evaluation

Questionnaire (OR)
Self-report measure (OR)
Measurement (OR)
Scale (OR)
Map (OR)
Assessment (OR)
Pictorial (OR)
Schemata (OR)
Appraisals

AND

Illness (OR)
Chronic illness (OR)
Pain (OR)
Low back pain (OR)
Physical symptoms (OR)
Injury (OR)
Disease (OR)
Sick (OR)
Disability (OR)

Group 2 of keywords: health states

AND

Group 3 of keywords:
theoretical concepts

Self regulation model   Beliefs   meaning

Common sense model   Catastrophizing   Conviction

Implicit model   Self efficacy AND control   Perception AND beliefs

Representation

707 references

179 abstracts

63 articles

1.7.2   Results

The bibliographic search using the strategy described generated 707 titles. These titles were reviewed independently by the two evaluators, who retained 179 of them. In the second step, the abstracts of the 179 titles retained were reviewed by the same two evaluators, who ultimately retained 63. These 63 articles were then analyzed using a grid. All the measurement tools were first classified according to the method they involved, i.e. qualitative or quantitative. This classification is shown in the table below.

Table 2: Measurement Tool Classification by Qualitative or Quantitative Method

Illness representation
Qualitative approach
- Short Explanatory Model Interview   - Explanatory Model of Illness Catalogue
Quantitative approach
- Implicit Model of Illness Questionnaire   - Illness Perception Questionnaire (original, revised and short versions)   - Illness Cognition Questionnaire
Components of the representation that concern pain
Quantitative approach
ATTITUDES   - Survey of Pain Attitude   - Fear Avoidance Beliefs Questionnaire   - Functional Abilities Confidence Scale   - Pain and Impairment Relationship Scale
BELIEFS   - Pain Beliefs and Perceptions Inventory   - Pain Beliefs Questionnaire   - Back Beliefs Questionnaire   - Pain Information and Belief Questionnaire   - Cognitive Risk Profile for Pain
SENSE OF SELF-EFFICACY AND CONTROL   - General Self-Efficacy Scale   - Pain Self-Efficacy Questionnaire   - Chronic Pain Self-Efficacy Scale   - Back Pain Self-Efficacy Scale   - Beliefs about Pain Control Questionnaire   - Multidimensional Locus of Pain Control Questionnaire   - Pain Locus of Control Questionnaire (PLC)
COGNITIVE DISTORTIONS Pain Catastrophizing Scale

Qualitative tools

The tools in this first category are based for the most part on a socioconstructivist paradigm influenced primarily by phenomenology (Berger & Luckmann, 1966; Schütz, 1967), interactionism in sociology (Blumer, 1969; Goffman, 1974) and empirically grounded theory (Strauss & Corbin, 1997). They are operationalized through structured and semi-structured interviews. The two main tools reviewed concern the concept of explanatory models of illness proposed by Kleinman (Kleinman, 1980) in the field of medical anthropology. The two tools in question are the "Short Explanatory Model Interview" (SEMI) (Lloyd et al., 1998) and the "Explanatory Model of Illness Catalogue" (EMIC) (Weiss, 1997). Briefly, the SEMI is a standardized structured interview that leaves little room for new material to emerge. To date, it has been used primarily on populations with mental health problems. This interview provides three clinical vignettes concerning psychological problems. Given the nature of the questions asked, interference from the social desirability factor can be reduced. The EMIC is an interview that simply proposes the themes to be covered, ranging from perception of causes to distress patterns. Its structure therefore resembles more closely that of a narrative or a life narrative method (Bhui & Bhugra, 2002). The advantage of this type of tool is that it allows spontaneous responses emerging from the patient's own experience to be expressed with no restrictions. For example, it allows for inclusion of the patient's experience with his or her social environment. On the other hand, it also has certain disadvantages: responses may be coloured by emotional factors or by the subject's ability to verbalize his or her experience (Massé, 1995), and the interviews may be long, thus limiting their use on a large scale.

Quantitative tools

Twenty-six quantitative measurement tools were identified through the literature review. However, most of these concerned only one aspect of pain representations: symptoms, attitudes, beliefs, catastrophizing or sense of self-efficacy and control. The tools and article sources are documented in Appendix 2. A few studies have already analyzed these tools (Bishop, Thomas, & Foster, 2007; Kendall, Spencer, & Murphy, 1996; Tan, Jensen, Thornby, & Anderson, 2005). We will therefore focus mainly on those tools specifically targeting the overall concept of representation.

Fewer questionnaires endeavour to identify illness representations. These are the (1) "Implicit Model of Illness Questionnaire" (Turk, Rudy, & Salovey, 1986); (2) the "Illness Perception Questionnaire" (Weinman, Petrie, Moss-Morris, & Horne, 1996), including a revised version by Moss-Morris et al. (Moss-Morris et al., 2002) and a short version by Broadbent et al. (Broadbent, Petrie, Main, & Weinman, 2006); and the (3) "Illness Cognition Questionnaire" (Evers et al., 2001).

Implicit Models of Illness Questionnaire (Turk et al., 1986)

The "Implicit Model of Illness Questionnaire" was developed on the basis of the self-regulation model of illness (H. Leventhal et al., 1980) and on Kleinman's explanatory models of illness (Kleinman, 1980). It includes 24 items that are rated from "strongly disagree" to "strongly agree" on a 7-point rating scale. Four dimensions are investigated: (1) seriousness; (2) personal responsibility; (3) controllability, and (4) changeability over time. The original English version was validated on healthy individuals, and on people with diabetes, arthritis, multiple sclerosis or the human immunodeficiency virus (HIV). Its internal validity was found to be good (α .79 to .92) (Turk, Rudy & Salovey, 1986). However, relatively little use has been made of this questionnaire in studies. Also, even though it is based on the commonsense model of self-regulation (Leventhal et al. 1980), this

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questionnaire does not assess perception of symptoms, of the course of the illness or of the emotional aspect of the illness. Consequently, the dimensions assessed provide a more limited understanding of the representation.

Revised Illness Perception Questionnaire (Weinman et al., 1996)

The "Illness Perception Questionnaire" was originally developed by Weinman (1996). This questionnaire seeks to measure the five components of the cognitive representation of illness, along the lines of the self-regulation model (H. Leventhal et al., 1997). These components are identity (symptoms), consequences, time-line, control and causes. The emotional representation of illness does not figure in this version. Also, the internal consistency of the "cure control" and "time-line" subscales yields varying results, according to the studies conducted (Moss-Morris et al., 2002). A revised version (IPQ-R) of the questionnaire was proposed to remedy these shortcomings (Moss-Morris et al., 2002). This version includes 56 items rated on a five-point scale, ranging from "strongly disagree" to "strongly agree." The following sub-scales are represented: (1) identity; (2) time-line; (3) consequences; (4) causes; (5) control; (6) personal control; (7) illness coherence; and (8) emotional representation. In addition, a list of 14 symptoms (rated yes/no) is used to measure the tendency to somatize, for a total of 90 items. The English version of this questionnaire was validated for eight different medical problems, including chronic pain (N=711). Some studies have documented the psychometric attributes of the tool and reveal good internal (α .79 to .89) and discriminant validity and acceptable test-retest reliability (Buick & Petrie, 2002; Hagger & Orbell, 2005; Moss-Morris et al., 2002). This tool is currently the most widely used. Hagger and Orbell's meta-analysis (Hagger & Orbell, 2003), based on the self-regulation model (H. Leventhal et al., 1980), supports the use of this measurement instrument in the clinical and research contexts. Given the large number of items covered, a short version of the questionnaire was developed and tested by Broadbent et al., 2006. This version has eight items rated on a ten-point scale, including five items that measure the cognitive representation of illness, two measuring the emotional representation, and one assessing comprehension. An open-ended question assesses the perception of causes. The validity was also assessed for a variety of health problems (N=891). The test-retest reliability was assessed at three- and six-week intervals in a sub-sample of 132 participants and was found to be satisfactory (r=.42 to .73). Its convergent, divergent and predictive validity was also acceptable (Broadbent et al., 2006).

Illness Cognition Questionnaire (Evers et al., 2001)

This self-report questionnaire looks more specifically at chronic illness representations. The concepts measured with this tool are therefore based on concepts that differ from those presented above. This questionnaire contains 18 items, rated on a four-point scale using the descriptors "disagree" to "strongly agree" (four response options). Three factors are assessed: (1) helplessness, (2) acceptance and (3) benefits. The English version was validated on arthritic patients and patients with multiple sclerosis. Its test-retest reliability after a one-year interval varied from .84 to .91 (Cronbach's alpha). The correlations between factors are also acceptable. This tool also has good internal (α .84 to .91), convergent and predictive validity (Evers et al., 2001).

1.7.3   Discussion

The second objective was to survey and document the tools used to measure the different components of illness and pain representations. The majority of the tools reviewed evaluate one

component of the pain representation, i.e., attitudes, beliefs, self-efficacy or cognitive distortions. However, they do not provide an understanding of how the different components work together. The representation measures reviewed concern illness representations. As these tools are generic in nature, they facilitate comparisons between health problems, but they have never been tested in a work disability context. This is an important factor since the occupational reintegration of workers is a complex phenomenon requiring a systematic approach rather than one focused on deficits. To this end, we reviewed two tools from the fields of anthropology and sociology that use a more systematic approach. While interesting, the SEMI is a standardized structured interview used in the mental health field. Its current form cannot be used with a population having a long-term disability due to an MSD. The EMIC resembles an interview guide that proposes more general themes. It is easier to use in other contexts. However, since it offers less structure, the length of the interview may pose a problem.

Based on the results of our tool review, it is not currently possible to identify a quantitative tool for measuring disability representations held by workers involved in occupational reintegration, without first carrying out the necessary validation studies. On the other hand, the qualitative approach may be used. Based on a theoretical model, these components could be documented by combining the different themes to be covered and some more specific questions, in order to clarify the interviewee's responses. The adoption of a semi-structured interview format would also make it possible to set an interview timeframe, and thus redress one of the shortcomings of the EMIC.

1.8 Objective 3 – Describe the representations formed of health, illness, pain and adaptive recovery strategies, as well as their progression during the work rehabilitation process, in workers experiencing a first episode of long-term absence from work due to an MSD

1.8.1   Method

This objective involved a descriptive exploratory study (Fortin, Côté, & Filion, 2006). The research design used was a multiple case study (Yin, 2003), which allowed for a systemic analysis of the phenomenon. A case was defined as a worker on a long-term absence from work due to a musculoskeletal disorder (MSD) and having been admitted to an interdisciplinary work rehabilitation program. Case observation was longitudinal.

Study population

To meet our objective, a purposive sample was retained. The workers were recruited at the beginning of their involvement in the PRÉVICAP rehabilitation program.

The inclusion criteria were as follows: (1) have an MSD accepted and compensated by the CSST and causing a work absence of over three months; (2) be between the ages of 18 and 64; (3) speak French; (4) have the right to return to work at their employer's; and (5) be on a first long-term work absence due to an MSD. The following factors were the reasons for exclusion: (1) an MSD related to a specific pathology (e.g. recent fracture, metabolic disease, inflammatory or infectious neoplasia of the spinal column), and (2) the presence of severe mental disorders, identified in the medical file.

Procedures

Each participant in the study was seen by two investigators during the rehabilitation program. More specifically, the critical moments, as identified by the previously mentioned project trajectories, were Time 1 (T1): beginning of case management by the interdisciplinary team; Time 2 (T2): announcement of the proposal that it was time for exposure to the real work environment; Time 3 (T3): return to 80% of regular work time; and Time 4 (T4): one month after completing the rehabilitation program.

Semi-structured interviews were conducted in order to describe the components and determinants of the health, illness, pain and recovery-strategy representations specific to the workers. The interview guide for the initial interview, constructed on the basis of the model developed by Leventhal et al. (1980), is presented in Appendix 3. It touches on the themes of illness representations, the therapeutic process and the perception of pain and recovery, adaptive strategies and relations with other stakeholders. These interviews were audiotaped and then transcribed verbatim. The interviews at times 1, 2 and 3 (T1, T2 and T3) were conducted at the PRÉVICAP program clinic so as to reduce the travelling required of the participants. The T4 interview took place either at the clinic or the participant's home, at the latter's convenience. The interviews lasted a maximum of 90 minutes.

Analysis of the interview material

The participants' names were removed from the interview transcripts. The material was analyzed using the content analysis software Atlas/ti. The interview content was analyzed thematically, first, using a list of themes taken from models identified beforehand in the literature review and including the model developed by Leventhal et al. (H. Leventhal et al., 1980). Second, to comply with the grounded theory approach (Strauss & Corbin, 1997), allowance was also made for emerging material and for *a posteriori* thematic codification. The content analysis was based on Landry's method (Landry, 1997), which involves the following five steps: (1) determining the objectives of the content analysis; (2) pre-analysis; (3) analyzing the material studied; (4) assessing data reliability and validity; (5) analyzing and interpreting the results. A first analysis guide was thus developed and then pre-tested to ensure that the themes were clear, pertinent, exclusive and reliable. These steps were followed until a reliability threshold was obtained between the codifiers. This method is recommended by Landry (Landry, 1997).

The cases under study were analyzed in different stages. A consensus was reached among the three investigators and three research assistants at each stage: first, by grouping all the results of the participants in the study for each theme under investigation. Second, the workers were classified according to their work status at the end of the rehabilitation program. More specifically, the first group consisted of workers qualified as "successful," i.e. participants who were back at work, and the other group as "failed," i.e. those who were absent from work. In this study, "return to work" was defined as holding a remunerated job for more than 80% of the regular work time at the pre-injury employer's or elsewhere. The participants who were fit for work but did not hold a remunerated job at the end of the program for reasons other than the problem being treated (e.g. due to unemployment or an administrative factor) were regarded as being in the "successful" category.

Ethical considerations

The project was approved by the Research Ethics Committee of Hôpital Charles-LeMoyne on December 9, 2003. The approval was renewed annually until the end of the project. The admissible subjects were met during the first days of their management under the rehabilitation program. Those who agreed to participate in the project signed the informed consent form that had been endorsed by the Research Ethics Committee of Hôpital Charles-LeMoyne (Appendix 4).

Sample

The recruitment period ran from January 2004 to December 2006. During this period, all the new workers admitted to the PRÉVICAP program were regarded as potential candidates for participating in the study.

During the recruitment phase, 55 workers admitted to the program were found to be ineligible for the research project, following application of the study inclusion criteria. The main reasons were as follows: the work absence episode was not a first absence for an MSD; the diagnosis was related to the lower extremities; or a therapeutic return to work (main component of the PRÉVICAP program) was not part of the intervention plan. Also, during this same period, nine workers refused to participate in the project, giving the following as their main reasons: not interested in the project; reticent about the possible questions and the recording; or too big a time commitment, given the demands of the rehabilitation program they had to follow. Finally, 20 subjects agreed to participate in the project and signed the consent form. Of these, two withdrew from the study prematurely and two other were excluded after an exclusion criterion (specifically, that of a serious mental health problem) came to light during the program. A total of 16 workers therefore participated in the study (ten men and six women).

The average participant age was 40 (with ages ranging from 25 to 56). All participants were in the chronic disability phase, with an average of 13 months having elapsed between their accident and their admission to the rehabilitation program (the time lapse ranged from 8 to 25 months). The occupations held by the workers varied greatly, as is the case for all the workers enrolled in this interdisciplinary program. However, using Hébert's occupational categories (Hébert, Duguay, Massicotte, & Levy, 1996), 13 occupations were classified in the "manual" category, two in the "mixed" category and one in the "non-manual" category. The equally varied medical diagnoses were grouped into two broad categories, i.e. upper limb impairment (n=5) or back impairment (n=10) and one worker with both back and upper limb impairments.

Given that each worker's rehabilitation program was personalized, one research assistant attended all the weekly clinical meetings in order to identify the appropriate interview times. Three workers refused to participate in the last interview (T4). The number of interviews conducted at each interview time is shown in Table 3.

Table 3: Number of Interviews Conducted at Each Interview Time

	Number of interviews conducted
T1 Interview	16
T2 Interview	9
Additional interview T	2
T3 Interview	5
T4 Interview	13

At the end of the program, 10 workers had been classified in the "successful" category and six in the "failed" category.

Given the limited number of participants in this exploratory study, the gender has been changed in all participant comments chosen to illustrate our analyses. In other words, any references to females have been masculinized, and vice versa.

1.8.2   Results

The workers' representations of health, illness and their current health state

The results of our research show, contrary to our expectations, that the workers defined their "current" health state (what they regarded as their problem at the time of the interview) as something other than illness. The workers' representations of health and illness are nonetheless important because they serve as a guide and point of reference in their discourse on their current state and during their rehabilitation trajectory. In fact, the workers saw health as a state which, more often than not, depicted them in the pre-injury stage or in the future they aspired to at the end of the rehabilitation process. Illness was also seen as a state representing them during the first period following their injury, but the components of this representation then served as reference points for evaluating the consequences of their employment injury. First, we will present a generic schemata depicting the health representation that emerged from the interviews as a whole. Second, we will analyze their illness representations, and will attempt to pinpoint, if applicable, the differences between the "successful" category of workers, i.e. those who returned to work, and the "failed" category of workers, i.e. those who were not exposed to work or who did not manage to stay at work. Our analysis revealed that the central themes used by the workers to describe health and illness were often the same, but since they were not the exact positive or negative mirror images of each other, for the sake of greater clarity, we will look at the health and illness representations separately. Third and last, we will analyze the representations the workers formed of their current state and how they saw themselves in relation to their health and illness representations.

Health representation

The workers' health representations comprised several meaningful elements that were often interrelated. These elements are shown in Figure 3, which depicts the organizational structure of the representation. Since the representation and its organizational structure were conveyed in the workers' discourse through word, concept and idea associations, we have endeavoured to stay as close as possible to the workers' actual wording.

Figure 3: Health Representation

Health Representation
N = 16
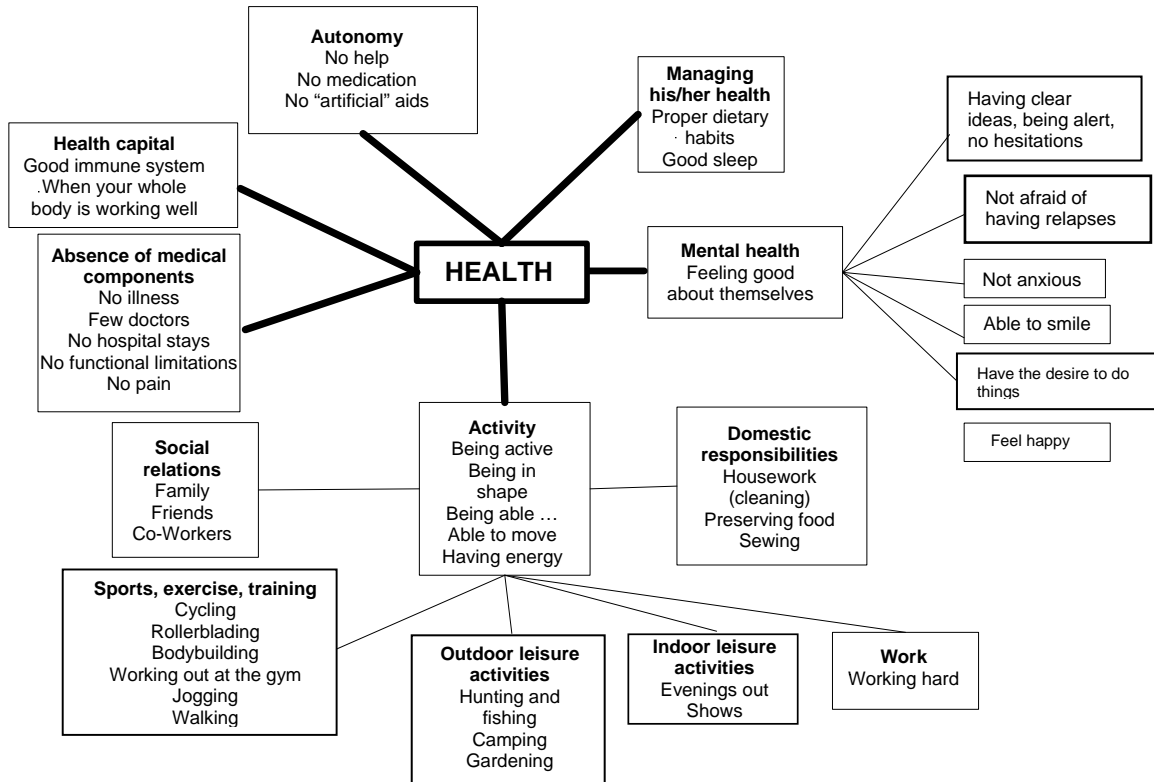
Meaningful elements

Activity

One of the meaningful elements used to define health and present in nearly all the workers' representations was the relationship to activity. For them, the concept of activity referred to activity per se, i.e. being active in the various spheres of daily living, which puts us into a paradigm of action. Activity also referred to the ability to do things (being able to…), to the fact of being able to move around in an alert or agile manner and to the workers' perception of themselves as being physically in shape.

The workers in our study saw activity as manifest in the ability to work intensively (i.e. work hard), to do sports or physical exercises, or even to belong to a gym. According to these workers, these activities are characteristic of health. This raises the concept of endurance. The ability to take part in outdoor leisure activities such as camping, hunting and fishing, but also gardening and property maintenance, was also seen as a characteristic of health that related to the concept of activity. The same applied to indoor leisure activities, such as going out to shows.

From another angle, health and its relationship to activity were expressed in the workers' discourse in terms of social relations and their ability to be "available" to others. Being able to help friends, co-

workers or family members was important in their representation of someone who was healthy. Being able to take care of or play with their children or grandchildren, being able to pick them up in their arms without pain and with some dexterity, was a point mentioned often in their comments on health. The fact of being able to assume their domestic responsibilities, such as doing housework, making meals or taking care of clothes, was also mentioned as a measure of health.

Mental health

The workers also emphasized the relationship between health and psychological factors. The most common way they conveyed the idea of good mental health was in expressions such as "feeling good about themselves" or "feeling well-balanced." Having clear ideas, feeling alert, not hesitating, not being afraid to move or afraid of potential relapses, not being anxious, being able to smile and feel happy, and lastly, having the desire to do things and get involved in activities were all points raised by the workers as illustrating health.

Managing health

Their comments on health also included the idea that health is something one has to manage, not only through activity and physical fitness, but also through proper dietary habits and quality sleep.

> *"It means someone who is in good health and who pays attention. Health means a lot of things. It's not just about sickness. Health is… I'd say it means being fit, being able to get enough sleep, being able to manage how much you sleep, being able to keep an eye on what you eat. […] Being healthy means you have to be disciplined. People who aren't disciplined [and who] are healthy, are lucky, I'd say." (Participant 18, T1)*

The absence of medical components

Some workers defined health in terms of the absence of illness-related factors or of the consequences of an illness. To some, being healthy meant "not hurting anywhere." This relates to the idea of "the silence of the organs" (Canguilhem, 1966). The absence of a known, disabling illness that could cause limitations was seen as a sign of health. Health was also seen as the absence of contact with medical practitioners or of medical appointments, especially hospitals and physicians, but also with anything related to medication, i.e. the absence of frequent visits to the drugstore. From this perspective, it was not the physical (bio-organic) signs that structured the health representation, but rather the social relations with medical institutions or players who served as intermediaries, that was construed as the "absence of" health.

Autonomy

Another characteristic of health for the workers in this study related to the concept of autonomy. The fact of not having to ask for help to tend to their personal care needs, household duties or work activities was seen as synonymous with health. Yet another element was the absence of dependence on medication or on "artificial" aids such as orthoses, prostheses or wheelchairs, to do their activities.

Fonds de santé (health "capital")

Lastly, this concept introduces the idea of a potential health capital that is intrinsic to each individual and is passed down through heredity or a strong immune system. Herzlich (Herzlich, 1969) associates "health capital" with the resistance and robustness that comes with being in good physical and mental shape.

Illness representations

The workers' illness representations appeared to be more diversified and complex than their health representations. It was difficult to pinpoint in the workers' comments what illness per se represented, or what defined the state of being ill (the sick state). The two aspects appeared to overlap. Illness representations were often expressed in terms of the consequences. For example, forced inactivity was seen as the outward sign of illness, but the fact of being inactive was not seen as an illness per se.

Figure 4: Illness Representation

Illness Representation
N = 16

Dependency
Unable to take care of yourself
Dependent on medication
Dependent on "artificial" aids
Dependant on the condition of your back

Presence of medical component
Have caught an illness
Lots of doctors
Hospital stay
Lots of medication
Injections
Insomnia

Having pain
Muscular
Flu
Back
Head

Mental health
Feeling down
Depressed (makes you sick)
Sad

Illness

Health capitals (internal systemic problem)
Heredity
The body is rotting inside
Something that should be inside your body
Allergy
Intolerance
Intestine
Heart-related

What is not considered an illness
Injury/cut
Taking pills of high cholesterol
Pain
Being handicapped

Inactivity
Not able to…
Feeling weak
Feeling knocked out
Being bedridden
Limited activity
Having limitations
Paralyzed
Amputated limb

Confined indoors
Lying on a sofa

Lack of outdoor activities
Hunting and fishing
Giving up your truck
Shoveling snow
Walking

Work
Unable to work

Meaningful elements

The presence of medical components

The workers' illness representation was formed mainly of elements that fall under the concept of the presence of medical components. This involved the idea of contracting or having a known, clearly identified illness. The workers interviewed saw influenza (the "flu") as the classic example of illness because it encompasses several elements used to define the sick state or the signs of illness. The flu was perceived as an illness that is caught, causes fever and pain, forces inactivity and affects the morale. Other problems immediately recognized as illnesses were also mentioned by the workers, including asthma, bronchitis, gastritis, pulmonary embolism, thrombosis and phlebitis. Such illnesses were cited mostly in reference to people close to them and only rarely in reference to themselves.

A distinction was made between illnesses that can be treated or are temporary, such as the flu or hayfever, and those that are more difficult to cure, such as cancer, cirrhosis of the liver, AIDS, or those that require taking medication on an ongoing basis, such as diabetes or heart problems. Regarding the latter types of problems, some workers referred to them as meaning that one is "really

sick" or "sick sick," as opposed to simply being "sick," when they were talking about illnesses they saw as passing and insignificant.

In their view, a situation not initially regarded as an illness could become so if it were prolonged. One worker explained how a backache can turn into an illness, as follows:

> [translation] *"... Over time, if it doesn't heal... it'll become an illness. ... Personally I think that if I'm stuck with my back like this for a very very... long time...things ... it'll never end... if I can't heal them with time, my bones will be completely finished. ... Worn out, worn out, finished... 100%, my bones will no longer be any good. And if, with time, I can't move them anymore ... Then that would be an illness that I won't be able to heal after that. Like osteoarthritis. You can't heal that." (Participant 15, T2)*

The signs of the presence of an illness were also seen in terms of the need to see several physicians and even sometimes to be hospitalized. According to the workers, being sick or suffering from an illness obliges the person to take a lot of medication. Insomnia and sleep disorders were also mentioned in the workers' comments as signs of illness or of being ill.

Health capital (internal systemic problem)

The idea of illness as an internal systemic problem, "right inside in the body," that undermines the person's "health capital" or attacks his or her immune system came up often in the workers' comments. The concept of heredity was very present in this illness representation. Cardiovascular diseases and emphysema were given as examples of hereditary problems. Other major concepts involved the image of the "body as being rotten inside" or the idea that illness was "something that should not be inside your body." The reference here was usually to cancer, and sometimes specifically to intestinal cancer. Other states perceived as referring to systemic problems were different types of intolerance and allergies.

Inactivity

> [translation]*"Someone who is limited. Who can't do what he or she wants. For me, that's a sick person. No matter what the handicap is or whatever, a person who has had a stroke, for me, is a person who is sick because he can no longer do what he used to do." (Participant 12, T1)*

Just as activity was used to define health, so the majority of workers used inactivity to define illness. Being inactive and unable to do or take part mainly in outdoor leisure activities like hunting and fishing, clearing snow or pulling one's truck out of the mud, were all construed as signs of someone with an illness. The fact of having limitations and of being obliged to limit one's activities, of "feeling weak," "knocked out, like a boxer," "having no endurance," or of being bedridden were all construed as signs that an illness was present. One image that came up in the discourse was that of someone who is housebound, "lying on a sofa" and forced, due to pain, to do nothing but "watch television." This isolation was also compared to periods of unemployment or inactive periods in the case of seasonal work. Periods of inactivity were considered fertile ground for developing an illness, whereas conversely, health was represented in the workers' comments by activity and the outdoors (outside).

Mental health

For most of the workers, the idea of illness was related to psychological factors. The fact of "feeling down," depressed or sad was regarded as a sign of illness. They often found it difficult to say whether the feeling was a consequence of a problem of another origin that was related to the illness (e.g. fever or pain) or of the illness itself. Without being identified as the sign of a specific mental illness, psychological factors, if they lasted too long, were seen as possibly contributing to illness "in the body" and to "getting sick." One worker expressed the relationship between body and mind as follows:

> [translation] *"Well, because at some point, you don't listen to your mind, you know. Then your body gets tired at a certain point; the fatigue builds up, you know. 'Cause when I had my accident, well after that, you could say that I suddenly got tired; it hit me like a ton of bricks, I was tired, just so tired that it was ridiculous. I would sleep away my weekends, I slept all the time, all the time, all the time. Then, you know, my brother said, "yup, all those different work schedules you used to do, the pace of life you kept, well at some point, it catches up with you.' He said, 'You used to run on dopamine at some point. And well now, you've got none left, no more dopamine. So now, you're.... You know, now you really feel what your body is feeling.' So you know, that's when I realized that yup... I'd gone too far... I was really tired... And in my mind too. I had less patience, I didn't want to see people, I didn't feel like going out. You know, I guess you could sort of say that at some point, things kind of... you know... Once the job fell apart, then my sense of self-worth, you know, sort of a vicious circle, like... That's when, when...I guess I was depressed, yeah, depressed, it was just ridiculous. It was as if I had... I had put so much into it that I had no life outside of work." (Participant 11, T1)*

Dependency

Among the workers interviewed, the fact of being dependent, i.e. of not being able to take care of their own basic personal hygiene needs, of being obliged to take medication in order to function, or of being dependent on "artificial" aids like a wheelchair or an oxygen tank, were all signs used to describe illness. Lastly, being dependent due to the physical limitations imposed by the poor condition of part of their body, like their back, was also seen by these workers as a sign of being ill.

Having pain

The presence of pain, whether muscular due to an exaggerated or repeated effort at work, or due to the flu or a deficit in their back or one of their limbs, or a migraine, was seen by several workers as a sign of a sick state.

What illness was <u>not</u>

For some workers, illness was defined in negative terms, i.e. as a state that was not necessarily one of health, but rather involved another category of deficits that they identified as injuries, such as cuts or open wounds. On the other hand, in their minds, an injury that became infected could become an illness. This relates to the idea of the systemic problem, which is important in the definition of illness. Similarly, some workers appeared to regard an injury that does not heal and that has psychological repercussions, such as anxiety, as synonymous with illness. Here they were referring to the fact of "making yourself ill." Lastly, the fact of having to take medication to control cholesterol was not in itself seen as synonymous with being sick because the other outward signs associated mainly with inactivity, dependency or pain were not present. During the interviews, the same type of representations were voiced regarding diabetes, but in more ambivalent terms.

In summary, we can conclude that the health representation was virtually identical and stable among all the workers, regardless of their successful or failed RTW situation. A degree of saturation seems to have been reached. In fact, elements such as activity, mental health, the absence of illness and of contact with medical practitioners, having a "good health capital," being independent and managing one's health through a balanced, healthy lifestyle were all facets of their health representation. Generally speaking, the health representation was also very stable over time, judging from the different interviews held at various points during the rehabilitation process. Certain details were added, but they often consisted of examples that were attached to a representation structure already firmly established since the time of the first interview.

Similarly, we can conclude that our analysis of the comments made by these workers with MSDs yielded an illness representation schemata that was relatively stable among the different categories of workers. In this regard too, a degree of saturation appears to have been reached. Elements such as inactivity, the presence of medical components, "health capital," mental health, dependency and the presence of pain were all major facets that came up repeatedly in the discourse on illness.

Furthermore, the health and illness representations were relatively stable over time, at the different interview times during the rehabilitation process. Generally speaking, they were firmly entrenched right from the first interview. However, for some workers, the idea that their problem was temporary changed toward the end of the process, and they admitted that they might be left with some physical limitations or pain.

Representation of their current state

In the interviews, we systematically asked the workers about their problem and how they defined their current state. We also asked them how their current state related to their idea of health or illness. Through analysis, we noted that their representations of their current state tended to vary, depending on when the interview took place during the rehabilitation process, but that the terms used to describe their current state representations most often referred to the elements that made up their

health or illness representations. The following diagrammatic portrayal of the current state representation midway between the two concepts of health and illness clearly shows their respective relationships and the dynamics of the recovery process.

Figure 5: Representation of Current State
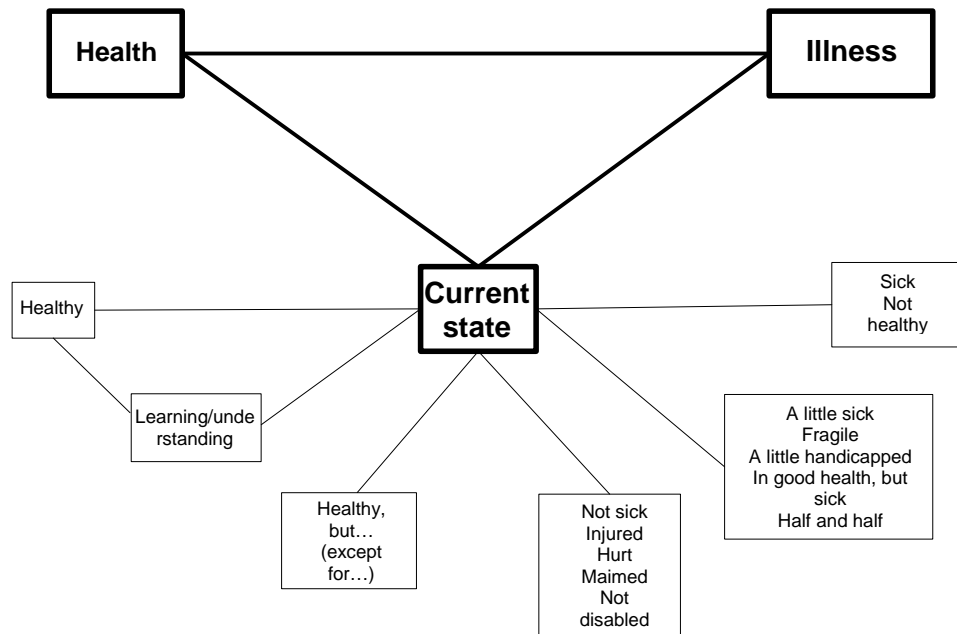
First, we will define the terms the workers used to describe their problem in their current state, and second, we will examine how these representations were positioned and how they changed during the rehabilitation process for each category of workers.

Definitions of terms used

Sick, not healthy (cf. Figure A, in Appendix 5)

Following our analysis, we added an interview time that was not directly concerned with the workers' appraisal of their current state at the time of each interview, but rather with an assessment of how they saw themselves at the very beginning of their injury/illness experience, long before beginning their rehabilitation program in the multidisciplinary clinic. Several workers described themselves as having been "sick" or "not healthy" immediately following the occurrence of their injury.

> *"I considered myself sick right after my accident, because, you know, with my hand, you know, I had no strength in it, I couldn't do a thing. Then after that, I told myself, "No, no, no. You're not sick. You had an accident and you're injured."*
> *(Participant 7, final interview)*

The points they mentioned to describe their "sick state" concurred with how they defined their illness representation. When they mentioned the fact of not being healthy, the points they raised referred to the systemic nature of the illness. They talked about the presence of pain, the upheaval in their daily living habits, or again, their medication or the side effects of the medication.

A little sick, fragile, a little handicapped, in good health but sick, half and half (cf. Figure B, Appendix 5)

In talking about their state, a number of workers defined themselves as being in an intermediate state that leaned more toward being sick, but without having all the characteristics of illness. They saw themselves as weak or fragile.

> *"I didn't really consider myself sick, you know. Okay, I saw myself as having a weakness. So... I don't like to say that I was sick... but I sure was depressed." (Participant 11, final interview)*

The psychological problems compounding the physical limitations coloured this representation. Moreover, the presence of these problems drove one worker to say that "they were in the process of making him sick."

The facts of feeling depressed, being housebound, having to reduce their activities and being dependent in terms of performing certain tasks other than personal hygiene were seen as characteristics of the illness. Their presence took the representation of self out of the context of the strictly "body-object" with limitations, and broadened it to include the consequences of the injury and a systemic perception of the problem.

The idea of "being handicapped" was expressed to varying degrees in the workers' discourse. Generally speaking, they described themselves as "a little handicapped." The expressions "not being 100%" and "being in slow motion" were used. For some workers, even though they associated the idea of inactivity with illness, this status was different from that of a sick person.

> *"Not sick, but I felt sort of like a handicapped person. I couldn't move, couldn't do anything. There were several things that... I had to pass up on doing things. [...] I stayed at home, then ... that was hard. [Depressed?...] Well, yeah... Exactly." (Participant 4, final interview)*

Not sick, but injured, hurt, or maimed; not disabled (cf. Figure C, Appendix 5)

We noted that it was often difficult for the workers to define their state in relation to illness or health, as revealed in the following citation:

> *"... I call that being injured. Not sick. The only thing is that during the first month, it was really tough. You know, even the 10... nearly 10 days in the hospital, that was hell. Plus everything else that happened. Anyways, little problems, you know... physical injuries that happen following the shock. At that point, you ask yourself questions, but anyways. If you call that being sick, that's fine. ... I consider myself injured... It's not the same thing. For sure you don't feel good, but... When it comes down to it, it is like being a little sick as you say, but anyways..." (Participant 3, T1)*

From the outset, several workers said they were "not sick," mainly because they saw their current state as being in a category other than sickness. According to them, the terms that defined their situation more accurately were "injured," "hurt" or "maimed," and they did not see themselves as "disabled" or "handicapped." They saw their state, unlike sickness or illness, as being temporary and non-systemic.

> *"I'm not sick. And I'm not healthy. It's just that I have an injury... I see it like somebody who cut himself." Participant 16, T2)*

Even if they had pain (and several did not consider pain to be an illness), and even if this pain made them feel like they were "not in their normal state" and caused them certain functional problems, this situation still allowed them to remain autonomous in terms of their personal hygiene or certain leisure activities. For them, illness, as we have seen, referred more to dependency and immobility. They therefore saw themselves in a category somewhere between health and illness, which though different, was still positioned in relation to the elements that made up their health and illness representations. This midway position is well-illustrated in the next representation.

Healthy but… (except for…) (cf. Figure D, Appendix 5)

The workers very frequently described their current state as "healthy but…" Given that illness was often defined as systemic or as related to major inactivity, despite their injury, the workers said they were healthy. In this case, health was seen as a general state and involved the absence of a systemic illness. This belief led several workers to say that they were healthy except for their injured limb or back. This representation reveals a fragmentation of the body. This state of mind was so internalized in some workers that they even asked for their injured limb to be amputated and replaced by a prosthesis in order to make the problem go away and regain their complete health.

> *"I cried and cried and cried. This is impossible, my elbow hurts so bad... Nowadays, they operate on your brain, on your heart, they operate on... They do everything... They walk on the moon, maybe they're going to go to Mars, and here I am, with my damn elbow that they can't even operate on, they can't do it... and they say I'm... there's nothing more they can do. So why don't they just chop it off. That's all. Let them put on a plastic arm... Something that... you know...Let them cut off my arm then.... Because pain, well I sure had it, pain, pain all the time. Let them just cut off my arm and put on a prosthesis. That's all there is to it." (Participant 20, T2)*

Learning and understanding (cf. Figure E, Appendix 5)

Thinking along other lines than strictly health, we found some workers during the rehabilitation process who defined their current state as that of "waiting" with regard to the choices before them. These choices sometimes elicited a degree of scepticism about the program being proposed or about their occupational future and the possibility of being able to resume their initial occupation or trade. According to these workers, this learning stage allowed them to understand their "body signs" and gave them better tools for understanding and overcoming the psychological challenges, for understanding and learning to live with pain, and lastly, for understanding their limits and managing their physical limitations.

> *"A really simple example you could take is that you've got four tires on a car. Then there's one tire, damn it, which is all... all worn down on one side, you know. Normally you try to drive as long as you can until the bad tire is finished, but not to the end of the three other tires that are still good. When you enter the curve, you don't take it as if you had four new tires; you take into account that one of the four is not new. That's what I mean. There's... you know, if your pelvis feels like that on one side, well, you know that on the other side, you know, you feel that it's solid. On this*

> *side, okay there's something that lets you know sooner, you know…" (Participant 18, final interview)*

Healthy (cf. Figure F, Appendix 5)

To describe themselves as healthy, the workers repeated the same elements used to describe their health representations and applied them to their current situation. In this sense, there was consistency in their discourse, even if they were not at work. In fact, the workers who described themselves as healthy claimed that they were able to do the exercises asked of them and that they were able to do leisure activities. They appreciated the fact of eating healthily again, having a balanced routine, getting good sleep and being alert.

Progression observed in the representation of their current state during the rehabilitation process

We observed that the workers saw their current state as an episode whose meaning was constructed on the basis of their health and illness representations. The episode they were experiencing, even if in some respects it resembled an illness, obliged the workers to construct a new model that did not fit directly with conventional health and illness constructs. This explains why often some workers would hesitate and answer "yes and no" when we used the word "illness" to describe their current state. The cause of their disabled condition, namely an employment injury, was considered to be different from "illness," and their condition was initially regarded as temporary.

Common points

A number of workers in both the "successful" and "failed" categories described themselves as "sick" at the beginning of their injury event, often referring to inactivity, depressive states or the side effects of the medication. Such remarks were made primarily during the T2 interviews or in the final interview. Only by reflecting back on their experience and with a certain distance, largely due to the improvement in their condition, did the workers describe themselves with hindsight as having been sick or unhealthy in the period immediately following their accident or injury.

Moreover, at this stage, the risk that their current state become a "real illness," often related to the danger of chronicity and disability, or to forced inactivity because of not returning to work, was raised in the workers' comments, and appears to have obliged them to think about a new status, i.e. that of a socially recognized unfit-for-work or chronically ill person. The workers' ambiguity about calling themselves "sick" or accepting themselves as sick may stem from the fact that in our society, it is difficult to agree to change one's identity status and to bear the stigma of being chronically ill (H. S. Becker, 1963; Goffman, 1963). Socially, it is probably easier to say that one has been injured.

At T1, the results of our discourse analysis showed that what mattered above all to the workers was to define their state and give it a name other than that of being sick, i.e. a label such as injured, hurt or maimed. The elements used to define themselves were very similar from one category of workers to another at this stage of the rehabilitation process.

Workers in the "successful" category

Starting mainly at T2, we saw a shift in these workers from the concept of a hurt or injured person toward the concept of weakness or temporary injury. This fragile or partially handicapped status was present in some workers at all stages of the rehabilitation trajectory, even if they were successful in returning to work. However, by the end of the process, this fragility was felt more in terms of the fear of injuring themselves again or of weakness, which brought on a feeling of fatigue and of being somewhat depressed.

We also noted a progression toward the idea of "being healthy but." In fact, while this type of language was used throughout the trajectory, it tended to change toward the end of the process. Beginning with the return to work, which for some workers corresponded to T3, the conditional ("but") became increasingly tenuous in that they said they had "slight medical problems" or some psychological difficulties, but that they had regained their functional autonomy. Some workers even ended up looking back on their experience as a slight hitch or, as one worker put it, as "a misunderstanding with my back." Without coming right out and saying they were healthy, for them the idea (at the end of the program) of "not being sick" was confirmed by their ability to resume their jobs and usual leisure activities; it also evoked for them the idea of controlling pain, of learning and of being willing to ask for help if needed.

The progression observed throughout the process was similar for the "healthy" label. In fact, we observed that while no workers declared themselves "healthy" without some kind of proviso at the beginning of the program, nearly half of them saw themselves as "healthy" at the end. Some even said they were in better shape than before their employment injury. They were more active, their pain had disappeared or they had learned to control it during their activities. The fact of no longer taking medication, of being in a good mood, of having learned to manage their "weaknesses," and for some, of having a confirmation from their physician that they were healthy, were all signs that reinforced this representation of their state.

For many workers, there was therefore a clear progression toward what they considered to be healthy, and the elements they used to define their health representation then appeared in their discourse. If we add to this group the workers who said they were "not sick" and who described their state very much like those who saw themselves as "healthy," the trend is even more marked. All the workers in this "successful" category mentioned that their physical and psychological health was better at the end of the program.

Workers in the "failed" category

At first glance, in the T1 and T2 interviews, the workers in the "failed" category resembled those who were successful in returning to work. Most said they were "not sick," defining themselves instead as "injured" and "a little handicapped," or as "healthy but," mainly due to their back pain and their lack of endurance. However, starting at T2, we noted that far more descriptors of illness were used by these workers than by those who reported themselves as healthy. They placed emphasis on their physical limitations and pain. In fact, when these workers said they were "healthy but," the elements they saw as preventing them from feeling healthy referred exclusively to the physiology of the back or to pain, and the elements pertaining to psychological health were virtually absent from their discourse.

The fact that several workers used the terms "handicapped" or "a little handicapped" was also noteworthy, and this was the case at all the stages of the rehabilitation process. Similarly, one of the workers continued to refer to himself as "sick" throughout the rehabilitation program.

Few of the workers in this category agreed to meet us for the final interview. Of those who did, one described himself as having an injury that offered, in his opinion, some possibilities of recovery, while another described himself as "sicker" than at the beginning of the rehabilitation process due to the persistent pain and limitations. For the same reasons, another worker referred to himself as being "a little handicapped" and dependent, or outright "handicapped" when the pain was strong. At the final interview one month after the end of the process, these workers clearly positioned themselves in the illness camp, and were thus further away from recovery if recovery is regarded as a trend toward integrating elements related to the health representation.

In conclusion, we noted that at the first interview times during the rehabilitation process (T1 and T2), the elements used by the workers in both categories to define their current state were very similar, and that nothing at the beginning allowed for a possible differentiation in the outcome of the process based on their representations of their state. On the other hand, during and at the end of the process, we noted a marked tendency for workers in the "failed" category to define themselves using descriptive elements closer to their illness representation and to distance themselves from the idea of recovery, and accordingly, from the elements used to represent health. The reverse trend was observed among workers in the "successful" category.

Pain representations

The theme of pain appeared in the discourse of all the workers interviewed. Throughout their narratives, the workers described pain in idiosyncratic terms, but also often using biomedical language. Pain was partly used to define their current state, i.e. the condition of their health and the designation of their problem. While pain was not seen as the only indicator of their state, it clearly sent the workers a signal. This idea of "signal" emerged as a key point in the workers' discourse.

The meaning given to pain

The pain signal

Several workers spoke of a "normal pain" frequently felt in the context of difficult working conditions and that, until then, had been under control. When the pain signal diminished, the pain was seen as "normal," and when it did not decline or it increased, it was perceived as "abnormal." Most of the workers interviewed had experienced different episodes of so-called "normal" pain. Some workers even had to "make do" in a difficult and physically demanding work context. When they reached their personal pain tolerance threshold, all the workers began a medical journey. The pain was then considered by them to be "abnormal" and represented a first point of disruption (see Figure 6). A "disruption" refers to a significant event that causes discontinuity in daily life (G. Becker, 1997), leading a person to question what he or she had considered to be "normal" up to that point, and obliging him or her to develop new strategies for coping with this situation (Bury, 1982). Following this first disruption, the workers generally expected to recover quickly and completely after the accident. As treatment progressed, the workers described reaching a therapeutic ceiling after which no other improvement was noted. This period represented a second point of disruption. Spanning several months, this period led workers to think that they had a "real problem" and to

anticipate long-term consequences of the pain. For some workers, this corresponded to a total disruption in identity, in which their feeling of personal identity was profoundly altered. When these workers began their multidisciplinary work rehabilitation program, they had already reached their normal pain threshold some time prior and were looking for a sustainable solution. In this regard, our analysis of their pain representations brought to light various components of the representation that were associated with these points of disruption.

Figure 6: Disruptions
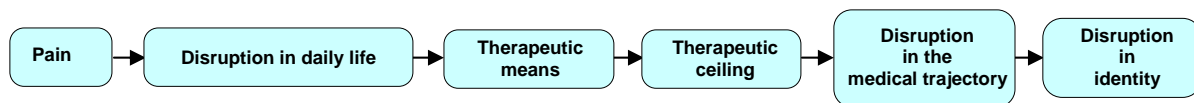
The pain signal also reflected the idea of a pain barometer which the workers used to assess their situation. This signal indicated to them the nature of the actions to take or attitudes to adopt to control the immediate or possible consequences of their pain. Their pain representations thus took on key importance in their choice of strategies. The workers who perceived their pain as normal expected the pain signal to diminish. Many of them spoke about a "fast recovery" before their episode of prolonged absence. They believed that if the signal did not diminish, the pain would possibly oblige them to stop or limit their activities. They might then perceive this as a signal that something was not right and that more radical or drastic action was needed to prevent the situation from worsening or from causing further injury. All the workers saw the presence of pain as an indication of whether their physical condition was improving or worsening, as illustrated in the following excerpt where the worker saw it as a sign of possible deterioration:

> *"It's… it [the pain] is still there. In fact, it's just… just… getting worse and worse and worse. So I tell myself, well, if it's just getting worse, then I guess there's a bigger risk that I'll hurt myself. So I might as well rest and just go slow." (Participant 16, final interview)*

In the following excerpt, the worker construes the pain signal as a measure of his fitness to work or not:

> *"If I can't go back to work and do light tasks, how will I know whether it hurts or not, you know … whether or not I'm able to do it. " (Participant 6, T1)*

Generally speaking, the presence of pain or the perception of the causes of the pain resulted in certain adaptive behaviours. This means that when a pain signal was present, the worker modified his or her behaviour or attitude. The workers interviewed thus described avoidance and pain management behaviours, as well as attitudes related to the fact of living with pain.

Adapting to pain

Avoidance

We noted avoidance behaviours that led the workers to stop their activities. Their avoidance sometimes arose out of fear or anxiety about the (perceived) negative consequences of the pain. Fearful of aggravating the situation, the worker would stop and avoid these activities, as illustrated in the following excerpt:

> *"When I have just a little bit of pain, I'm able to do it. It's just that you're not comfortable. But when the pain is really bad, I stop right away. When I feel that my back is tensed up then… it pulls, well, then I know that's not good. I know it's really not good then, so I stop." (Participant 13, T1)*

Managing pain

In some cases, the process of pain also led the worker to stop his or her activities. However, contrary to avoidance behaviour, this behaviour was not aimed at managing fears, but rather at adjusting the tasks or physical efforts. This management process took either passive or active forms. The workers who adopted more passive strategies stopped their activities to alleviate their pain, using means that involved little control of the pain, for example, by applying ice while "waiting for it [the pain] to pass," lying down and taking medication as the only way of finding alleviation, with mixed results. The following excerpt illustrates this idea:

> *"The next morning, I might find that it's blocked… There's not much I can do… Yeah, I just have to stay lying down… on my side. For sure I can't lie on my back… Because the heating pad, I try to tolerate it. (Interviewer: How long can this go on?) One month… one month each time." (Participant 9, T1)*

Workers who opted for active means tried to change or control the intensity of their activities, or stopped them if need be, momentarily, before resuming them again. The following worker's comments illustrate this idea:

> *"I hurt my back yesterday. But the pain continued. It's the same pain I had before leaving [home] that just kept on) […] so what I do is I get out. I stop by the side of the road or at a rest area, then I stretch my legs, I walk, I bend forward a little, I bend backwards a little bit […] after, I take off again and drive a little further. When it starts to hurt too much again, well then I stop again. Or I put up with it until I get to the end." (Participant 12, T2)*

In some cases, the pain management process also meant testing themselves to find out their limits. When met for the first time at the beginning of the rehabilitation program, many workers indicated that they were anxious about "testing the reality." This concern took the form of apprehending the possible consequences of the pain and a long-term work stoppage, which led some of them to wonder whether they would ever see the "light at the end of the tunnel." For some workers who had experienced repeated failures in terms of rehabilitation, the fact of embarking on an interdisciplinary program left them feeling sceptical or even sarcastic. Testing and finding out their limitations might thus be part of a long process which, for several workers, involved the idea of having to mourn the

fact that they could not "go back to the way it was before." Most of the workers gradually accepted the idea of living with pain, provided that it was manageable and tolerable and that they felt "active" and "functional."

Living with pain

The perceived consequences of pain led most of the workers to wonder about the possibility of living, or their ability to live, with pain. Accepting to live with pain was, for all the workers, a way of showing that they had control over their situation and could master the outcome. This pain, which in the past had already led to episodes of disruption in their medical trajectory, was then cast in another light, in which the workers integrated a gamut of tools that allowed them to function normally. For them, accepting to live with pain necessarily required adopting strategies and attitudes that differed from those involved in enduring pain. It involved the active management techniques described earlier, whereas enduring pain involved passive techniques and presumed that the worker did not control the situation. The following excerpt illustrates the situation of a worker who had learned to live with pain and manage the adverse effects:

> "I still have pain in my back, but I've learned to live with it. I've learned to control my pain and to understand that, hey, look, I've reached my limit. That's enough. Because before that, you know, I was always able to take more of it. That was me. All the time. But now I know that, let's say, if I start to have this symptom, the others will follow, so that's when I know I have to stop and calm down, you know, like I stretch... you know... I've learned to... to control... you know, to be more aware of... of my body." (Participant 11, T2)

This next citation illustrates the contrary situation in which a worker endured the pain somewhat spitefully and without using any real strategies to control it:

> "Even if it hurts, it has been there forever so you just keep on going anyway...; at some point you tell yourself, even if you want to start [working] again, you're gonna have to endure it. That's when you say to yourself, okay, I'll have to try it. I'll try to resist. If it hurts too much, well then, I'll stop." (Participant 12, T2)

A changing sense of personal identity

All the workers who mentioned this theme described the problem in terms of "no longer being able to do like they used to" and as a threat to their sense of personal identity. This threat was experienced more vividly when the worker's identity was based largely on physical activity. The worker felt seriously shaken up by the fear of not being able to go back to the way he or she "was before." This generally happened when a worker anticipated more dramatic consequences from the pain, often resulting in another point of disruption in his or her trajectory.

The fact of living with pain, and above all, when this pain was not controlled or was poorly controlled, had consequences at the level of self-esteem and sense of personal identity. For some workers, when the pain and disability resulted in greater dependence on the members of their family or close friends and a feeling that they had reached a therapeutic ceiling, their self-image appears to have been altered. Here we are looking at a "*maladie-destruction*" (destructive illness) paradigm, to use the wording of Herzlich (Herzlich, 1969). As the person's identity and integrity are brought into

question, this theme touches on a more emotional dimension of pain representations. It is therefore not surprising to see this theme closely related to the biographical disruption experience, i.e. when the worker loses his or her life's balance, or when his or her future plans disintegrate or become uncertain, and in short, undermine the person's moral equilibrium and the interactional dynamics that define his or her framework of existence.

For example, at work, some workers experienced a feeling of guilt and loss of self-esteem when they "saw themselves" as obliged to stop their activities. They felt less competitive and less productive. According to these workers, their pride or personal integrity, as well as their competitiveness at work, all came into play. The following worker's comments illustrate this point of view:

> *"It's also the fear of not performing like the others, you know […], it's the guy who works the fastest. Let's say, you've got 3 or 4 people who've just started, and it's all about who's the best; which one is the fastest? You know you've got competition; for sure you know that. If you take your time, and there you are… look: for sure the boss can see things. That's for sure. That's one of my fears, you know." (Participant 13, T2)*

Many workers also described this experience in terms of a curtailment of their family or leisure activities. Some workers were particularly affected by the problem of no longer being able to take care of their children as they wished. Other workers were concerned about their inability to fill the family role they had constructed for themselves, not only their role as parents but also as grandparents. The following worker's comments illustrate this viewpoint:

> *"My children don't live far away, but just… just driving the car to get there… and it's not my nature to be aggressive. I've never been aggressive. I never was… but then, with the pain, the worse it got, the more I felt … the least little thing made me… and that's not me. That's just not me, not at all." (Participant 19, T1)*

Pain led the workers to draw lessons from life

Some workers who experienced an episode of identity disruption managed, if their situation improved, to regain a sense of self. This "rediscovery of self" with the meaning given to it by Charmaz (Charmaz, 1983, 1994) enabled the workers to rediscover the main thread of their daily life that had been broken during their long-term disability. This reconstruction led them to "rationalize their experience" (Herzlich, 1969) and, in retrospect, to find some overall sense in their pain and their episode of long-term disability. This theme also illustrated the idea that in the final analysis, the suffering was not always in vain, that "every cloud has a silver lining." Sometimes we detected moral, religious or societal themes that went well beyond the sensation of pain and its limiting aspects. The following citation illustrates such a moral component.

> *"I realized […] that I was burning the candle at both ends. I didn't see my children enough, things like that […] And that made me aware, made me pay more attention to my mental health, that… making money… yeah, mental health. If my car is paid for and stuff like that, yeah, my mental health would be better, except that, I dunno, eating with friends, I find that, for the moment, that matters more to me than going to work overtime." (Participant 16, T1, successful)*

The religious component illustrates the idea of the instrumentalization of pain by a higher force in order to make us aware of something. Here is one such example:

> *"I see myself as being at a point in my life where I'm gonna have to slow down... Take my time, enjoy life a little... I was never able to do that. But I'm starting to do it... Yeah, I'm starting to do it. I was obliged to.... Maybe it's Him up there, who decided that I would have to hurt myself in order to settle down a little, you know. I used to be on the run too much." (Participant 7, T1)*

Lastly, the societal component refers to the judgement made by society in general. Thus, the following worker claimed that the pain he suffered from was not just an individual problem, but also the result of a lifestyle widely adopted by the population at large and having repercussions on his personal health. He stated as follows:

> *"Right now, society is going at 100 miles an hour. You just don't have time to take care of yourself [...] You've gotta run to get your kids, run to do this, run to do that... But if people took a little time to take care of themselves, you know, things would already go quite a bit better. Because backaches, and burnouts, and depressions, I've gotta tell you... I think that everyone knows someone who's been there. (Interviewer: So in fact you became aware of a lot of things?) That's for sure. I became totally aware this summer. It was really a summer when I came to realize things." (Participant 11, final interview)*

Even if pain was portrayed as a societal problem, this worker nonetheless refused to feel less guilty or to abdicate his responsibility. For him, the PRÉVICAP program was an "awareness-raising" tool, a change factor. It should be noted that this worker did not talk at all in this excerpt about reconditioning, physical healing or recovery. The recovery process "taught" him something that went well beyond the physiological dimension.

Drawing lessons from the pain experience was a subsequent phase to the actual change in sense of identity. The worker, still coping with a pain or disability problem, had sufficiently improved his condition to be able to extract positive elements from the whole trajectory.

The need to be believed

As was shown earlier, just as inactivity was an element associated with illness, being inactive without saying that one was sick also signified something abnormal. According to the workers interviewed, they had to regain the characteristics that define health in order to correspond to a certain image of "normalcy," particularly when this type of "abnormality" undermined their social identity, i.e. how others saw them. Impaired self-image also appeared when other people doubted the person's pain or when the person was not believed.

The fact of experiencing other people's doubt (real or presumed) about the legitimacy of their pain experience overwhelmed several workers. A number of them in fact spoke about the problem (or fear) of not being believed by others. For some workers, this doubt could take the form of the employer contesting the validity of the medical diagnosis. In this case, it was the worker's honesty or integrity that was seen as being cast into doubt. Or, the disbelief could come from family members, friends or co-workers who did not understand the persistence of the pain (which they were unable to fit into a known "sickness" schema). The following worker explains this idea:

"To be told all the time by my co-workers, every time that I brought in my CSST paper, to be told... 'Oh, come on, [first name], you gotta be kidding. You're not supposed to still be in pain. Come on, it's just a shoulder. It doesn't make sense. You've been off work for 7 months now. That's impossible... Come on, guy, you must be faking, it just doesn't make sense...' You know, people say these kinds of things to you... And I'm someone who's kinda proud, so it hurts; in fact, it hurts a lot because I would say to myself... I wish you could be in my place." (Participant 7, T1)

This same worker also brought up the aspect of medical validation, illustrating that the social recognition of pain also involves medical recognition:

"Yeah, I was worried because even today at my work, they didn't believe that I had pain. They just don't believe me. Nope. For them, it's impossible. And then there was [first name of a clinician] who proved to them when she came to meet them on October 27 that I still had something. When she said to them: 'Mr. [worker's family name], he's not pretending; he is in pain...' " (Participant 7, T1)

The need to be believed also related to the belief that the pain was truly physical and that "it's not just in your head." This position often revealed a fear of being seen as "crazy":

"There was one person who just threw this at me... like... he just threw this out. 'Ah come on, it must be psychological.' So, I just looked at him and said, 'I'm not crazy, you know. If you've got pain, like if I hit you, you're gonna hurt. But will you really have pain or is it just gonna be in your head, your pain?' " (Participant 13, T1)

From another perspective, some workers wanted to return to work quickly to show their "good faith" and their sense of integrity (and that they were not trying to "rip off" the healthcare system and the social safety net). The following excerpt illustrates this position:

"I'm not here, you know, to screw the system, to say, look, I wanna take advantage, I'm on CSST benefits. I'm at home, sitting on my ass... It's not at all what I want. I really wanna get back on the right track." (Participant 16, T1)

The causes of pain

When asked about the causes of pain, all the workers defined possible causes that can be divided into two categories: initial causes, such as an accident, and current causes (aggravating factors or triggering elements). Process-related causes were also identified, such as body wear and tear. This wear and tear was seen as attributable to a natural or "premature" aging process in the context of physically demanding work or to unhealthy lifestyle habits. Therefore, it was sometimes difficult to clearly differentiate between the causes associated with a specific initial event such as an accident and the contexts that predisposed the workers to such accidents. In any case, whether due to an accident or wear and tear, the workers described physiological mechanisms of pain. Physiological-type explanations were pervasive. Some workers attributed their pain to an impairment of their skeletal structure, while others spoke of a muscular impairment or weakness. The therapeutic methods recommended were not always the same, depending on the locus attributed to the pain. For example, in the workers who saw their problem as an impairment to their skeletal structure, surgery was often presented as the best possible solution, although some of the workers themselves confirmed that they had run up against the physician's refusal to perform the surgery: "they say that

I'm inoperable." When the pain was related to weakness or endurance, the workers spoke more of the need to strengthen their muscles in order to give their spinal column better support. For these workers, exercise and maintaining sound lifestyle practices were presented as the more beneficial solution. Other physiological causes were identified; these pertained to activity, inactivity, awkward movements, overload, overwork and the process of wear and tear. The aspect of body wear and tear and overwork was at times associated with a "premature aging" process when the wear and tear was considered abnormal, or as caused by lifestyle habits that were regarded as unhealthy. A few workers thus likened themselves to "little old men" to describe their loss of mobility and autonomy.

The workers also identified psychological causes, primarily stress and anxiety. The following worker's comments explain this idea:

> *"In my case, it's chronic pain, it seems, that is maybe related to something psychological. My pain in fact, I was injured there, but my body…you could say that it has a hard time admitting that I no longer have an injury there, you know." (Participant 20, T1)*

Socially speaking, the workers cited other people's pessimism, the employer's contestation of the validity of their diagnosis, or diverging opinions among the different specialists as aggravating factors.

The following worker spoke of other people's pessimism, which had an effect on his morale:

> *"My former buddy. It's strange, huh. It was always him who used to throw a wrench in the works. It was always him who used to say to me, 'they'll never take you back, you'll never go back to work, you're finished…' He was always negative. He wasn't worried, he was downright negative." (Participant 7, final interview)*

The following worker's comments show the difficulties experienced with regard to the employer's contestation:

> *"All these things worried me for a good two weeks when I received that letter there… For sure, you get stressed, automatically, and, well then, your back pain starts up." (Participant 19, T3)*

Lastly, the same worker spoke about the effect of receiving contradictory opinions:

> *"I couldn't feel my arm anymore, I told the same orthopedist, I said, 'It hurts, it hurts so bad.' He gave me an injection, then said to me, 'I can't do anything for you; go see your doctor.' So then my doctor sent me back for physiotherapy and occupational therapy at the same time. In physiotherapy, at first they told me, 'Don't move; move your arm as little as possible.' Then in the afternoon at occupational therapy, they told me, 'Move your arm.' So then I was all mixed up. I was in pain. So when I saw that in physiotherapy, he says to me, 'Call your doctor.' "(Participant 20, T1)*

Given this more generic presentation of pain representations, there appear to be noticeable differences between the two categories of workers: "successful" and "failed."

Differences between the categories of workers

Workers in the "successful" category

The workers in the "successful" category clearly illustrated the elements that have been described more generically above. For these workers, the pain experience sent a signal that could be interpreted positively or negatively. When there was no recovery, the signal was seen as negative and the pain was perceived as "abnormal." Thus, at T1, avoidance due to fears of reactivation was evident in some of these workers as a response to pain, but this strategy disappeared starting at T2, and completely by the time of the final interview.

The signal was seen as positive when the pain was successfully reduced or was of short duration. This capacity to "recover" appeared to be a key element affecting their interpretation of the pain signal, which was then perceived as "normal." Contextual factors such as the requirements of physically demanding work also had an impact on the interpretation of the pain signal. The workers therefore had to adapt to the pain, and the above-mentioned strategies that were implemented to offset the negative or incapacitating consequences of the pain included active management techniques. During the rehabilitation program, these workers agreed to live with the pain because they developed effective strategies for reducing or controlling it, which in turn allowed them to remain active and even to change their lifestyle habits. They returned more easily to the idea of a normal pain even though their physical condition had not necessarily gone back to "the way it was before."

The representation that these workers generally had of the causes of acute pain specifically involved physiological mechanisms. However, when the pain persisted, the workers at least partly recognized how psychological mechanisms, including stress and anxiety, contributed to the phenomenon. While some of these workers spoke about the consequences of pain in terms of an alternation in their sense of personal identity by situating themselves in an "illness-destruction" paradigm at T1, during the program several of them spoke of the reconstruction of their self-image and of the lessons they derived from their personal pain experience. This may illustrate the idea that the pain, according to them, was not in vain or pointless, and that it enabled them to reflect on the meaning to give to their lives, pace and work habits. This "awareness" (or realization) began as early as T1 and peaked at T3, when these workers even tried to introduce healthy work habits to their co-workers. However, when these same workers were interviewed one month after the end of the interdisciplinary program, we noted that they had tended to resume the risky behaviours that had prevailed prior to their injury.

Workers in the "failed" category

The workers in the "failed" category were no different from those in the "successful" category in terms of their medical trajectory. The same applied with regard to the pain signal. These workers described identical trajectories in terms of a disruption in both their daily life and their medical trajectory, i.e. they had the same therapeutic ceiling experience. They differed, however, in that they almost never mentioned the idea of "recovery" and their focus was nearly exclusively on pain rather than other aspects of the problem. These workers also cited often-difficult or physically demanding work requirements, but unlike the "successful" cases, their action strategies concentrated mainly on avoiding the activity that caused the pain and on passive management techniques, with mixed results. These workers were closer to the "enduring pain" pole than to the "accepting to live with pain" pole such as described earlier. They also understood the consequences of pain in terms of an altered sense

of identity; however, instead of evolving toward a reconstruction of their self-image, these workers remained caught in an "illness-destruction" paradigm.

Some of them also described experiences related to the fact of not being believed. Contrary to the "successful" cases, who experienced the same phenomenon, these workers identified the fact that their employer contested the validity of their diagnosis as a source of anxiety that could trigger pain. However, according to them, the main cause of their pain remained essentially physiological. For some who identified stress and anxiety as factors influencing the pain mechanism, the strategies they used remained biomedical, or they defined passive management strategies such as those described earlier. Others cited the psychological factor as a possible contributor, or to discredit it, said "pain is physical, it's not in your head" or "tell that to someone else, but not me," and they were more put off by certain aspects of the interdisciplinary program dealing with these aspects. All these workers continued to emphasize pain, as well as avoidance and passive pain management strategies, through to the end of the program. The idea of pain as a negative signal thus remained very prominent in the final interview.

The characteristics of the problems, goals and strategies adopted

This next section describes the problem-solving components reported by the workers and explores those that make it possible to distinguish between the workers who returned to work and those who did not. For this purpose, we based ourselves on the key components of the self-regulation model (H. Leventhal et al., 1980), specifically, that the individual seeks to reduce the gap between his or her current state and the state (i.e. the goal) sought (Horne et al., 1998). The representation he or she forms will guide his or her action plan and adaptive strategies (H. Leventhal et al., 1980). The previous section has already documented certain pain management strategies used by the workers.

We investigated the subjective interpretations of the problem components, goals set, and problem-management strategies as reported by each of the workers. We then extracted characteristics common to several of these interpretations. These elements lay between two poles, sometimes ranging from the presence to the absence of the characteristic in question, and sometimes from one concept to another qualitatively different concept. Based on this analysis, we were able to observe near which pole the characteristics of the workers in the two categories (successful – failed) most often lay and to identify what differentiated the two categories.

Characteristics of the problems

As shown in Figure 7, our analysis of the workers' problems brought to light four dimensions that can be used to characterize the problems, i.e. the way of defining them, the perceived degree of control exerted over them, the perceived changes that occurred in them during the program, and the actual content of the problems. These dimensions were present in all the workers, but were manifested differently, depending on whether the participants returned to work or not.

Definition of the problems

The first dimension reveals the existence of two poles with regard to the definition of the problem. At one of the poles, the workers define their problems from a psychological standpoint, i.e. they approach their problems in terms of a personal challenge or an impact on one or more areas of their life. The psychosocial definition is expressed using psychological rather than physiological vocabulary. In addition, this type of definition allows the individual to expand his or her field of imaginable solutions beyond strictly medical care. Figure 7 summarizes the characteristics of the problems in terms of their occurrence among the successful and failed cases.

Figure 7: Characteristics of the Problems

Characteristics of the problems reported by participants

More frequent among the failed cases	**Evenly distributed**	**More frequent among the successful cases**
• Problems defines in biomedical terms • Feeling of having no control over the problems • Perception that the problem does not change over time	• Worries, anxiety, fears • Reduced capacities, physical limitations	• Problems defined in psychosocial terms • Feeling of having control over the problems • Perception that the problem changes over time

The next citation clearly reflects the vision that one worker had of his problem, which initially was a problem of back pain but which, according to him, worsened when he spent all his time thinking about it.

> *[...] "But I tell myself I mustn't stop here because it's not by stopping and telling myself that it hurts that I'm going to make it get better. All along I've said, 'Put me back in my workplace.' I give myself 3 months, then in 3 months, I'm going to be back*

to 200% of where I'm at now. And I know that's what's going to happen to me. Because I know that I'm going to forget it, the darned pain that I have, because I'm going back to work, and I'm going to stick with it." [...] . (Participant 7, T1)

At the other pole were the workers who had a biomedical vision of their problem. While they were aware of the impact their pain had in various areas of their lives, these workers saw the causes and solutions as lying exclusively within the biomedical realm. Consequently, they were limited to relying on the medical community for all the solutions. In the following citation, the worker described his problem without veering away from the biomedical definition, while at the same time expressing his views of the psychosocial aspect of pain that the program was trying to teach him.

[...] "There was one person who threw this at me… like… who laid this on me: 'Ah, this must be psychological. I just looked at him and said, 'Look here, I'm not crazy, you know. What about you… when you've got pain, like, if I hit you there, is it gonna hurt?' I think, I'm sure that pain is…I mean I'm not just sure, I'm absolutely certain that pain is physical. You feel it. Okay. So." [...] (Participant 13, T1)

Feeling of having control over their problems

Nearly all the workers who succeeded in returning to work had something in common: they regarded the measures needed to manage their problem as accessible and believed that they were capable of applying them. These workers already had a sense of self-efficacy, or developed one during the program. The following citation shows the great confidence with which this worker described how he got the upper hand of his problem:

[...] "That thing inside there, the subconscious or I don't know what you call it. I … I like, put my pain aside, I told myself, 'when you're hurting,' like, I'm a lot stronger than my pain. I can manage it a lot better now than I could before. Before, I used to say, 'My God, what am I gonna do about this pain?' I was always afraid of having worse pain, all the time. That was my problem, [being afraid of] having worse pain." [...] (Participant 7, final interview)

None of the workers who failed to return to work developed this feeling. They all considered that no solution existed or was within reach, for most of the problems they faced. They attributed the cause to their own limitations or to the fact that an outside institution prevented them from accessing the solutions. Also, some did not consider themselves responsible for their situation, but instead, saw themselves as victims of other people's incompetence. The following example illustrates a worker who, in seeking a treatment that would alleviate his pain, had the feeling that he had very little control over himself.

[…] "What miracle solution is there that… will work, you know? It's a little bit of that. OK, there are other specialists, but,… is that going to work? You don't know. And then if you don't try it, well then, you'll never know. But I think that the last six months I've been through have clarified a lot of things in a certain way. (Interviewer: What do you mean?) Well, I won't be able to do things like before, you know. As long as I have this problem, as long as it's not resolved, I won't be able to… won't ever be able to function like I used to before…I mean, like walking… just doing the dishes at

home gives me a sharp pain above my buttocks, so you know it's...". […] (Participant 14, T2)

Presence of a variety of complaints, worries, fears and anxieties

All the workers complained about the limitations and physical disabilities caused by their pain. Several of them revealed worries in their comments, mentioning a series of events that had major negative consequences for them. To a more or less intense degree, they also had fears about specific issues. For example, one worker mentioned that he had just bought a house and was going through financial uncertainty in light of his new obligations. Lastly, several workers revealed diffuse anxiety experienced at the physiological, psychological or cognitive levels, yet were unable to identify the specific source of their worries.

The following citation comes from a worker who, at the very beginning of the PRÉVICAP program, was worried about what would happen to him at the end:

> *"How can I say this...the only thing that worries me a lot is, if when I leave here, they tell me, okay, you're in shape and all that, but in my own head, I know that maybe I will have trouble doing my job, but […]. Will they support me right through to the end? Are they going to pay for courses if I need some? And if I need to change occupations? These are things...it's little things like this that sometimes...I guess you could say, that cause a lot of worry. You know, like, are they going to tell me, okay, now then, okay, case 4 is settled, click. It's over; end of the road. Which means that the next morning I might have to scramble to find another job because..."* *(Participant 4, T1)*

The following example comes from a worker who complained about the fatigue caused by pain since he had been back at work. He was worried about the future, when he would have to work more, and about being unable to make the effort required; all this made him anxious.

> *"[…] even just doing four hours, I feel it, you know... a pill, then with... I go right to bed when I get home. That's what it's like, I'm just dead... I'm really, you know... I'm just wiped out. You know, don't ask me to... you know, and I was only working four hours. That was still... Don't ask me to do any housework or to make dinner. No way. (Interviewer: You mean exhausted?) Exhausted, yeah. I'm just dead. I've worked only four hours and I'm wiped out. You know. So after 13 hours, I'm going to be completely wiped out ..." […] (Participant 6, T2)*

A change in perception of the problem over time

Another characteristic that can be used to divide up the group of workers is the change in their perception of their problem over time. A common point among all the workers who failed to return to work was that their perception of the characteristics of their problem remained unchanged between T1 and the final interview. Conversely, a change in perception did occur in nearly all the workers who succeeded in returning to work. In these workers, the change enabled them to regain a sense of control and self-efficacy with regard to their pain problem. The following two citations from the same worker (who succeeded in returning to work), one at T1 and the other at T2, illustrate a major change in his perception of his problem:

T1:

> *"She, she used to say, it was a matter of managing the pain. You know, like when you have pain, well then, for her, you sit down with a book, then your mind will move onto something else and you'll have less pain. Well, I'm sorry, but my pain is not in my head. You know, it's my head that sends me the message, you know, that I've got a pain. But it starts in my back, you know. It's not my... [...] (Interviewer) "So you had the impression they were telling you that it was in your head." (Worker) "Yeah, that's right [...]" (Participant 16, T1)*

T2:

> *"[...] before that, you were hurting, so... what did you do during the daytime? Absolutely nothing. So then, your mind, you know. [...] So your mind, you know, like it turns to something else, so... You know, before that, I used to say no. But now, my mind, it... I decide... to do some activities, so my mind, my mental health is better because it's no longer the pain that decides things for me. Now, it's my mind that decides for my back." (Participant 16, final interview)*

Characteristics of the goals

Setting goals

We observed that all the workers' goals focussed on two main themes: specifically, returning to work and managing the pain (Figure 8). The workers whose goals were oriented toward a return to work made it a priority in terms of the effort they put into managing their problem. Pain management may also have been one of their objectives, but only as a secondary goal to promote their ability to work. The following worker's comments clearly reflect the priority he placed on the goal of returning to work:

> *[...] That's my goal. My goal is to go back to work, so as long as I have this goal in my mind, I'm going to do the best I can to make it happen [...] (Participant 16, T1)*

Figure 8: Characteristics of the Goals

Characteristics of the goals reported by the participants: frequency
according to workers status

**More frequent among
the failed cases**

**More frequent
among the
successful cases**

- Emphasis placed on pain
- Goals remain defined in general and unclear terms
- Goals remain unchanged over time

- Emphasis placed on returning to work
- Goals explicitly and clearly defined
- Goals modified over time

The workers whose primary goal was to manage their pain (eliminate, reduce, heal) in the context of managing their problem made pain reduction an absolute condition for their return to work. The following citation reveals one worker's ambivalence regarding the choice of returning to work, as well as the presence of pain as the determining factor in knowing whether or not he could return to work.

> *[...] So the doctor told me... my doctor told me... we're going to try a new week, but... of normal work... My pain had sort of calmed down. So I said sure, why not? I'll give it a shot. You know, it might just work. You know, maybe I'll be able to tolerate the pain. And even if I have a little bit of pain like I used to have, that's okay, that's fine... So I went back to work. I wasn't... uh, it was just hell [...] (Participant 6, T1)*

Change in and clarification of goal definition

We also observed that certain workers defined their goals more clearly than others, thus reflecting their understanding of the main goal and the secondary goals needed to attain it. The workers who minimally defined their goals stuck to generalities, without specifying the steps that would enable them to attain these goals. These workers belonged primarily to the failed category, although a few also fell into the successful category. However, the latter refined their objectives over time, as their implementation of new strategies yielded positive results and as they developed a sense of self-efficacy in managing their problem.

Characteristics of strategies

As illustrated in Figure 9, we identified four dimensions that were common to all the workers in terms of the strategies they implemented to manage their situation. These dimensions concern the degree of correspondence between the goals set and the means used to reach them, the integration of strategies, their effectiveness, and changes made to the strategies or goals during the program.

Figure 9: Characteristics of the Strategies

Characteristics of the strategies reported by the participants:
frequency according to workers status

More frequent among the failed cases

More frequent among the successful cases

- Not related to the goal
- Not integrated by the participant
- Mostly ineffective
- No change in beliefs related to the problem

- Directly related to the goals
- Integrated by the participant over time
- Effective
- Change in beliefs related to the problem

The link between strategies and goals

The workers developed strategies that corresponded in varying degrees to their goals, ranging from close correspondence to none at all. The more closely the strategies corresponded to the goals, the more directly they sought to meet a specific need (regardless of whether or not they were effective). The need was defined beforehand by the worker, who then expected certain results. For example, starting to play a sport when the goal set is to regain physical fitness is a strategy that corresponds closely with the goal sought.

Contrarily, we also noted strategies that did not meet the need specified by the worker, or that even worked against the goals sought. The case of one particular participant illustrates this point: his main goal was to return to work, but throughout the program, his key strategy was to prove to the program clinicians that he was too badly injured to work. He even hoped to use a therapeutic return to work to show the accompanying clinician that he was unable to do his job. This strategy appeared to be counterproductive in terms of achieving the main goal.

Integration of strategies

Some workers assimilated the strategies they learned during the program and integrated them gradually into several areas of their lives. They personalized or adapted the strategies in various contexts where the problem might have an impact. They also assimilated the lessons learned during the program and applied them in other areas of their lives outside the problem context. The following worker's comments and tone reflect how he integrated what he had recently learned about the control he could exert over his pain at work, starting with respecting his personal physical limitations:

> *"My tasks have changed a little bit. First there is an agreement with my company that I no longer have the right to lift heavy boxes [...]. There are work methods, we have handtrucks, or what I call flat trucks, so they (the company) told me, 'You're going to start working'... I used to work with them before, but only on busy days. I said to myself, 'Oh yeah, when I used to want to do a big job and I wanted to do a lot at once, well then, I'd fill it right up, then I'd say to myself, 'Ok, here we go.' But now, I don't do that anymore. Now, I'll take it... even if I have only two little boxes, I... I don't push myself anymore, I take more coffee breaks, I stop more often, I stop, I wait, I do what the clinician told me to, a little physical check, then after that, okay, and off I go again. And that's how it is." (Participant 7, T2)*

Effectiveness of strategies

It was only workers in the successful category who adopted effective strategies yielding positive results related to the initial goal or that led to a change in the goal. These workers also included those who changed initially ineffective strategies for more effective ones, as illustrated in the following example:

> *"I learned some good tricks with the clinicians. The tricks they gave me, plus knowing not to ever push myself beyond what I was able to do... You know, moderation, [handling pain] up to level three... or... I really got the message, you know. I never let it go beyond level 3. If it hurt me, like the clinician told me, when it hurts, you stop.' [...] Then after that, you start again. And if then you see... if your pain gets worse, you stop, if then you see that you aren't able to do it. But if you see, yeah okay, it hurts a little but it passes, you do some stretching and it passes, then it means you can do it, you can make that movement, you can do [...]." (Participant 20, final interview)*

By contrast, what characterized the workers who used ineffective strategies was not the fact that they applied means that did not yield positive results, but rather their persistence in using them despite their ineffectiveness in relation to their stated goals. In the following citation, the worker describes the means he used to make the health professionals believe he was really in pain. He retained this strategy for the duration of the program, making no change whatsoever:

> *"When I used to go see the doctor, I wanted things to... to be in bad shape so that I could really show him that it was true, because if I went to him at a time when I wasn't bad, he was going to tell me that I was okay. But essentially the pain is there; yeah, it goes away, but then it comes back."(Participant 13, T1)*

Successful cases that appeared to be failures

Some of the successful cases had a profile resembling that of the failed cases. Moreover, they shared with the latter the feeling of having no control over their problem. However, what differentiated these particular "successful" cases was that the notion of control was not necessarily identified or felt as such, yet their strategies still moved them in the direction of their goals. Also, despite defining their problems in biomedical terms, they placed greater emphasis on physical reactivation than on pain. In this sense, there was some assimilation of the strategies proposed by the program.

In addition, these participants focused more often on their physical pain than on the return to work, as the latter was a source of great anxiety to them. The program nonetheless helped them reduce their fears by offering them the possibility of tackling them directly. These workers were able to develop a certain openness toward understanding their pain, with the help of a psychosocial definition. The fact that they aimed for physical fitness was another important factor in the success of their return to work, for it enabled them to develop a sense of self-efficacy over time.

However, in one of these workers, we observed high self-efficacy expectations with regard to the criteria he set for himself once back at work, criteria that he did not succeed in meeting because of the nature of the work itself, which simply made it impossible for him to achieve his goal. Based on this situation, it can be concluded that this worker had good expectations but did not fully acknowledge the context in which he had to apply them.

It is plausible to think that these workers were at high risk of re-injury (as in fact was the case for one of these workers), due to the little control they had over various components of their problem.

In summary, through our analysis of the characteristics of the workers' goals, problems and strategies, we identified those occurring most often in the discourse of the workers in either the successful or failed categories, and those occurring equally in both categories.

The definition of goals by the workers in the failed category tended to place emphasis solely on the elimination of pain and not to define the goal more specifically, i.e. in terms of tasks and actions to be performed. They perceived the nature of their problems as mainly biomedical, which in their minds reduced the accessibility of strategies and the feeling of control they had over themselves. The pain management strategies and the return-to-work recommended by the PRÉVICAP program did not correspond to their own expectations of eliminating the pain. The strategies learned were therefore not integrated or directed toward the goal of returning to work. Yet they also appeared to be relatively ineffective in eliminating pain. The shared characteristic of the goals, problems and strategies of workers in this category was that they remained the same from the beginning to the end of the program.

What distinguished the workers in the successful category from those in the failed category was above all their main goal, which was to return to work, and the fact that they specified their goal in terms of the steps to be taken to attain it. They defined their problems in psychosocial terms, which expanded the range of possible strategies for managing the problems. The application of effective strategies enabled them to experience successes, and as they gradually integrated these strategies, they developed a feeling of control. Lastly, what was common to the goals, problems and strategies of the workers in the successful category was that the workers changed them during the PRÉVICAP program.

1.8.3   Discussion

Our analysis of health and illness representations reveals that they comprise elements that are relatively common to and stable between both categories of workers. Very briefly, the basic elements used to construct the representations verbalized and their different components fell into place right from the time of the initial interview. In several respects, the health representation was essentially the mirror image of the illness representation. We often noted a symbolic system of opposites: activity versus inactivity; presence versus absence; dependency versus autonomy; inside versus outside; inner versus outer, etc. These opposites became entrenched, which only served to reinforce the stability of the health and illness representations. On the other hand, many more referents were used to describe illness than to describe health.

When asked about their problem and their current state, the workers defined themselves as being in a state other than either health or illness. The elements used to define the representation of this "other" state were nonetheless the same as those used to define their health and illness representations. In fact, this other state was described in terms that allow it to be positioned on a continuum. Based on our analysis of the discourse, it appears possible to establish a continuum of states starting from "sick" at one end, then "a little sick" or "fragile", and at the centre, a state that would appear to be moving away from that of sick, i.e. "injured or hurt," with a gradual shift toward "I'm healthy but," and finally, at the opposite end of the continuum, "health." The recovery process is geared toward achieving elements that represent health, or conversely, toward eliminating several of the elements that make up illness. Thus, the further one moves from the characteristics of illness and the closer to those of health, the stronger the workers' sense of being on the road to recovery. It is therefore important to have a thorough understanding of the elements that comprise these representations as they will be directly involved in the perception of recovery held by workers with MSDs.

The theme of pain is a major component of the representations and comes up in the comments made by all the workers. Pain is seen as an indicator that can be interpreted in different ways. According to the workers interviewed, pain can be normal and under control in a work context, or abnormal and anxiety-inducing when it is constantly present and recovery is difficult. This so-called abnormal pain causes a biographical disruption and triggers an often-complex medical process spanning several months. The pain plays the role of a signal or barometer for gauging their progress or regression when they are evaluating their condition and along their path to recovery. This pain representation in turn plays an important role in the identification and implementation of strategies. The strategies used to adapt to pain include avoidance, passive or active management, and acceptance of living with residual pain with some or no means of controlling it. Living with pain may alter personal identity and self-esteem. The latter also depends on how the worker is perceived by other people, who may doubt his or her integrity. This touches on an important emotional dimension of the representations.

For workers in the "successful" category, pain seen as a signal was less present at the end of their trajectory and served to prevent behaviours regarded as exaggerated. If at the beginning of the trajectory these workers were hoping for a complete recovery, by the end, they accepted the idea of possibly having residual pain and of having to use active strategies to manage it. Given that they were back at work, the question of a disruption in identity did not come up in their discourse. However, the experience allowed several individuals to derive life lessons with moral, societal and religious components. Many workers in this category also looked at the psychological dimensions associated with pain.

The concept of pain as a signal was always present in the discourse of the workers in the failed category. It elicited the fear of injury and of permanence. Pain was always the key focus of their concerns and remained so for the duration of their trajectory. Given that they did not succeed in returning to work, the idea of testing their capacities always remained an important issue. The primary strategies adopted were avoidance and passive pain management. The issue of a sense of personal identity remained very present and the need to be believed was an important concern for them.

Our analysis of the strategies adopted revealed that the workers who returned to work integrated a much larger psychosocial component than the other workers, who confined themselves to the strictly biomedical dimension. While all the workers expressed fears, worries and anxiety about their situation and the outcome of their rehabilitation, those who returned to work believed that solutions existed and that they could apply them. They believed they had a certain control over their trajectory and concentrated on the return to work. They therefore had a specific goal, and the strategies they used were well-suited to this goal. Moreover, they were able to adapt and change their representations and their behaviour throughout the rehabilitation process. In contrast, the workers who did not succeed in returning to work believed they had little control over their problem and focused almost exclusively on their pain throughout their trajectory. They tended to maintain the same strategies all along despite their ineffectiveness. However, these were only trends, because some workers who returned to work shared the same characteristics as those in the failed category. On the other hand, these workers appeared at risk for relapse and aggravation.

Our analysis of the discourse on representations and strategies revealed that certain health, illness and pain representations that run counter to scientific evidence regarding MSD treatment may cause workers to adopt behaviours which hinder their rehabilitation and return to work. However, it may also be possible to change these representations during the therapeutic process and to trigger recovery and occupational reintegration in some workers.

2. GENERAL DISCUSSION

The impact of the various factors predictive of work disability and their interaction during the rehabilitation process of workers with MSDs remains a subject that has been little investigated to date. The theory underlying the few existing studies implicitly regards the reactivation process as linear, i.e. where the worker progresses relatively constantly through the recovery process until returning to work. Yet, as noted in this paper, a linear trajectory is a relatively infrequent occurrence, with the majority of workers passing instead through a phase of progression, then reaching a ceiling, and sometimes experiencing a phase of regression in their condition (Loisel, Durand, Baril, Langley, & Falardeau, 2004). To date, the factors contributing to the triggering of these phases are poorly understood. These mechanisms seem to be associated primarily with the representations workers form of health, illness, pain and adaptive recovery-oriented strategies. The general objective of this exploratory study was therefore to document workers' representations along their rehabilitation trajectory, in order to gain a clearer understanding of the impact these representations have on their behaviours during the management and therapeutic follow-up processes aimed at occupational reintegration.

Our critical review of the various models developed for health, illness and pain representations brought to light different models with differing approaches, depending on the research discipline. In health psychology, the models seek primarily to change the individual's behaviour (Coutu et al., 2000). The anthropological and sociological perspective is broader, covering the entire continuum from the individual to society. At the individual level, the concept of trajectories makes it possible to re-situate the illness experience within the person's life history (Bury, 1982; Charmaz, 1983; Good et al., 1992; Kleinman, 1988; Williams, 1984). Illness may be seen as a point of disruption in the person's life trajectory and identity. According to Bury (Bury, 1982), the person must find a certain meaning in his or her illness in order to regain balance in his or her trajectory, by developing an acceptable self-image. At the social level, it appears that the pain-related representations and behaviours observed in a person cannot be dissociated from the living environment, which gives a sense of meaning and a practical purpose. Therefore, given the "holistic" or multifactorial nature of the persistent pain associated with an MSD (Thunberg et al., 2001), any understanding of these representations must be multidimensional. It must also include the individual's cognitive and emotional representations, as well as the interactions between these and his or her environment, during the occupational reintegration trajectory.

In the context of this project, all the workers were asked about their "health" and "illness" representations. The results reveal a convergence and a degree of consistency in their ways of being, speaking and doing, with regard to health and illness representations. Moreover, these representations were stable throughout the rehabilitation process. The homogeneity of these representations among workers and their stability over time suggests that the latter constitute social representations, i.e. ones emerging from a set of values and standards generally shared by society. This partly corroborates the results of a number of anthropological and sociopsychological studies (Bibeau & Pelletier, 1985; Herzlich, 1969; Pierret, 1984). For Jodelet (Jodelet, 1989), health and illness representations depend on commonsense, where the representations are self-evident, i.e. they are endorsed without necessarily involving a systematic and conscious reflection process. The fact that we questioned the workers regarding the terms they used to talk about health, illness, and their current state, catalyzed a reflection process in

which all the workers identified a gap between their current state and their health and illness representations. When a person can no longer explain his or her current state based on commonsense representations, he or she is obliged to ask him- or herself questions and construct a new meaning (Bury, 1982). This is illustrated by the variety of terms used to describe their state, such as healthy, injured, maimed, or a little sick. Regarding pain, it was seen as a signal on the basis of which the workers evaluated the effectiveness of their actions. Pain thus served as a barometer that guided their evaluation and the progression in their current state, thereby becoming central to the process. The key role played by symptoms is also corroborated by the work carried out by Cameron et al. (Cameron, Leventhal, & Leventhal, 1993, 1995).

The dynamic mechanism whereby a worker forms a representation of his or her situation and develops an action plan with a view to adapting and to evaluating the effectiveness of his or her actions is considered to be a process of self-regulation. This process is, among other things, described in health psychology in the self-regulation model developed by Leventhal et al. (H. Leventhal, Nerenz, Straus et al., 1982) in terms of feedback loops. More specifically, feedback loops enable the person to compare his or her current state to the goal sought. When the gap between the two is neither reduced nor increased, the person may choose to reconsider his or her representation of the problem, action strategies and even evaluation criteria. Conversely, if the gap is reduced, he or she may believe that the strategies used (and deemed effective) should be maintained. The feedback system in the self-regulation model is regarded as stable when the feedback loops allow for behavioural adjustments to be made toward strategies that are viewed as more effective for attaining the goal set. Contrarily, it is said to be disorganized if it does not allow for readjustments in the representation, strategies or evaluation criteria. The presence of feedback thus makes it possible to differentiate between the trajectories that will lead workers back to work from the trajectories of those who will not return to work. In fact, the RTW workers presented stable feedback loops. Their representations of their current problem were mainly focused on pain at the beginning of the rehabilitation program. Some presented a more physiological representation of their problem. Most of them also mentioned having little control over their pain. However, the latter changed for these workers during the rehabilitation process. Also, even at the start of rehabilitation, avoidance due to fears of reactivation appeared as a strategy, but this diminished at T2, and had completely disappeared at the final interview. Their goals were specifically oriented toward returning to work, and were explicit and precise. In terms of strategies, active pain management appeared during the rehabilitation process and seemed to promote a return to work. These strategies, which were considered effective, were adopted and then gradually changed and refined. These workers observed a reduction in their pain signal. According to the operant conditioning theory, this positive result may have reinforced the efforts made and behaviours adopted. Consequently, this in turn may have promoted the feedback process, the changing of representations and the refinement of adaptive strategies.

Regarding the workers with a trajectory of not returning to work, their representations of their problem were focused particularly on pain and were described mainly in physiological terms. The impact of the psychological component on pain was very marginal. These workers also had a poor perception of the control they exerted over their pain. Their goals remained general and unclear, such as the "need to be believed" or "to endure the pain." According to the principles of problem solving (D'Zurilla, 1988), in order for the problem-solving process to be effective, the problem and goals must be defined in sufficiently clear and detailed terms. It is therefore not surprising that these workers had a great deal of difficulty implementing effective strategies. For

example, the strategies adopted to reduce pain involved mainly so-called passive management of pain in which avoidance and antalgic strategies were paramount. At best, these strategies were reported as reducing pain in the short term. However, they did not make adaptation to the pain possible over the long term, i.e. by reducing the pain signal or preventing an increase in pain above the tolerance level. Interestingly enough, despite the ineffectiveness of their strategies, their representations, goals and strategies remained relatively stable throughout the rehabilitation process.

According to the self-regulation model of illness, the feedback system for these workers was found to be disorganized. It is thus impossible for the person to identify major indices that would signal to him or her the need for a readjustment (H. Leventhal, Nerenz, & Straus, 1982). The most microscopic aim of the personal construct theory could prove useful in this case for the purpose of identifying the interpretation processes the person uses to form his or her personal constructs. Analysis may reveal a conflict within the personal construct system that could explain why the worker resorts to a personal construct despite its constant invalidation (O'Connor et al., 1994). Unfortunately, our results cannot be used to document this hypothesis, since the interviews were not conducted from this perspective. In addition to this interpretation, another hypothesis could be advanced to explain these results. These workers' representations were less elaborate or detailed than those formed by the workers who returned to work, and remained so throughout the rehabilitation process. These workers also made much less mention of psychological components. Such characteristics could be related to aspects of alexithymia (Larousse, 1992). Alexithymia is characterized by, among other things, a difficulty in identifying and verbalizing emotions. The emotions are often manifested in somatic complaints. This type of person does not easily differentiate between his or her physiological sensations and emotional states (Larousse, 1992). However, he or she benefits from more behavioural strategies (Larousse, 1992). In this regard, gradual exposure to work constitutes a behavioural method. However, the majority of these workers only benefited from one clinical intervention, given that a gradual return to work was not possible due to the lack of a host environment, apart from one worker who started a gradual return to work, which then ended because of its seasonal nature.

The results of this study highlight the importance of having specific, clearly defined goals. Moreover, the goals must go beyond the actual illness experience, as posited by Leventhal et al. (H. Leventhal & Mora, 2005). Our results have presented the process of self-regulation through feedback loops from a cognitive, behavioural perspective, in which the representations formed affect behaviours. However, the model also includes an emotional component, albeit little developed. The more general behaviour-regulation perspective of Scheier and Carver (Scheier & Carver, 2003) helps explain some of our results in terms of approach and avoidance. According to these authors, this process of emotional feedback is less immediate, and takes place more over time. The pace at which the gap between the current situation and the goal sought diminishes will affect the emotions experienced. From the "approach" perspective, as the person seeks to approach a goal such as returning to work, the more he or she will experience a feeling of confidence, of hope, if not euphoria (Carver & Scheier, 1998). Our results effectively reveal elements of confidence and hope among the workers who returned to work. From the "avoidance" perspective, a person may also try to distance him- or herself, for example, from pain. When the person succeeds in doing so, a sense of alleviation will be felt. Conversely, if the person fails to avoid pain, the feeling experienced will be one of anxiety (Carver & Scheier,

1998). Here again our results attest to these elements, this time in the workers who did not return to work.

Over the longer term, the therapeutic process may be evaluated using the biographical trajectory approach (Bury, 1982; Charmaz, 1983; Good et al., 1992; Kleinman, 1988; Williams, 1984), which becomes more pertinent for reconstituting the individual's trajectory in relation to his or her personal identity, and for identifying points of disruption in the trajectory. In this regard, at the beginning of their rehabilitation program, some of the workers who returned to work reported consequences in terms of an altered sense of personal identity. During their occupational reintegration trajectory, however, the workers mentioned attributing a meaning to their current problem. This meaning would appear to be associated with the process of reconstructing their personal identity. These results support those obtained by Bury (1982), i.e. that pain has a meaning that is sometimes difficult to grasp when the first signs appear. Lastly, the workers who returned to work embarked upon a personal quest for meaning, which included an existential and moral dimension. This complements the picture presented in Herzlich's classic study of health and illness representations (Herzlich, 1984), which differentiates among three different conceptions of illness, each including specific attitudes and behaviours: illness as a destructive force, illness as a liberator and illness as an occupation. Our results reveal the presence of a transforming illness through which the identity of being sick (or handicapped, maimed, etc.) is dropped. In addition, during the last interview with some of the workers who returned to work, we noted the presence of emotions verging on euphoria, as posited by Carver and Scheier (Carver & Scheier, 1998). We were also able to identify a "transforming illness" thread through the workers' implicit reference to an illness that "revealed something to them" and through the intensity of the interview. Conversely, in the workers who did not return to work, instead of evolving toward a reconstruction of personal identity, these workers remained caught up in the idea of a destructive illness. This situation may hasten a disruption in identity. Among these same workers, the results underscored the importance for them of being believed or having their experience legitimized. There is therefore good reason to reflect on the emotional impacts of contestation and the fact of not being believed, on the recovery process. A number of recent studies have raised this same problem (Beaton et al., 2001; Dekkers, 1998; Garro, 1994; Glenton, 2003; Hilbert, 1984; Hunt, Jordan, & Irwin, 1989; Hunt & Mattingly, 1998; Lillrank, 2003; Ong et al., 2004; Reid et al., 1991; Sommer, 1998; Toombs, 1987; Walker et al., 1999; J. T. Young, 2004). These results highlighting the interaction between the worker and his or her environment would appear to be mirrored in the sick role approach. The health and illness representations reported by all the workers resemble, among other things, the representation of an episode of acute, symptomatic illness for which it is considered acceptable to withdraw from one's obligations and take the time to recover. The workers who did not return to work reported sensing a degree of scepticism in their environment, which suggests that this could be an example of the stigmatization process. Consequently, these workers could find themselves outside a collective representation of illness, thereby missing out on the social mechanisms provided for recognizing the illness and managing the ill person (Bendelow & Williams, 1996; Ewan et al., 1991; Glenton, 2003; Hilbert, 1984). According to this approach, in this context the worker could adjust the information he or she has been given (Hilbert, 1984; Osborn & Smith, 1998), depending on which is more advantageous (Osborn & Smith, 1998). If the hypothesis of alexithymia were to be documented, it would therefore be important to ensure simultaneous documentation of the impact of the worker's interaction with his or her environment. This is all the more important in view of the results obtained in the study conducted by Ong (Ong et al.,

2004), who observed that some patients use biomedical terminology to describe their condition in order to gain greater credibility in the physician's eyes.

The results obtained from our interviews with the workers shed new light on a possible form for a conceptual model, one that would bear a closer resemblance to a therapeutic reality, take the worker's environment into account and unify different models from health psychology, medical anthropology and health sociology. In fact, within the therapeutic trajectory, the worker may self-regulate his or her behaviour in order to adapt to his or her problem. When this self-regulation allows for behavioural adjustments, it also allows the person to adapt. However, when there is no self-regulation, a disruption may occur within the individual's therapeutic trajectory. In addition to the psychological mechanisms underlying these disruptions, the worker's interaction with his or her environment is important, especially if the person perceives him- or herself as not being legitimized. The worker might then seek to resolve this specific problem rather than concentrating on returning to work. Understanding this dynamic allows, among other things, a rehabilitation professional to explain a behaviour that might otherwise be interpreted as a secondary benefit or an amplification of symptoms and thereby lead to the worker's stigmatization.

2.1   Strengths and limitations of this study

This exploratory study breaks new ground in the area of knowledge concerning the rehabilitation of workers with MSDs. First, it describes the conceptual frameworks for health and illness representations developed in three different disciplines; second, it reviews the validated tools available. Third, it describes workers' representations, taking their interactions with their environment into account. The latter were observed longitudinally during the participants' rehabilitation program, thus creating a dynamic and evolving vision of their representations. The fact of conducting interviews on a prospective and longitudinal basis also follows the recommendations made by Leventhal and Mora (2005), as a means of documenting the self-regulation process. To the best of our knowledge, this aspect has never been investigated in other studies concerning individuals with an MSD.

Regarding the three objectives of our study, certain methodological aspects attesting to the scientific quality of the study warrant mention here. First, the reviews of the literature and tools are described in detail, allowing for perfect replication of this part of the study. The articles and tools were selected in a systematic manner in which interrater agreement was verified and found to be higher than 80%. An analytical grid was developed for the articles, ensuring systematic collection of information. For the multiple-case study, the data were analyzed by all the investigators involved in the study and two research assistants. The interlinking of the investigators' different disciplinary backgrounds made it possible to maintain a multidisciplinary view of the representations. Interrater reliability was verified during interview coding (higher than 80%), and data saturation was achieved during the analysis process. Also, the participants in this study presented with back problems or impairments to their upper extremities, a positive factor in that it covered the main disabilities related to MSDs.

Certain limitations must also be noted. First, the selection of subjects was limited by two main conditions. The workers had to be experiencing a first episode of disability, meaning that the profile drawn up of the representations and their progression was restricted to this population,

whereas in actual fact, recurrences or relapses of problems are very frequent among workers with MSDs, and it is specifically this relapse population that is often referred to in the work rehabilitation context. Also, the number of workers referred for service to the PRÉVICAP program represents only a small proportion of all the workers who receive rehabilitation services in Québec. Some of the other services offered involve intervention methods that do not incorporate the workplace, and these services could impact differently on the representations due to the different interventions effected by the clinicians involved. This point has yet to be investigated. Another limitation of this study was the large proportion of workers, among those who did not return to work at the end of the program, who refused to undergo the third and last interview. The results of our study showed that the representations held by workers who were back at work evolved differently from those of the workers who were not. Additional clarifications on the differences between the two groups might have emerged if all the interviews planned had been completed. In summary, the profile drawn up on the basis of our study corresponds to a specific clientele enrolled in a work rehabilitation program including exposure to the real work environment, and represents only a small proportion of the entire population involved in rehabilitation, thereby making any attempt to generalize the results somewhat risky.

3.   RECOMMENDATIONS

- The specific models developed for representations, such as those of Leventhal or Kleinman, touch, in theoretical terms, on many more aspects of health and illness than we were able to examine in this study. It would be worthwhile to re-examine the material and continue the analysis, for example, in terms of the perception of diagnoses, causes and injury mechanisms, or the perception of treatments in relation to the rehabilitation process.

- The study of social representations provides a more in-depth understanding of the cognitive, emotional, attitudinal and behavioural schemas that guide the actions and adaptive strategies of patients who have begun a recovery or rehabilitation process. By combining these different dimensions, it may be possible to bridge the gap between a personalist (micro) approach, which loses sight of the sociocultural roots of individual representations, and a sociocultural (macro) approach, which generally examines systems of meaning and practices (therapeutic or otherwise) from a macro social viewpoint. We therefore recommend an approach which, drawing from both qualitative and qualitative methodologies, would seek to integrate the entire continuum, from the personal experience level to the sociocultural. This multi-level integration was also proposed by Young (J. T. Young, 2004). In concrete terms, this type of approach has yet to be developed and tested in the MSD field.

- Our bibliographic search and analysis of the measurement tools showed that both qualitative and quantitative tools exist. However, the quantitative tools, which are mostly used in measuring aspects of pain, have not been tested in the work-related disability context. The three tools more specifically related to illness representation warrant being validated in this complex context. Moreover, the Brief Illness Perception Questionnaire would appear to be highly relevant and may make it possible to pinpoint and organize themes that could be discussed directly by clinician and worker in a clinical setting. The two qualitative tools retained would also require some adaptations to the work disability context, because one was developed in the context of mental health studies while the other (EMIC), more general in nature, would require a semi-structured interview format to allow for tighter control of interview duration and analysis complexity.

- The bibliographic search also made it possible to review a certain number of studies that adopt a gender-based comparative approach. These studies bring to light the fact that men's and women's rehabilitation trajectories are different. The differences would appear to be attributable to a series of psychosocial and cultural factors. For example, women are more likely to experience doubt or the non-legitimization of their pain than are men (Guthrie & Jansz, 2006); the interruption or reduction of work tasks for health reasons does not necessarily involve a reduction in the household tasks performed by the women concerned (Cinamon & Rich, 2002; Gustafsson et al., 2004; Johansson, 1999; Ostlund et al., 2004); and the latter would appear to constitute an additional factor in maintaining the disability (Ostlund et al., 2004). Furthermore, differences were reported in their verbalization of emotions (Herbette, 2004) and their sense of self-efficacy (Jackson, Iezzi, Gunderso, Nagasaka, & Fritch, 2002). Gender-based comparative analysis was also one of the recent recommendations made by the CIHR for the study of social determinants of health (IRSC, 2007).

- Even if the trends among the workers who return to work and those who do not appear to be relatively pronounced, future research is needed to develop a questionnaire that would highlight the key elements of health, illness and recovery representations and to use this questionnaire with a larger sample of workers in situations that differ in terms of injury, therapeutic process and return to work. This would help validate the inter-category differences between workers and the trends observed in this exploratory study.

- The rehabilitation process involves a number of social players. The fact that this study concentrated more on aspects related to workers' perceptions must not overshadow the importance of the interactions with, and representations held specifically by, these different players. It would be worthwhile to explore the various representations held by the social players involved in the process and to analyze the interactions among them from the standpoint of the role played by social representations. This would constitute an important step toward gaining a better understanding of the internal dynamics of the work rehabilitation process.

- Lastly, the results of this study revealed that certain health, illness and pain representations may cause workers to adopt behaviours that actually hinder their rehabilitation and return to work. It is therefore essential for health professionals to systematically evaluate these representations at several points during the rehabilitation process. This understanding will enable them to develop and adjust the intervention plan to be more grounded in the client's reality. Health professionals thus have a privileged role to play in that they can propose personalized activities to workers and assist them in evaluating these activities. In fact, based on our study, it appears that the mechanism of self-regulation is central to the rehabilitation process and that it allows individuals to adapt to their situation. Consequently, these results suggest that health professionals must also be familiar with and be able to plan therapeutic activities, bearing the self-regulation model, among other things, in mind. Rehabilitation involves a dynamic and evolving process that requires a certain flexibility on the part of the professional in his or her treatment plan. A closer attunement of the clinician to the worker's representations would appear to offer some guarantee of a progression toward a return to work.

4.   CONFERENCES AND ARTICLES EMERGING FROM THIS GRANT

Presentations at scientific congresses
Coutu, M. F., Baril, R., Durand, M. J., Côté, D. What can be learned from the literature on social representations to understand workers' motivation during work rehabilitation? 28th Congress of the International Commission on Occupational Health, Milan (Italy), June 11 to 16, 2006.

Baril, R., Durand, M. J., Coutu, M. F., Côté, D., Cadieux, G. The impact of social representations of illness, pain and recovery on the work rehabilitation process of workers with musculoskeletal disorders. 28th Congress of the International Commission on Occupational Health, Milan (Italy), June 11 to 16, 2006.

Coutu, M. F., Baril, R., Durand, M. J., Côté, D., Rouleau, A., Cadieux, G. Pain: one word with many meanings for workers during work rehabilitation. Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS). Boston, August 27 to 30, 2007.

Coutu, M. F., Baril, R., Durand, M. J., Côté, D., Rouleau, A., Cadieux, G. Workers' coping strategies during work rehabilitation. Palma International Forum IX, Palma de Mallorca (Spain), October 4 to 6, 2007.

Côté, D., Coutu, M. F., Baril, R., Durand, M. J. Contributions de l'anthropologie dans le contexte de la réadaptation au travail. International symposium "Anthropologie des cultures globalisées. Terrains complexes et enjeux disciplinaires." November 8 to 11, 2007.

Miscellaneous presentations
Baril, R., Durand, M. J., Coutu, M. F., Côté, D., Cadieux, G., Rouleau, A., Ngomo, S., 2007. L'influence des représentations de la maladie, de la douleur et de la guérison sur le processus de réadaptation au travail des travailleurs présentant des TMS. Centre d'action en prévention et en réadaptation de l'incapacité au travail (CAPRIT), Longueuil, Québec (Canada), May.

Coutu, M. F., Baril, R., Côté, D., Durand, M. J., Cadieux, G., Rouleau, A., Ngomo, S., 2007. Les représentations de la douleur des travailleurs présentant des TMS. Centre d'action en prévention et en réadaptation de l'incapacité au travail (CAPRIT), Longueuil, Québec (Canada), September.

Articles
Coutu, M. F., Baril, R., Durand, M. J., Côté, D., Rouleau, A. What can be learned from the literature on social representations to understand workers' motivation during work rehabilitation? *Journal of Occupational Rehabilitation*, Vol. 17, No.3, September 2007.

Coutu, M. F., Baril, R., Durand, M. J., Côté, D., Rouleau, A., Cadieux, G. Pain: one word with many meanings for workers during work rehabilitation. *The Clinical Journal of Pain* (pending submission).

Coutu, M. F., Durand, M. J., Baril, R., Labrecque, M. E., Côté, D., Rouleau, A. A review of assessment tools of illness representations. *Journal of Occupational Rehabilitation* (pending submission).

Coutu, M. F., Baril, R., Durand, M. J., Côté, D., Rouleau, A., Cadieux, G. Health and illness representations among injured workers (in progress).

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6.   APPENDICES

Appendix 1: Summary Table of the Theoretical Models and Approaches

	Main tenets	Strengths	Weaknesses	Implications for MSDs
Fear-avoidance model	Avoidance of activity, which contributes to disability	Provides an understanding of the development of phobic behaviours.	Centered on the individual; interactions with his or her environment may not be understood.	Helps provide an understanding of the development of disability through the use of variables such as fear of movement of fear of pain that have already been validated.
Transtheoretical model	Identification of five phases associated with pain and readiness to change.	Examines factors that could explain the readiness to change.	There are few descriptions given of the mechanisms underlying the shift from one phase to another.	Adaptation in the MSD field known as the Motivational Model of Pain Self-Management.
Commonsense model of self-regulation	Focuses on the illness experience and the way in which individuals set goals and recovery-oriented action strategies, and how they evaluate the results obtained..	Emotional and contextual factors are integrated into the illness representation.	Contextual factors remain more theoretical than operational.	Promising model validated for other illnesses, but yet to be validated in the context of work rehabilitation for MSDs.
Personal construct theory	Description of the personal constructs underlying individual representations.	Helps to identify opposing cognitive constructs that could cause a non-adapted behaviour. Use of a systematic analytical grid known by the name of *Kelly's Grid*.	Analysis centered on the individual; analysis may become laborious if it includes too many constructs.	Can be useful during treatment if the individual appears resistant to change; has yet to be developed in research field concerned with MSDs and work rehabilitation.

Biographical/ illness trajectory approach	Reconstitution of the course of the illness experience and the meaning attached to it by individuals, and its personal impacts.	Highlights the contextual factors in the course of an illness.	Use of narrative and biographical methods makes generalizations difficult.	Helps link prolonged work stoppage with loss of self-esteem, feelings of uselessness and weakened self-esteem.
Sick role approach	Sick role is constructed and lived in interaction with other people, in accordance with their representations of the illness.	Describes the process of validating the personal experience of illness.	Difficult to apply and operationalize in a clinical context.	Looks at the interactional factors that can be addressed, such as potential obstacles to work rehabilitation.
Therapist/ patient relationship	Identification of the types of therapist/patient relationships.	Highlights some of the communication and interaction mechanisms that define a clinical encounter.	Makes the therapist/patient relationship central to the illness interpretation process, neglecting other contextual factors.	In the MSD field, may serve as a tool for determining the intervention that best corresponds to a specific kind of therapist/patient relationship.
Gender analysis	Gender-based social roles are constructed and lived in social interactions; the feeling of a change in personal identity based on gender roles may cause a feeling of loss or disruption.	Identifies gender-based factors that can maintain disability.	Risks overestimating the issue of gender-based social roles in the process of work rehabilitation.	An understanding of family structure may help generate more productive adaptive strategies. Adaptation in the MSD field known as the Domestic Strain Model.

Sociocultural approach	Variations in individual representations of health and illness may be attributed to the patients' cultural origins.	Sheds light on the influence of culture on the construction of health and illness representations. An understanding of patients of different cultural origins may foster the creation of a more appropriate clinical approach.	Overly rigid application of this model may lead to a risk of distortion in the interpretation of individual cases.	Studies on pain-related behaviour show that reactions to pain and care-seeking strategies vary according to culture.

Appendix 2: Measurement Tools

Qualitative Method

Name of tool	Abbreviation	Article sources
Explanatory Model Illness Catalogue	**EMIC**	Weiss, M. G., Doongaji, D. R., Siddhartha, S., Wypij, D., Pathare, S., Bhatawdekar, M., Bhave, A., Sheth, A., Fernandes, R. (1992). The Explanatory Model Interview Catalogue (EMIC). Contribution to cross-cultural research methods from a study of leprosy and mental health. *British Journal of Psychiatry*, 160: 819-30. Taïeb, O., Heidenreich, F., Baubet, T. Moro, M. R. (2005). Finding a meaning for illness: from medical anthropology to cultural epidemiology. *Médecine et maladies infectieuses*, 35: 173-85. Weiss, M. (1997). Explanatory Model Interview Catalogue (EMIC): Framework for comparative study of illness. *Transcultural Psychiatry*, 34(2): 235-63
Short Explanatory Model Interview	**SEMI**	Lloyd, K. R., Jacob, K. S., Patel, V., St-Louis, L., Bhugra, D., Mann, A. H. (1998). The development of the Short Explanatory Model Interview (SEMI) and its use among primary-care attenders with common mental disorders. *Psychological Medicine*, 28(5): 1231-7.

Quantitative Method
Illness Representation / Questionnaires

Name of tool	Abbreviation	Article sources
Implicit Models of Illness Questionnaire	**IMIQ**	Schiaffino, K. M., Cea, C. D. (1995). Assessing chronic illness representations: the Implicit Models of Illness Questionnaire. *Journal of Behavioral Medicine*, 18 (6): 531-48. Turk, D. C., Rudy, T. E., Salovey, P. (1986). Implicit models of illness. *Journal of Behavioral Medicine*, 9(5): 453-74.
Illness Perception Questionnaire	**IPQ**	Weinman, J., Petrie, K. J., Moss-Morris, R., Horne, R. (1996). The Illness Perception Questionnaire: a new method for assessing illness perceptions. *Psychology and Health*, 11: 431-46.
Illness Perception Questionnaire - Revised	**IPQ-R**	Moss-Morris, R., Weinman, J., Petrie, K. J., Horne, R., Cameron, L. D., Buick, D. (2002). The Revised Illness Perception Questionnaire (IPQ-R). *Psychology and Health*, 17: 1-16.
Brief Illness Perception Questionnaire	**Brief IPQ**	Broadbent, E., Keith, J., Petrie, J., Weinman, J. (2006). The Brief Illness Perception Questionnaire. *Journal of Psychosomatic Research*, 60: 631-37
Illness Cognition Questionnaire	**ICQ**	Evers, A. W, Kraaimaat, F. W, van Lankveld, W., Jongen, P. J., Jacobs, J. W., Bijlsma, J. W. (2001). Beyond unfavorable thinking: the Illness Cognition Questionnaire for chronic diseases. *Journal of Consulting and Clinical Psychology*, 69: 1026-36.

Pain – Attitudes		
Name of tool	**Abbreviation**	**Article sources**
Survey of Pain Attitudes	**SOPA**	Jensen, M. P., Karoly, P., Chant, D. (1987). The development and preliminary validation of an instrument to assess patient's attitudes toward pain. *Journal of Psychosomatic Research*, 31: 393-400. Jensen, M. P., Turner, J. A., Romano, J. M., Lawler, B. (1994). Relationship of pain-specific beliefs to chronic pain adjustment. *Pain*, 57: 301-9. Tait, R. C., Chibnall, J. T. (1997). Development of a brief version of the Survey of Pain Attitudes. *Pain*, 70(2-3): 229-35. Duquette, J., McKinley, P. A., Litowski, J. (2001). Traduction et pré-test du Questionnaire sur les attitudes envers la douleur (Survey of Pain Attitudes). *Revue québécoise d'ergothérapie*, 10: 23-30. Duquette, J, McKinley, P. A., Litowski, J. (2005). Test-retest reliability and internal consistency of the Quebec-French version of the Survey of Pain Attitudes. *Archives of Physical Medical Rehabilitation*, 86(4): 782-8.
Fear-Avoidance Beliefs Questionnaire	**FABQ**	Waddell, G., Sommerville, D., Henderson, I., Newton, M., Main, C. J. (1993). A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*, 52: 157-68. Swinkels-Meewisse, E. J., Swinkels, R. A., Verbeek, A. L., Vlaeyen, J. W., Oostendorp, R. A. (2003). Psychometric properties of the Tampa Scale for Kinesiophobia and the Fear-Avoidance Beliefs Questionnaire in acute low back pain. *Manual Therapy*, 8(1): 29-36.

Functional Abilities Confidence Scale	**FACS**	Williams, R. M., Myers, A. M. (1998). Functional Abilities Confidence Scale: a clinical measure for injured workers with acute low back pain. *Physical Therapy*, 78(6): 624-34
Pain and Impairment Relationship Scale	**PAIRS**	Riley, J. F., Ahern, D. K., Follick, M. J. (1988). Chronic pain and functional impairment: assessing beliefs about their relationship. *Archives of Physical Medical Rehabilitation*, 69(8): 579-82. Slater, M. A., Hall, H. F., Atkinson, J. H., Garfin, S. R. (1991). Pain and impairment beliefs in chronic low back pain validation of the Pain and Impairment Relationship Scale. *Pain*, 44(1): 51-6. Houben, R. M., Vlaeyen, J. W., Peters, M., Ostelo, R. W., Wolters, P. M., Stomp-van den Berg, S. G. (2004). Health care providers' attitudes and beliefs towards common low back pain: factor structure and psychometric properties of the HC-PAIRS. *Clinical Journal of Pain*, 20(1): 37-44.

Pain – Beliefs		
Name of tool	**Abbreviation**	**Article sources**
Pain Beliefs and Perceptions Inventory	**PBPI**	Williams, D. A., Thorn, B. E. (1989). An empirical assessment of pain beliefs. *Pain*, 36(3): 351-8. Strong, J., Ashton, R., Chant, D. (1992). The measurement of attitudes towards and beliefs about pain. *Pain*, 48(2): 227-36. Herda, C. A., Siegeris, K., Basler, H. D. (1994). The Pain Beliefs and Perceptions Inventory: further evidence for a 4-factor structure. *Pain*, 57(1): 85-90.

Pain Beliefs Questionnaire	**PBQ**	Edwards, L. C., Pearce, S. A., Turner-Stokes, L., Jones, A. (1992). The Pain Beliefs Questionnaire: an investigation of beliefs in the causes and consequences of pain. *Pain*, 51(3): 267-72.
Back Beliefs Questionnaire	**BBQ**	Symonds, T. L., Burton, A. K., Tillotson, K. M., Main, C. J. (1996). Do attitudes and beliefs influence work loss due to low back trouble? *Occupational Medicine*, 46(1): 25-32.
Pain Information and Belief Questionnaire	**PIBQ**	DeGood, D. E., Shutty, M. S. Jr. (1992). Pain Information and Beliefs Questionnaire [PIBQ]. In Turk, D. C., Melzack, R. (ed.). *Handbook of Pain Assessment*. New York: Guilford Press. Shutty, M. S. Jr, DeGood, D. E., Tuttle, D. H. (1990). Chronic pain patients´ beliefs about their pain and treatment outcomes. *Archives of Physical Medical Rehabilitation*, 71: 128-32.
Cognitive Risk Profile for Pain	**CRPP**	Cook, A. J., DeGood, D. E. (2006). The Cognitive Risk Profile for Pain: development of a self-report inventory for identifying beliefs and attitudes that interfere with pain management. *Clinical Journal of Pain,* 22(4): 332-45.

Pain / Sense of self-efficacy and control		
Name of tool	**Abbreviation**	**Article sources**
General Self-Efficacy Scale	**GSES**	Bosscher, R. J., Smith, J. H. (1998). Confirmatory factor analysis of the General Self-Efficacy Scale. *Behaviour Research and Therapy*, 36: 339-43
Pain Self-Efficacy Questionnaire	**PSEQ**	Nicholas, M. K. (2007). The Pain Self-Efficacy Questionnaire: taking pain into account. *European Journal of Pain* (in press). Gibson, L., Strong, J. (1996). The reliability and validity of a measure of perceived functional capacity for work in chronic back pain. *Journal of Occupational*

		Rehabilitation, 6: 159-75. Nicholas, M. K., Wilson, P. H., Goyen, J. (1992). Comparison of cognitive behavioural group treatment and an alternative non-psychological treatment for chronic low back pain. *Pain*, 48: 339-47. Asghari, A., Nicholas, M. K. (2001). Pain self-efficacy beliefs and pain behaviour: a prospective study. *Pain*, 94: 85-100.
Chronic Pain Self-Efficacy Scale	**CPSS**	Anderson, K. O., Dowds, B. N., Pelletz, R. E., Edwards, W. T., Peeters-Asdourian, C. (1995). Development and initial validation of a scale to measure self-efficacy beliefs in patients with chronic pain. *Pain*, 63(1): 77-84.
Back Pain Self-Efficacy Scale	**BPSES**	Levin, J. B., Lofland, K. R., Cassisi, J. E., Poreh, A. M., Blonsky, E. R. (1990). Back Pain Self-efficacy Scale [BPSES]: 337-40. In Redman, B. K. (ed.). *Measurement Tools in Patient Education*. New York: Springer Pub. Co.
Beliefs about Pain Control Questionnaire	**BPCQ**	Skevington, S. M., Skevington, A. (1990). A standardised scale to measure beliefs about pain control (BPCQ): a preliminary study. *Psychology of Health*, 4: 221–32.
Multidimensional Locus of Pain Control Questionnaire	**MLPC**	ter Kuile, M. M., Linssen, A. C. G., Spinhoven, P. (1993). The development of the Multidimensional Locus of Pain Control Questionnaire (MLPC): factor structure, reliability, and validity. *Journal of Psychopathology and Behavioral Assessment*, 15(4): 387-404.

Pain Locus of Control Questionnaire	**PLC**	Main, J. C., Waddell, G. (1991). A comparison of cognitive measures in low back pain: statistical structure and clinical validity at initial assessment. *Pain*, 46(3): 287-98. Bachiocco, V., Credico, C., & Tiengo, M. (2002). The pain locus of control orientation in a healthy sample of the Italian population: sociodemographic modulating factors. *Journal of Cultural Diversity, 9*(2), 55-62. Koumantakis, G. A., Watson, P. J., Oldham, J. A. (2005). Trunk muscle stabilization training plus general exercise versus general exercise only: randomized controlled trial of patients with recurrent low back pain. *Physical Therapy*, 85(3): 209-25.
Pain – Catastrophizing		
Pain Catastrophizing Scale	**PCS**	Sullivan, M. J. L., Bishop, S., Pivik, J. (1995). The Pain Catastrophizing Scale: development and validation. *Psychological Assessment*, 7(4): 432–524. Cano, A., Leonard, M. T., Franz, A. (2005). The significant other version of the Pain Catastrophizing Scale (PCS-S): preliminary validation. *Pain*, 119 (1-3): 26-37.

Appendix 3: Guide for Participant Interviews

1. SELF-IMAGE BEFORE
Pre-injury perceptions of "self"
>Can you please tell me what you were like before?
>Did you see yourself as being healthy?
>What does "being healthy" mean to you?
>>*What is it that makes a person healthy?*
>>*What does "being sick" mean to you?*
>>*What is it that makes a person sick?*

PHASES OF ILLNESS
2. Representation and sources of information:
>What problem brought you here?
>What makes you say that?
>What originally caused your problem?
>What is causing your problem now?
>>*Do you consider yourself to be sick?*
>>*Is there a difference between "being sick" and what you have now?*
>>*Why did you go to see the doctor to begin with?*
>*(Explore the point of disruption where the symptoms changed into illness)*
>Over time, whom did you see about your problem and what did they tell you?
>What were they supposed to heal or make better?
>How serious do you believe your problem is? How long do you think you will have your problem?

3. Therapeutic processes
3.1 Personal trajectory
>**What you do you think it would take to solve your problem?**
>Are you moving closer to your goal or further away it?
>What helps you move closer toward it?
>What moves you further away from it?
>**What makes you say that your problem is getting better or worse?**
>**What would happen if you pushed your limits a little further?**
>**What helps you control your problem or make it bearable?**

3.2 Medical trajectory
>**How is the rehabilitation program supposed to help you?**

3.3 Administrative trajectory
>**Regarding your relationship with the CSST, is there anything the CSST does that makes your situation easier?**
>Is there anything the CSST does that makes it harder?

3.4 Employment trajectory
>**Is there anything about your workplace and work environment that helps you cope with your problem?**
>Is there anything about your work that makes it harder?
>*Is it possible that work like yours (your type of job) not cause injury or illness?*

3.5 Social trajectory

Has your problem changed things in your life?
In what ways?
In your daily activities, are there things or people that make life easier?
Are there things or people that make life harder?
        What does your family think of what you have?
What you do think of your relationship with your different health professionals (so far)?
In terms of your relationship with the members of the rehabilitation team, are there things that help you?
Are there things that make your situation harder?
Do you agree with the decisions that are being (or have been) made?

4. NEW SELF-IDENTITY
What condition would you like to be in by the end of the program?

5. PAIN SCALE
        On a scale of 0 to 10

Appendix 4: Consent Form

Participant number: _____

Title of project: The Impact of Health, Illness, Pain and Recovery-Strategy Representations on the Work Rehabilitation Process of Workers with Musculoskeletal Disorders

Number of project under study: 2003-04-34

Date of project approval by the HCLM Ethics Committee: December 9, 2003

Principal investigator: Raymond Baril, Ph.D.

Sponsor: Institut de recherche en santé et sécurité au travail (IRSST)

Address: Hôpital Charles LeMoyne
                         3120 Taschereau Blvd.
                         Greenfield Park, Québec J4V 2H1

Telephone: (450) 674-5908

Investigators: Marie-José Durand, Ph.D.   Marie-France Coutu, Ph.D.

You have just begun a rehabilitation program (PRÉVICAP) at the Centre de recherche clinique en réadaptation au travail of Hôpital Charles LeMoyne. In order to document your perceptions of your problem, we would like to ask you to participate in the study described below.

Purpose of the study
At the present time, no study provides a detailed description of how workers who are obliged to do a rehabilitation program perceive their problem. This research project therefore seeks to gain a better understanding of your current health problem.

Nature of the participation requested
If you agree to participate in this study, you will be asked to take part in several interviews with two trained interviewers. They will ask you questions about how you see your current health problem, such as, what, in your opinion, is the cause of your problem, and what makes it better or worse. Four interviews are planned: the first, when the PRÉVICAP team starts managing your case; the second, when your health professional proposes that you return to work; the third, when you have resumed 80% of your regular work schedule; and the fourth and last, one month after the end of the rehabilitation program. If a major change takes place during your program, it is also possible that we meet with you one other time, again, to find you how you see your situation. Each interview will last a maximum of 90 minutes and will take place on the PRÉVICAP premises, except for the last interview, which takes place in your home. This means

that you will not have to go anywhere simply for the interview, and we will not ask you to give any extra time or to make any extra trips that would not be reimbursed by the CSST. These interviews will be incorporated directly into your program schedule. Your participation in this study will cut very minimally into your participation in the program activities.

Potential risks and benefits of participating in this study
There is no physical risk associated with participating in this study. You may, at moments, feel somewhat uncomfortable owing to the nature of the interview questions, which are designed to find out what you are experiencing at that time. However, the interviews pose absolutely no risk to your well-being or to your participation in the activities involved in the work rehabilitation program.

We are unable to pay any remuneration for participation in this study, but your participation will help advance knowledge in the work rehabilitation field. Eventually, it will also help health professionals better understand other workers, who, like you, are obliged to do a rehabilitation program.

Right to withdraw from the study
Your participation in this research project is completely voluntary. You are free to withdraw at any time without suffering any prejudice whatsoever, and your withdrawal will have no impact on the health care and services you are or will be receiving. In addition, you do not relinquish any of your rights or obligations associated with the CSST's handling of your claim by agreeing or refusing to participate in this research project.

Confidentiality
Any data collected through your participation in this study will remain confidential in accordance with the provisions of Québec's *Act respecting Industrial Accidents and Occupational Diseases* and Canada's *Access to Information Act*. The interviews will be recorded on audiotape solely for purposes of later analysis. The information you provide will be used for scientific purposes and will be kept strictly confidential. Your identity will not be revealed, nor that of any professionals you might mention during your interview. To ensure anonymity, you will be assigned a number code, and the names of all persons mentioned will be removed during retranscription of the interview. Also, the information provided during the interviews will under no circumstances be transmitted to the CSST or to any of the health professionals working with you. The recordings of the interviews will be kept under lock and key, and inaccessible to the clinical team during the course of the project. The tapes will be destroyed when the project is completed. Personal identifiers (name and address) will be kept for a period of seven years in a separate file from your numerically coded file and will only be accessible to the people in charge of the project.

We remain available if you require any additional information. Please contact Dr. Raymond Baril, Ph.D., at (514) 288-1551, or Dr. Marie-France Coutu, Ph.D., at (514) 674-5908.

If you wish to obtain more information concerning your rights as a participant in a research project or if you believe that your rights have not been respected, you may contact the secretary of the Comité de déontologie de la recherche (research ethics committee) of the Centre de

recherche clinique (clinical research centre) of Hôpital Charles-LeMoyne at (450) 466-5000 extension 2564.

Consent

I have had the opportunity to ask questions concerning the topic of this study and they have all been answered to my satisfaction.

I understand that I am free to participate or not in this project, and to withdraw from it at any time, and that I will not suffer any prejudice in terms of my future care.

I have read and understood the contents of this consent form. I, the undersigned, hereby agree to participate in this project.

Name of participant	Signature	Date

Name of witness	Signature	Date

Name of researcher	Signature	Date

Appendix 5: Figures of Representations of Current State

Figure A

Figure B

Figure C

Temporary weakness
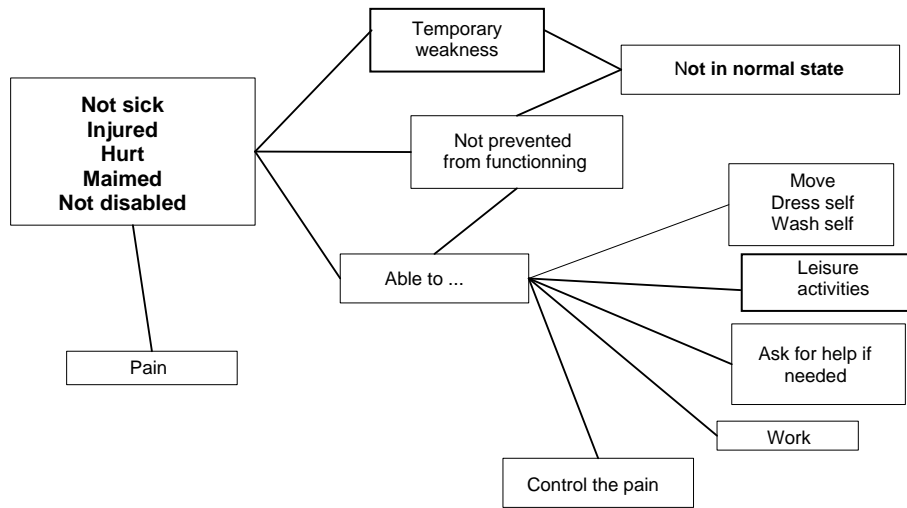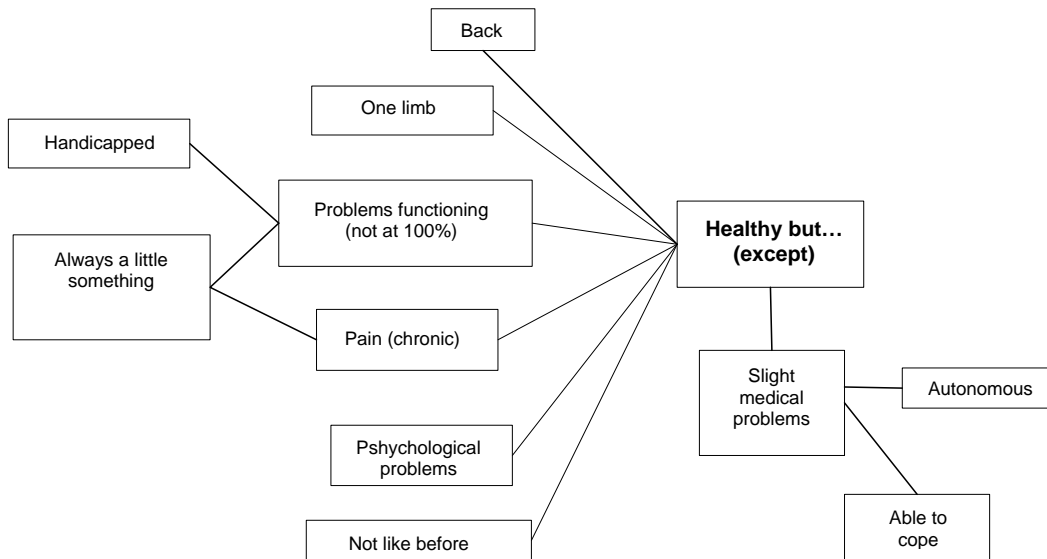
Not in normal state

**Not sick
Injured
Hurt
Maimed
Not disabled**

Not prevented from functionning

Move
Dress self
Wash self

Leisure activities

Able to ...

Ask for help if needed

Pain

Work

Control the pain

Figure D

Back

One limb

Handicapped

Problems functioning (not at 100%)

**Healthy but…
(except)**

Always a little something

Pain (chronic)

Slight medical problems

Autonomous

Pshychological problems

Not like before

Able to cope

Figure E

Figure F