



Occupational Rehabilitation

Studies and Research Projects



REPORT R-767



Presence, Intensity, and Temporal Changes in Generalized Anxiety Disorder Maintenance Factors in Workers Undergoing Rehabilitation for Persistent Musculoskeletal Pain

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This study was made possible thanks to the participation of a cohort of workers who had experienced a long-term work absence. Their commitment to the study was repeatedly evidenced by their willingness to answer all the questionnaires. They generously shared their worries and fears, enabling us to document a new perspective that has been little studied to date in the occupational rehabilitation field.

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ABSTRACT

Problem: Generalized anxiety disorder (GAD) is more prevalent in people with low back pain than in the general population. When GAD is present, intolerance of uncertainty is also higher and anxiety is maintained through ineffective strategies. In the long term, reduced self-efficacy in problem solving and the onset of depressive symptoms may hinder the return to work.

The **general aim** of this exploratory study was to enhance understanding of the nature of the anxiety symptoms found in workers with a persistent musculoskeletal disorder (MSD). The primary objective was therefore to document the presence, intensity, and temporal changes in GAD and its maintenance factors, using the model developed by Dugas *et al.* (1998). These factors include intolerance of uncertainty, worries, negative problem orientation, beliefs about the usefulness of worrying, cognitive avoidance, and depression. The secondary objectives were as follows: (1) to document, on an exploratory basis, the relationships between the component factors of the GAD model developed by Dugas *et al.* (1998) and the biopsychosocial factors already recognized in the MSD field, and (2) to document the relationship between all these factors and the return to work.

Method: A prospective, repeated-measures observational design was employed and a convenience sample of 39 workers was recruited. The inclusion criteria were (1) having an MSD that was accepted and compensated by Québec's worker compensation board, the CSST (Commission de la santé et de la sécurité du travail) and that had caused a work absence of more than three months; (2) being between 18 and 64 years of age; (3) speaking French, and (4) having a work exposure component in their treatment plan. The exclusion criteria were (1) having an MSD related to a specific pathology and (2) the presence of a severe mental disorder identified in the medical file. The participating workers were evaluated (1) at the start of their rehabilitation program (2) during the initial hours of their return to work, (3) when they had resumed 50% of their full work hours, and (4) at the end of their rehabilitation program, by means of validated self-report questionnaires measuring the factors in the GAD model, biopsychosocial factors recognized in the MSD field, and medico-administrative factors.

Results: A total of 50% of the participants presented with symptoms of GAD. However, with respect to the intensity of the symptoms pertaining to GAD development and maintenance factors, the profile obtained was not typical of GAD. Intolerance of uncertainty, worries, negative problem orientation, beliefs about the usefulness of worrying, cognitive avoidance, and depression were significantly reduced during the rehabilitation program. At the end of rehabilitation, only 21% of the participants still met GAD diagnostic criteria. The biopsychosocial factors already recognized in the MSD field did not appear to correlate significantly with the component factors of the GAD model. However, the perception of benefitting from a safe work environment correlated with a lower risk of presenting GAD symptoms. Regarding the return to work, the related factors were beliefs about the usefulness of worrying, kinesiophobia, pain catastrophizing, and the perception of benefitting from ergonomics and disability management.

Conclusion and contributions of the study: The comparison of our results with empirical or normative data also allowed for the interpretation and a better understanding of the magnitude of the difficulties experienced by workers with a work disability.

TABLE OF CONTENTS

1. SUMMARY OF THE PROBLEM	1
2. STATE-OF-THE-ART REVIEW OF KNOWLEDGE.....	1
2.1 Fears associated with the fear of pain.....	2
2.2 The generalized anxiety disorder model.....	4
3. OBJECTIVES	6
4. METHODOLOGY	7
4.1 Design and participants.....	7
4.2 Recruitment procedure	7
4.3 Evidence-based interdisciplinary rehabilitation programs	8
4.4 Data collection procedure.....	8
4.5 Measurement instruments.....	8
4.6 Statistical analyses	13
5. RESULTS	15
5.1 Description of the sample	15
5.2 Primary objective: To document the presence, intensity, and temporal changes in generalized anxiety disorder and its maintenance factors	16
5.3 Secondary objective: A) To document, on an exploratory basis, the relationships between the component factors of the Dugas <i>et al.</i> GAD model (1998) and the biopsychosocial factors already recognized in the MSD field.....	20
5.4 Secondary objective: B) To document the relationship between all these factors and the return to work.....	23
6. DISCUSSION	25
6.1 Our findings about the presence, intensity, and temporal changes in the GAD model factors.....	25

6.2	Our findings about the relationships between the GAD model factors and biopsychosocial factors	27
6.3	Our findings about the relationship between the return to work and both the GAD model factors and biopsychosocial factors	28
6.4	Strengths and limitations of the study	28
6.5	Contributions of the study.....	29
7.	CONCLUSION	31
8.	PAPERS AND ARTICLES RESULTING FROM THIS STUDY	31

TABLES

Table A: Sociodemographic profile of participants.....	16
Table B: Temporal changes and significant correlation with presence of GAD.....	20
Table C: Relationship between GAD model factors and biopsychosocial factors associated with work disability	22
Table D: Factors associated with a return to work	24
Table A. 1: Correlations among secondary variables	39
Table A. 2: Correlations among secondary and sociodemographic variables.....	40
Table A. 3: Correlations among Dugas model variables (including sociodemographic data).....	41
Table A. 4: Correlations among secondary variables and Dugas model variables.....	42

FIGURES

Figure 1: Fear-avoidance model (Vlaeyen and Linton, 2000).....	3
Figure 2: Generalized anxiety disorder model (Dugas <i>et al.</i> , 1998).....	4
Figure 3: Temporal changes in percentage of participants with generalized anxiety disorder	17
Figure 4: Temporal changes in percentage of participants with symptoms related to generalized anxiety disorder, from subclinical level up	18

1. SUMMARY OF THE PROBLEM

Musculoskeletal disorders (MSDs) are one of the most frequent causes of work absences (Coyte, Asche, Croxford and Chan, 1998). They account for 38% of all work-related injuries and over 40% of work-related injury compensation costs (Commission de la santé et de la sécurité du travail (CSST), 2002). In Québec between 2005 and 2008, a decline of 16.1% was observed in the number of spinal disorders reported, with numbers dropping from 30,140 in 2005 to 25,274 in 2008, and a decline of 14.7% in other types of injuries (Commission de la santé et de la sécurité du travail, 2009a). Spinal disorders constitute 30% of all work-related injuries (Commission de la santé et de la sécurité du travail, 2009b), with the majority of workers with an MSD returning to work after three or four weeks of absence (Frank *et al.*, 1996; Spitzer, 1987). Nonetheless, in a small percentage of cases (approximately 8%), MSDs lead to a long-term work absence, i.e. more than 12 weeks (Frank *et al.*, 1996; Spitzer, 1987). These cases alone account for half of the compensation costs generated (Commission de la santé et de la sécurité du travail, 2002a, 2002b). For the year 2008, \$540.5M were disbursed by the CSST for all new and persistent spinal disorders, representing nearly \$35M more than in 2003 (Commission de la santé et de la sécurité du travail, 2009b). In other words, despite a reduction in the number of spinal-disorder claims in the past few years, the payouts have continued to rise.

2. STATE-OF-THE-ART REVIEW OF KNOWLEDGE

A number of studies conducted during the acute (less than four weeks after the onset of pain) (Frank *et al.*, 1996) and subacute (from four to 12 weeks after the onset of pain) phases of pain (Frank *et al.*, 1996) have sought to identify the factors explaining long-term disability, which means disability that persists beyond 12 weeks (Main and Watson, 1995; Pincus, Burton, Vogel and Field, 2002; Truchon, 2001; Webb *et al.*, 2003). It is now recognized that MSD-related disability must be understood from a biopsychosocial perspective (Waddell and Burton, 2005). This perspective focuses on a biological, psychological, and social understanding of the factors possibly causing and maintaining the disability (Turk, 1996). It involves understanding the individual in light of his¹ interactions with his environment (Loisel *et al.*, 2001). From this perspective, it can be seen that several factors contribute to the development and persistence of the inability to maintain an active working life. Some of these factors stem from the person, work environment, compensation policies, healthcare system, and insurance (Frank *et al.*, 1998; Krause, Frank, Dasinger, Sullivan and Sinclair, 2001; Loisel *et al.*, 2001). However, current knowledge does not allow us to determine the relative importance of each specific factor. Moreover, Waddell and Burton (2005) underscore the significant impact of psychosocial factors, such as beliefs and fears, in the development of disability. The Dionne *et al.* study (2004) also observed that beliefs associated with fear of movement and self-efficacy rank among the main determinants of a return to work in people with low back pain. Self-efficacy is defined as people's beliefs about their capability of successfully making a judgment regarded as necessary to achieve a result (Bandura, 1997).

In addition, regarding the chronic pain phase (Frank *et al.*, 1996), one systematic review attempted to identify the factors that could hinder a return to work in people enrolled in a

¹ The masculine gender is used throughout this document solely to facilitate reading and has no discriminatory intent.

rehabilitation program for an MSD (van der Hulst *et al.*, 2005). The results of this review differ from those noted in the acute and subacute phases in that no conclusive result was obtained regarding the impact of psychological factors (van der Hulst *et al.*, 2005). However, the reported psychosocial factors concerned mainly variables associated with people's personalities. Very few studies have investigated people's beliefs and fears, which conceivably explains the difference in results. A study conducted by Durand *et al.* (2008) observed, in the context of a workplace rehabilitation program for people with an MSD, that the period of exposure to the workplace constituted the critical period of the intervention. In fact, it was observed that workers' anxious reactions during this period could influence the outcome of the rehabilitation program (Durand *et al.*, 2008).

The scientific literature in the MSD field thus highlights the negative impact that pain-related fears (Barlow and Cerny, 1988; Vlaeyen, de Jong, Geilen, Heuts and van Breukelen, 2002; Vlaeyen and Linton, 2000) can have during the acute and subacute phases of pain. Yet to our knowledge, no study currently exists that documents worker fears and worries during the chronic pain phase in a workplace rehabilitation context from a biopsychosocial perspective. The scientific data collected from clinicians also reveal the presence of fears and worries, but these clinicians are poorly equipped to intervene in this regard. This exploratory study seeks to improve understanding of the nature of the anxiety symptoms seen in workers with an MSD that results in a work absence of more than 12 weeks, during their participation in a work rehabilitation program.

2.1 Fears associated with the fear of pain

Among the main psychosocial factors associated with the development of disability, behaviours aimed at avoidance of pain-inducing activities have in recent years attracted the attention of many researchers in the MSD field (Linton, 2002; Vlaeyen, Kole-Snijders, Boeren and van Eek, 1995a; Vlaeyen and Linton, 2002).

Kori *et al.* (1990) investigated kinesiophobia, or fear of movement, a specific phobia that can be placed in the category of anxiety disorders. The anxiety experienced in kinesiophobia concerns physical movements specifically and the fear that they lead to catastrophic consequences caused by pain. The fear-avoidance model developed by Vlaeyen *et al.* (1995b) shows the role of avoidance in disability development and maintenance. Figure 1 summarizes the model. As indicated on the right side of Figure 1, it illustrates that the majority of injured workers will confront the few fears that may persist after injury, which will lead them along the road to recovery. By contrast, as shown in this model, in the scenario leading to disability, a pain caused by an injury or a movement is experienced negatively and interpreted catastrophically, giving rise to both fear and anxiety. These negative emotions are then managed by avoiding all movement or activity likely to elicit pain. This avoidance strategy in turn reduces anxiety. However, it also leads to a decrease in or loss of physical fitness and maintenance of the functional disability, and gives rise to the onset of depressive symptoms in the medium and long terms (Barlow and Cerny, 1988; Vlaeyen and Linton, 2000). To modify this pain catastrophizing/avoidance cycle, which maintains the anxiety and disability, workers need to be educated: by providing them with information on the avoidance process, demystifying the symptoms associated with pain and the fears it generates, and confronting them with the reality (Barlow and Cerny, 1988; Vlaeyen and Linton, 2000). The technique of gradual exposure to the

anxiety-inducing situation constitutes one way of progressively reducing avoidance behaviours and specific fears that could not be changed using the education technique (Barlow and Cerny, 1988).

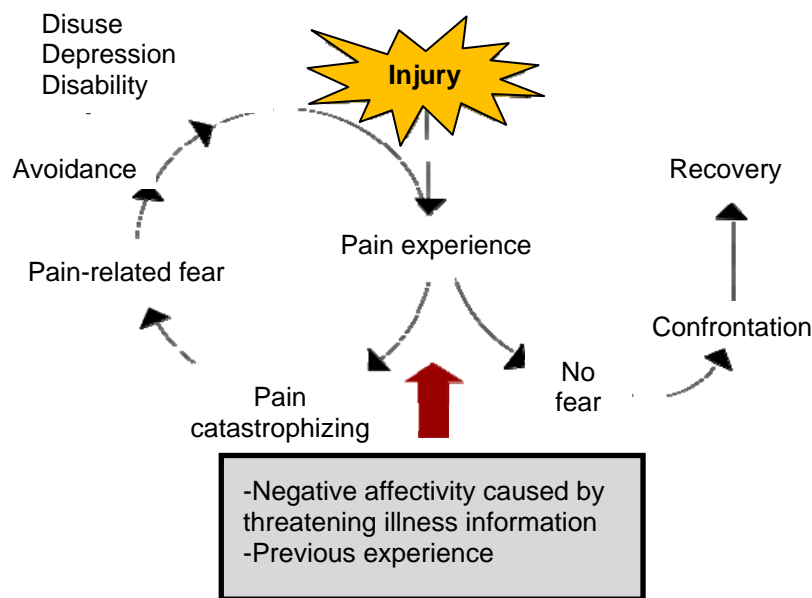


Figure 1: Fear-avoidance model (Vlaeyen and Linton, 2000)

On the other hand, ensuring the efficacy of this exposure technique (inspired by psychopathology) requires clearly ascertaining that irrational fears are involved (Barlow and Cerny, 1988). To make this judgment, the content of the fears must first be determined, and the fears then seen in the context of the life circumstances (i.e. the environment) of the worker undergoing rehabilitation for his MSD.

Beyond the fears associated with the process of kinesiophobia, this evaluation could also reveal the existence of another type of anxiety disorder: generalized anxiety disorder. It is differentiated from kinesiophobia by the presence of uncontrollable worries about probable or possible negative future events. In this case, rather than avoiding physical movements, the worker constantly seeks information and evidence that will eliminate all uncertainties about the anxiety-inducing situation before taking any action (Dugas *et al.*, 1998).

The anxiety component in workers with a persistent MSD is far from negligible. In fact, based on the criteria specified in the Diagnostic and Statistical Manual of Mental Disorders III-R, or DSM-III-R, McWilliams *et al.* (2003; 2004) observed a 35.1% prevalence rate of anxiety disorders in 382 persons with persistent pain compared to a prevalence rate of 18.1% in the general population. As for GAD, it is 2.5 times more prevalent in people with a low back pain (LBP) problem, i.e. a rate of 6.2% versus 2.5% in a group representative of the American population not suffering from arthritis, migraine, or low back pain (McWilliams *et al.*, 2004). The particularity of GAD lies in the level of intolerance of uncertainty (Dugas *et al.*, 1998; Dugas and Koerner, 2005; Turk, 2005). Wietz (1989) defines uncertainty, in an illness context,

as the person's inability to develop a satisfactory way of explaining his illness to himself and of understanding his pain. The level of uncertainty is especially high for patients suffering from persistent pain since, at the present time, medical practitioners and health professionals cannot give them a scientifically complete and definitive explanation. Figure 2 shows the GAD model in relation to worries and fears, as conceptualized by Dugas *et al.* (1998).

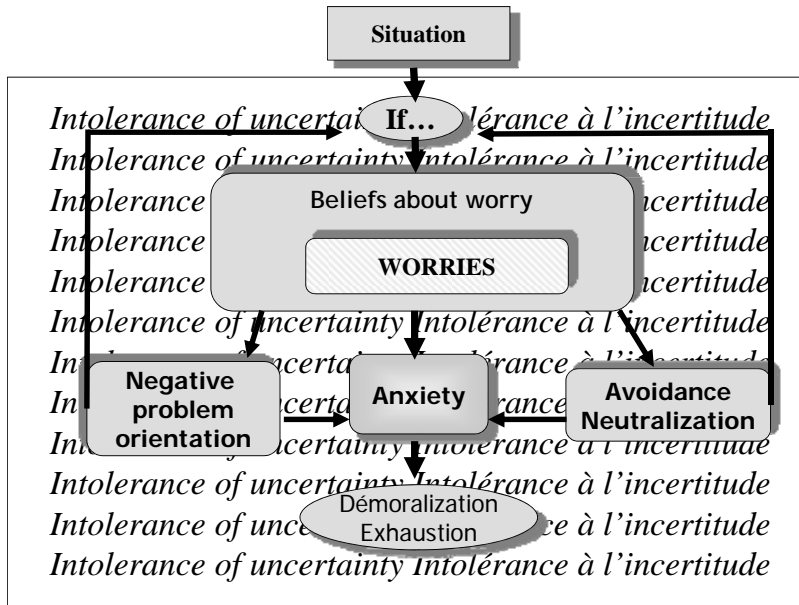


Figure 2: Generalized anxiety disorder model (Dugas *et al.*, 1998)

2.2 The generalized anxiety disorder model

During our lifetime, all of us inevitably face situations that cause us to experience varying degrees of uncertainty and are a source of worry and fear. For people with a general intolerance of uncertainty, uncertainty is seen as unacceptable in life, as reflecting badly on themselves, and as a source of frustration, stress, and an inability to act (Freeston, Rhéaume, Letarte, Dugas and Ladouceur, 1994). Intolerance of uncertainty manifests itself in fears that lead to worries. According to Borkovec (1983), worry consists of holding a chain of negative, relatively uncontrollable thoughts and images about uncertain events that could have one or more negative consequences.

Two types of worries exist: (1) worries that concern current problems; (2) worries that concern potential situations (Dugas, Letarte, Rhéaume, Freeston and Ladouceur, 1995). As illustrated in Figure 2, during a current or anticipated problematic situation, people who are intolerant of uncertainty will have different worries, which will be maintained by various beliefs about the usefulness of worrying. For example, they may be convinced that worry helps them anticipate and resolve problems. However, in actual fact, they are often very little inclined to take the actions required to concretely resolve the problem; instead, they tend to remain focused on their fears and worries (Dugas *et al.*, 1995). People who are intolerant of uncertainty may also believe that they can stave off negative emotions by anticipating events. And they may be

convinced that the fact of being worried is part of their personality, that this is simply the way they are, and that they can do nothing to change it. In addition to their beliefs about the usefulness of worrying, poor problem orientation will hinder problem solving. This type of negative orientation not only leads them to perceive problem situations as threatening, but also gives them the impression that they have little control over or capacity to manage the situation (Dugas *et al.*, 1998). Given this poor sense of self-efficacy, they will tend to worry more, believing that in this way they will be able to resolve the problem.

In attempting to manage the negative emotions generated by these worries and fears, people who are intolerant of uncertainty give priority to strategies designed to suppress the uncertainty rather than tolerate it (Gosselin and Laberge, 2003). In other words, instead of instituting a plan of action to resolve the situation that makes them anxious, they tend to avoid it. Avoidance can take different forms, such as distracting oneself, trying not to think about the problem, or avoiding situations that induce worry (Dugas *et al.*, 1998). In addition, these individuals may try to reassure themselves by constantly seeking information and concrete evidence in their environment that will show them that there is no need to worry about current or potential problems. However, these avoidance strategies are ineffective for resolving problems. On the contrary, they lead to the maintenance of anxiety and prevent any satisfactory and sustainable reduction of anxiety. Since the problem situation will ultimately persist unresolved, the intolerant person will continue to experience worry and fear. This inevitably leads to a situation of failure, which in turn diminishes his feeling of self-efficacy in resolving problem situations (Gosselin and Laberge, 2003) and results in the onset of depressive symptoms, such as exhaustion and demoralization (Dugas *et al.*, 1998).

In a return-to-work (RTW) context, workers have to come to grips with certain administrative, organizational, or social demands that may serve to increase their anxiety level (Neville, 2003) and their worries and fears. In a rehabilitation program carried out in the workplace of a person with an MSD, the period of exposure to the workplace constitutes the pivotal period of the intervention. In fact, it has been observed that workers' anxiety responses at that time may influence the outcome of the rehabilitation program (Durand *et al.*, 2008). However, our study did not identify the nature of the anxiety involved. These observations therefore point to the need to clarify the types of fears experienced in order to eventually propose courses of action adapted to the worker undergoing rehabilitation.

In summary, the scientific literature in the MSD field documents primarily the fears associated with fear of pain and movement (Barlow and Cerny, 1988; Vlaeyen *et al.*, 2002; Vlaeyen and Linton, 2000), while the factors associated with GAD have not been studied to date in a clientele with a work disability caused by an MSD. Given the difficulty these people have in developing an RTW action plan and the consequent decrease in their sense of self-efficacy, a negative correlation may exist between various GAD maintenance factors, as identified in the Dugas *et al.* model (1998), and occupational rehabilitation.

3. OBJECTIVES

This exploratory study sought to gain a better understanding of the nature of the anxiety symptoms found in workers with an MSD resulting in a work absence of more than 12 weeks, during their participation in a work rehabilitation program. We therefore defined three objectives:

1) Primary objective:

- To document the presence, intensity, and changes over time in generalized anxiety disorder and its maintenance factors, using the Dugas *et al.* GAD model (1998). These factors were: intolerance of uncertainty, worries, negative problem orientation, beliefs about the usefulness of worrying, cognitive avoidance, and depression.

2) Secondary objectives:

- a. To document, on an exploratory basis, the relationships between the component factors of the Dugas *et al.* GAD model (1998) and the biopsychosocial factors already recognized in the MSD field.
- b. To document the relationship between the return to work and the component factors of the Dugas *et al.* GAD model (1998) and the biopsychosocial factors already recognized in the MSD field, while controlling for medico-administrative factors.

4. METHODOLOGY

4.1 Design and participants

A prospective, repeated-measures observational/correlational design was adopted. A convenience sample of 39 workers starting their rehabilitation program was recruited from three work rehabilitation centres in the Montréal and Estrie regions of the province of Québec, Canada, offering a workplace exposure intervention. The inclusion criteria were as follows: (1) having an MSD that was accepted and compensated by the CSST and that had caused a work absence of more than three months; (2) being between the ages of 18 and 64; (3) speaking French, and (4) having a work exposure component in their treatment plan. The exclusion factors were: (1) having an MSD related to a specific pathology (e.g. recent fracture, metabolic disease, inflammatory or infectious neoplasia of the spinal column) and (2) presence of a severe mental disorder identified in their medical file. The individuals who agreed to participate signed a consent form approved by the research ethics committees of the participating centres.

4.2 Recruitment procedure

Participant recruitment began in June 2006 among workers enrolled at the Centre d'action en prévention et réadaptation de l'incapacité au travail (CAPRIT), located in the Hôpital Charles LeMoyne research centre. Initially, a total of 40 participants were sought. By spring 2007, only 10 workers had been recruited since the beginning of the study. To increase this number, the research team turned to two other rehabilitation clinics offering work exposure as part of the treatment plan. The Centre de réadaptation de l'Estrie (CRE) and the Service interdisciplinaire de réadaptation fonctionnelle du Centre hospitalier universitaire de Sherbrooke (SIRF-CHUS), both located in Québec's Sherbrooke region, were therefore targeted. The first participants from these two new sites were recruited in fall 2007. Thus, participant recruitment took place in the three participating rehabilitation centres: CAPRIT, CRE, and SIRF-CHUS. These centres were chosen because they apply the same evidence-based intervention principles.

The workers who met the research criteria were identified by the clinic coordinators. At the end of the first week of the rehabilitation program with each worker, the coordinator asked the worker's permission to have a research officer contact him to provide an overview of the study. If he agreed, the research officer then contacted the worker to verify his eligibility, explain the nature of his participation in the study, and schedule a time to meet to sign the consent form and complete the first questionnaires. Recruitment and data collection took place between June 2006 and September 2008. The study was approved by the research ethics committees of the three participating establishments.

4.3 Evidence-based interdisciplinary rehabilitation programs

Interdisciplinary rehabilitation programs, which were offered at the three centres, focus on treating disability rather than pain. A client-centred approach is recommended. Program activities are based on the fear-avoidance model (Vlaeyen *et al.*, 1995a; Vlaeyen et Linton, 2002), among other things. Program components include educating and reassuring the worker, which serve to modify his catastrophic interpretations; restoring fitness, which reduces physical deconditioning; reactivation, which reduces fears and pain-avoidance behaviours; and pain and stress management, which promotes the adoption of adaptive behaviours. Problem-solving strategies are also taught to help reduce the impact of psychosocial factors that hinder a return to work. These programs have a particular feature that involves a therapeutic return to work (TRW), namely a gradual return supervised by a clinical team (Durand, Vachon, Loisel and Berthelette, 2003). These programs are based on the Sherbrooke model (Loisel *et al.*, 1997) and run an average of 12 weeks. Another specific feature of these programs is the close collaboration sought with the worker, rehabilitation counsellor, employer, attending physician, and the worker's social environment, including union representatives if any.

4.4 Data collection procedure

In our study, to investigate possible variations in psychosocial factors during the rehabilitation program, the workers were evaluated at four points in time regarded as critical in the rehabilitation process. These points in time were identified further to a study of the trajectories of workers with a work disability who had required work rehabilitation (Durand *et al.*, 2008). The four measurement times were (1) the start of their rehabilitation program; (2) the announcement of the return to work; (3) the point when they were back to 50 % of their full work hours, and (4) the end of their rehabilitation program. The questionnaires described below were administered at each measurement time. A number of constraints prevented measures from being taken at the second time, namely, when the return to work was announced. In reality, the participants completed the questionnaires three to four hours after their initial exposure to work. A research officer visited the different clinics at each measurement time to have the participants fill out the validated French versions of the questionnaires.

4.5 Measurement instruments

The **principal variables** were based on the factors comprising the Dugas *et al.* GAD model (1998). They were evaluated using the validated French versions of self-report questionnaires.

The Worry and Anxiety Questionnaire (WAQ) (Dugas and Freeston, 2001) includes 11 items measuring the presence and intensity of GAD symptoms as defined in the DSM-IV (American Psychiatric Association, 1994). It also serves to collect information on people's worry themes. The total score can be dichotomized (0 or 1) so as to identify participants presenting with GAD symptoms. Its psychometric properties have been demonstrated with a non-clinical sample by comparing their WAQ results with their results on the Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger and Borkovec, 1990). To meet GAD criteria, a

person must report at least one worry theme typical of the disorder and a score of “4” or higher on the rating scale for all the other items. For the somatic section, the person must report a score higher than “4” on three of the six somatic symptoms mentioned (Bouvard and Cottraux, 2005).

Regarding sensitivity and specificity, participants who fell into the first quartile on the PSWQ were found not to meet GAD criteria according to the WAQ (Dugas and Freeston, 2001). Of those falling into the last quartile on the PSWQ, 78% met GAD criteria. WAQ’s sensitivity and specificity have also been demonstrated in a clinical population by comparing their WAQ results to those obtained in a structured interview based on DSM-IV criteria (Brown, Di Nardo and Barlow, 1994). The results revealed that of those participants who met GAD criteria according to the structured interview, 89.5% also met GAD criteria according to the WAQ (Dugas and Freeston, 2001). Test-retest reliability has also been measured, with the questionnaires administered 64 days apart. The results further showed that 75% of the participants who met GAD criteria (measured using the WAQ) at Time 1 also met GAD criteria at Time 2. Of those who did not meet GAD criteria at Time 1, 82.4% also did not meet the criteria at Time 2 (Dugas and Freeston, 2001).

The Intolerance of Uncertainty Scale (IUS) (Freeston *et al.*, 1994) includes 27 items. It measures perceptions relating to the idea that uncertainty is unacceptable in life, reflects badly on a person, and generates frustration, stress, and an inability to take action. It also provides an indication of the level of severity of the intolerance of uncertainty. The participant is asked to rate how characteristic of him each item is, using a five-point Likert scale (1 = “Not at all characteristic of me” to 5 = “Entirely characteristic of me”). A total score is calculated by adding up the ratings for all the items, and can vary from 27 to 135. A high score means a higher intolerance of uncertainty. This instrument has excellent internal consistency (Cronbach’s alpha = 0.91). Criterion validity is deemed to correlate with the Questionnaire of Generalized Anxiety Disorder – Modified (Freeston *et al.*, 1994). Test-retest validity at five weeks is good ($r = 0.78$) (Dugas, Freeston and Ladouceur, 1997).

The Negative Problem Orientation Questionnaire (NPOQ) (Gosselin, Dugas and Ladouceur, 2002a; Gosselin, Ladouceur and Pelletier, 2005; Gosselin, Pelletier, Bertrand and Ladouceur, 2000) is a 12-item measure that evaluates people’s cognitive orientation toward everyday problems. More specifically, this questionnaire assesses whether the individual tends to view problems as a threat to his well-being, doubts his own problem-solving abilities and solutions, and is pessimistic about the chances of solving a problem. The participant is asked to indicate how closely each statement reflects his way of reacting or thinking when confronted with a problem, using a five-point Likert scale (1 = “Not at all true of me” to 5 = “Extremely true of me”). A total score is calculated by adding up the ratings for all the items, and can range from 12 to 60. A high score means strong negative problem orientation. Internal consistency is excellent (Cronbach’s alpha = 0.90). Divergent validity has been assessed using the Rational Problem-Solving subscale of the Social Problem-Solving Inventory – Revised ($r = - 0.13$) (Gosselin *et al.*, 2005). Test-retest validity at five weeks is excellent ($r = 0.87$) (Gosselin *et al.*, 2005).

The Cognitive Avoidance Questionnaire (CAQ) (Gosselin *et al.*, 2002b) contains 25 items and assesses five avoidance strategies aimed at inhibiting emotions: avoidance of threatening stimuli, distraction, thought suppression, thought substitution, and the transformation of images into thoughts. The participant is asked to indicate how typical each statement is of his way of reacting to certain thoughts, using a five-point Likert scale (1 = “Not at all typical of me”

to 5 = “Completely typical of me”). A total score is calculated by adding up the ratings for all the items, and can range from 25 to 125. A high score signifies that the participant tends to use more avoidance strategies when confronted with problems. Internal consistency is excellent (Cronbach’s alpha = 0.95) (Gosselin *et al.*, 2002b). Test-retest reliability at four weeks is also excellent ($r = 0.81$) (Gosselin *et al.*, 2002b). The results obtained have shown that participants who exhibit a high level of worry use cognitive avoidance strategies more often than participants exhibiting a moderate level of worry (Gosselin *et al.*, 2002b).

Why Worry - II (WW-II) (Gosselin *et al.*, 2003) is a 25-item questionnaire that assesses erroneous beliefs about the usefulness of worrying. Analysis of its factor structure confirms five theoretical factors: worry helps to motivate, aids in problem solving, prevents negative outcomes, is a positive personality trait, and protects against negative emotions (Gosselin *et al.*, 2003). The participant is asked to indicate how true each statement is for him on a five-point Likert scale (1 = “Not at all true” to 5 = “Absolutely true”). A total score is obtained by adding up the ratings for all the items, and can range from 25 to 125. A high score means that the participant holds several erroneous beliefs about the usefulness of worrying. Cronbach’s alpha is 0.93 for internal consistency, and total item coefficients have been calculated and found to range from 0.45 to 0.79 for the subscales and from 0.38 to 0.74 for the total score (Gosselin *et al.*, 2003). Discriminant validity has been confirmed, with a moderate correlation coefficient obtained between the WW-II and the Beck Depression Inventory ($r = 0.27$). Criterion validity has been assessed using the WAQ. The results obtained have shown that participants who meet the GAD diagnostic criteria report holding a greater number of erroneous beliefs about the usefulness of worrying (Gosselin *et al.*, 2003). Test-retest reliability at five weeks shows excellent temporal stability ($r = 0.81$).

The Beck Depression Inventory II (Beck, Steer and Brown, 1997) measures the presence and severity of 21 depressive symptoms, based on the diagnostic criteria specified in the DSM-IV (American Psychiatric Association, 1994). The participant has to choose the statement that best describes how he has felt during the past two weeks, rating each item on a four-point Likert scale ranging from 0 to 3. A total score is calculated by adding up the ratings for all the items, and can range from 0 to 63. Based on the validated French instrument (Beck, Steer and Brown, 1997), the scores for degree of depression should be interpreted as follows: total score of 0 to 11: no depression; a score of 12 to 19: mild depression; a score of 20 to 27: moderate depression; and a score over 27: severe depression (Bouvard and Cottraux, 2005). The French version of the instrument exhibits satisfactory internal consistency (Beck, Steer and Brown, 1997).

The **secondary variables** represent the biopsychosocial factors associated with the development of a disability.

The original TAMPA Scale for Kinesiophobia (Kori *et al.*, 1990) includes 17 items, while the shortened version has 11 items (Woby, Roach, Urmston and Watson, 2005). The TAMPA measures fear of movement and of reinjury. The questionnaire used in this study included the French translation of the 17 items administered to French-speaking workers in New Brunswick with work-related injuries (French, Roach and Mayes, 2002), but retained the 11 items of the new shortened version. The participant has to rate his agreement with each item on a four-point Likert scale ranging from 1 = “Strongly disagree” to 4, “Strongly agree.” A total score is calculated by adding up the ratings for all the items (inverse scores for items 4, 8, 12, and 16). The total score can range from 11 to 44, with a high score meaning a high level of kinesiophobia. Internal consistency assessed using Cronbach’s alpha is 0.71 (French *et al.*, 2002). Regarding

construct validity, significant correlations have been observed between fear of movement and the following factors: level of psychological distress ($r = 0.45$), anxiety ($r = 0.43$), pain-related disability ($r = 0.47$), pain severity ($r = 0.41$), and affective distress ($r = 0.35$) (French, Roach and Mayes, 2002). Negative correlations were observed between fear of movement and perceived control over one's life and personal mastery ($r = -0.30$) and the ability to return to work at the end of a rehabilitation program ($r = -0.28$) (French *et al.*, 2002). Test-retest reliability assessed using the English version, administered at 76-hour intervals (± 14 hours), shows good sensitivity to change (Cronbach's alpha = 0.79) (Woby *et al.*, 2005).

The 13-item Pain Catastrophizing Scale (PCS) (Sullivan, Bishop and Pivik, 1995) measures catastrophic thoughts and the emotions associated with the pain experience. The participant must rate the presence of pain-related thoughts or emotions on a five-point Likert scale (0 = "Not at all" to 4 = "All the time"). A total score is calculated by adding up the ratings on all items, and can range from 0 to 52. A high score indicates more pain catastrophizing. Internal consistency is 0.87 (Cronbach's alpha) and the test-retest correlation at six- and 12-week intervals ranges from 0.70 to 0.75 in a pain-free population (Sullivan and Stanish, 2003a; Sullivan *et al.*, 1995). The questionnaire has good convergent validity with the TAMPA Scale for Kinesiophobia ($r = 0.34 - 0.53$) (Crombez, Vlaeyen, Heuts and Lysens, 1999; Roelofs, Goubert, Peters, Vlaeyen and Crombez, 2004) and good divergent validity with the Positive Affectivity subscale of the Positive Affect – Negative Affect Scale (Sullivan *et al.*, 1995; Sullivan and Stanish, 2003b; Watson, Clark and Tellegen, 1988).

Fears and pain-avoidance behaviours were assessed using the Fear-Avoidance Beliefs Questionnaire (FABQ) (Waddell, Newton, Henderson, Somerville and Main, 1993) comprising two subscales that measure beliefs to the effect that work (10 items) or physical activity (5 items) influences low back pain (Waddell *et al.*, 1993). The participant must rate, on a seven-point Likert scale (0 = "Strongly disagree" to 6 = "Strongly agree"), his agreement with statements concerning the effect or possible effect on pain. A total score for each subscale is calculated by adding up the participant's ratings for each item. Items 1, 8, 13, and 14 must not be added as they constitute distractors. The total score can range from 0 to 24 for the Physical Activity subscale and from 0 to 42 for the Work subscale. A high score indicates greater fear about physical activity and work. The Cronbach's coefficients assessing the internal consistency of the Physical Activity and Work subscales are 0.77 and 0.88 respectively (Waddell *et al.*, 1993). Test-retest reliability after 48 hours gives a kappa coefficient of 0.74 (Waddell *et al.*, 1993). The instrument's construct validity correlates fairly well with pain and the FABQ Work subscale ($r = 0.23$). Disability, assessed using the Roland-Morris Questionnaire (1983), also correlates with the FABQ's Work subscale ($r = 0.39$ to 0.55) and the Physical Activity subscale ($r = 0.23$ to 0.51). Psychological distress measured using the Modified Somatic Perception Questionnaire (Main, 1983) and the Modified Zung Depressive Inventory (Main, Wood, Hollis, Spanswick and Waddell, 1992; Zung, 1965) correlates poorly with the FABQ's Work subscale ($r = 0.36$ and 0.41) and the Physical Activity subscale ($r = 0.36$) (Waddell *et al.*, 1993).

Pain intensity was assessed using a visual analog scale. The worker has to rate his level of pain on a 10-cm continuous line (0 = "No pain" to 10 = "Worst possible pain") (Von Korff, Jensen and Karoly, 2000). This constitutes one of the three most commonly used methods of measuring pain intensity (Von Korff *et al.*, 2000). It has sound psychometric properties (Von Korff *et al.*, 2000) and is sensitive to change (Jensen, Turner, Romano and Fisher, 1999). Its test-retest reliability is also very good (Pengel, Refshauge and Maher, 2004).

Self-efficacy in performing one's work was measured using the French-language *Échelle de mesure du sentiment d'efficacité personnelle* questionnaire developed during a study conducted by Dionne *et al.* (2004). The wording of the questions reflects the definition given to this concept in Bandura's social cognitive theory (1997). The questionnaire includes a total of eight items. The participant has to indicate how confident he is about being able to perform his work in his current situation, using a percentage rating from 0 to 100 (0 = "Not at all confident" to 100 = "Totally confident"). An average score is calculated for all the items (total score = sum of all the items/8), and the higher the score, the more confident the participant is about being able to do his work in his current situation. Internal consistency is 0.88 (Cronbach's alpha) (Dionne *et al.*, 2004).

The Organizational Policies and Practices (OPP) questionnaire (Truchon, Fillion, and Gelinas, 2003) includes 22 items measuring the worker's perception of four organizational dimensions. First, the people-oriented culture factor documents the worker's perception of the extent to which the employer involves employees in decision making, there is trust between management and employees, and a cooperative work environment exists. Second, the safety climate factor documents the participant's perception of the extent to which the employer maintains a safe work environment and takes the necessary corrective actions to redress unsafe conditions. Third, the disability management factor assesses his perception of the employer's disability management and its proactive return-to-work efforts ("the company works with the treating physician to develop a plan for return to work"). Fourth, the ergonomic practices factor is used to assess activities aimed at reducing the biomechanical workload ("jobs are planned to minimize heavy lifting"). The participant must indicate to what extent he agrees with each statement on a five-point Likert scale (1 = "Strongly disagree" to 5 = "Strongly agree"). An average score is calculated for each rating scale and a high score signifies a positive perception of the work environment. Its psychometric properties are satisfactory. The questionnaire offers good internal consistency, with Cronbach's coefficients ranging from 0.81 to 0.87 for three of the four factors. Test-retest reliability at four-week intervals is satisfactory, with intraclass correlation coefficients ranging from 0.45 to 0.61. Concomitant validity is satisfactory. Poor to moderate correlations have been found with measures of work stress, social support, and job satisfaction perceptions (Truchon *et al.*, 2003).

A question assessing perception of competent work behaviours (Durand, Berthelette, Loisel, Beaudet and Imbeau, 2007) was used. This question assesses the relationship between the work activity currently performed by the worker and the complete work activity that must be performed. The participant has to answer the question on a graded scale ranging from 0% = "Work activity not carried out at all" to 100% = "Work activity carried out." The higher the percentage, the smaller the gap between the work activity currently performed by the worker and that which must be performed. Originally this question was put to the occupational therapist in order to measure his perception of the worker's work activity (Durand *et al.*, 2007). However, for this study, the question was asked directly of the worker. In addition to the question assessing the work activity, an adapted version of the question was used to measure the worker's perception of his regular activities outside work.

A sociodemographic profile was also documented for each participant. It included age, sex, marital status, level of education, injury site, whether the participant was unionized or not, whether he or his employer was contesting a CSST decision, whether he had attempted to return to work prior to the rehabilitation program, and the number of days elapsed between the date of

the accident, the date when he stopped working, and the date when he began the rehabilitation program.

Work status at the end of the program was also documented, using a questionnaire developed by Durand *et al.* (1996). This questionnaire made it possible, by means of a decision tree, to determine three categories of work status: (1) back at work (old job or another job; full-time or part-time); (2) absent from work due to a treated problem; (3) absent from work for a reason other than the treated problem.

4.6 Statistical analyses

With regard to the primary objective, descriptive analyses were performed to document the presence and intensity (level) of the component factors of the Dugas *et al.* GAD model. Again, these factors are intolerance of uncertainty, worries, negative problem orientation, beliefs about the usefulness of worrying, cognitive avoidance, and depression. By means of these analyses, we verified whether the participants exhibited high levels of the components of generalized anxiety disorder. To document temporal changes, mixed linear models (Verbeke and Molenberghs, 1999) were used, with the SAS System PROC MIXED procedure, version 9.1.3 (SAS and Institute, 2009). Simple contrasts were then performed specifically to identify significant differences over time.

A series of analyses was performed for the first secondary objective to document the relationships between the factors comprising the Dugas *et al.* GAD model (1998), biopsychosocial factors, and sociodemographic variables. Given that the data were subjected to repeated measures, a series of analyses was performed, depending on the type of variable, to take into account correlations between the observations made regarding any one individual. More specifically, analyses involving generalized estimating equations (GEE) were performed for the categorical dependent variables, using the SAS System PROC GENMOD procedure (Stokes, Davis and Koch, 1995). This procedure represents a generalization of a traditional logistic regression. Mixed linear models were used for the continuous dependent variables (Verbeke and Molenberghs, 1999) with the SAS System PROC MIXED procedure. This procedure constitutes a generalization of a matched data model or a repeated-measure ANOVA. One of the strengths of these models is that they take into account the measures pertaining to a given individual even if some data are lacking (premature disappearance, non-response, etc.) for a certain length of time. This represents an added value, since normal procedures eliminate individuals for whom data are incomplete. Given that the analyses took into account the number of valid data (due to the data structure) rather than the number of patients, the power of the study is optimized. Another advantage of using this type of analysis is that it allows inclusion of all the independent variables documented in the literature without having to construct a correlation matrix beforehand to reduce the number of factors (Blackwell, Mendes De Leon and Miller, 2006; Wolfinger and M., 1998). The limitation of using a correlation matrix to select factors *a priori* is that it does not take into account correlations among the various factors over time. Analyses involving generalized estimating equations by means of the SAS System PROC GENMOD procedure were performed for the second secondary objective, with “return to work” as the dichotomous dependent variable (Diggle, Liang and Zeger, 1994; Gelman and Hill, 2007; Littell, Milliken, Stroup, Wolfinger and Schabenberger, 2006; Twisk., 2003).

5. RESULTS

5.1 Description of the sample

Sixty-seven workers were contacted for possible participation in the study. Nine of them refused because it implied too much measurement time or because they did not want to fill out all the questionnaires. In addition, 17 workers did not meet the inclusion criteria (e.g. mental health problems, not participating in a return-to-work program, physician's refusal, and stopping treatment before completing the questionnaires) and two could not be reached for the purpose of signing the consent form or responding at the first measurement time. In the end, a total of 39 workers agreed to participate in the study. Three of these signed the consent forms but never completed the questionnaires, including one person who was unable to do so due to a poor knowledge of French. Nineteen participants completed the questionnaires at all the planned measurement times. Among those who dropped out, one person was hospitalized for another health problem, while two left the rehabilitation program and could no longer be reached. As well, eight persons ended treatment prematurely shortly after responding at one measurement time. Finally, six participants who completed the program could not be reached by the researcher for the final evaluation. Five of these participants had returned to their pre-injury jobs.

The average duration of the rehabilitation program was 71.8 calendar days, or approximately ten weeks. Table 1 shows the sociodemographic profile of the 36 participants whose data were analyzed. Average participant age was 40.39 years; the majority were single (25%), living common-law (42%) or married (28%). Nearly 70% of the participants reported having been referred to the program for a back injury. The average number of days elapsed between the work-related accident and the beginning of the rehabilitation program was 305.11 days (standard deviation = 127.42 days). Approximately half of the participants were not unionized (55.5%). The majority of them or of their employers were not contesting the CSST decision (80.6%). In cases where a contestation was involved, most of the time it was the employer contesting (97.2%). Slightly over half of the participants had not made attempts to return to work since their work-related accident (55.6%). Regarding work status at the end of the rehabilitation program, 15 people were back at work at the same employer's and performing the same tasks, while one person had different tasks. One person had changed employers but held the same job with different tasks. Another person had changed employers, jobs, and tasks. Fifteen participants had not returned to work due to their health problem. We were unable to ascertain the work status of three participants (one at each centre).

Table A: Sociodemographic profile of participants

Sociodemographic variables	Total N = 36	CAPRIT n = 28	SIRF n = 6	CRE n = 2
Age Average (sd)	40.39 (10.49)	41.18 (10.81)	35.50 (9.98)	44.00 (2.83)
Sex Male	24 (67%)	19 (68%)	5 (83%)	0 (0%)
Female	12 (33%)	9 (32%)	1 (17%)	2 (100%)
Marital status Single	9 (25%)	6 (21.4%)	3 (50%)	0 (0%)
Common-law	15(41.7%)	13 (46.4%)	2 (33.3%)	0 (0%)
Married	10 (27.8%)	7 (25.0%)	1 (16.7%)	2 (100%)
Widowed	1 (2.8%)	1 (3.6%)	0 (0%)	0 (0%)
Separated	1 (2.8%)	1 (3.6%)	0 (0%)	0 (0%)
Injury site Back	25 (69.4%)	20 (71.4%)	5 (83.3%)	0 (0%)
Upper extremity	6 (16.7%)	4 (14.3%)	1 (16.7%)	1 (50%)
Lower extremity	1 (2.8%)	1 (3.6%)	0 (0%)	0 (0%)
Multi-site	4 (11.1%)	3 (10.7%)	0 (0%)	1 (50%)
Unionized No	20 (55.6%)	14 (50%)	5 (83.3%)	1 (50%)
Yes	16 (44.4%)	14 (50%)	1 (16.7%)	1 (50%)
Contestation No	29 (80.6%)	22 (78.6%)	5 (83.3%)	2 (100%)
Yes	7 (19.4%)	6 (21.4%)	1 (16.7%)	0 (0%)
Attempted to RTW before starting program No	20 (55.6%)	17 (60.7%)	5	1 (50%)
Yes	16 (44.4%)	11 (39.3%)	4	1 (50%)
Number of days elapsed between work-related accident and starting program Average (sd)	305.11 (127.42)	318.79 (124.97)	146.50 (10.61)	294.17 (134.35)
Returned to work by end of program No	15	12	3	0
Yes	18	15	2	1

5.2 Primary objective: To document the presence, intensity, and temporal changes in generalized anxiety disorder and its maintenance factors

Using the results of the Worry and Anxiety Questionnaire (WAQ), we were able to identify those participants who met the diagnostic criteria for GAD. Based on these criteria, half of the participants were found to possibly have GAD. As illustrated in Figure 3, this percentage was significantly reduced over time ($\chi^2(3, N = 36) = 13.38, p = 0.0039$). Simple contrasts, performed using the chi-square test, revealed a significant reduction in the number of participants with GAD-related symptoms between the start of their rehabilitation program ($n = 50\%$) and each measurement time, namely work exposure (T2: $n = 22\%$; $\chi^2(3, N = 36) = 11.02, p = 0.0009$), resumption of 50% of full work hours (T3: $n = 27\%$; $\chi^2(3, N = 36) = 11.16, p =$

0.0008), and the end of their program (T4: n = 21%; ($\chi^2(3, N = 36) = 13.11, p = 0.0003$). No significant difference was observed between times 2 and 3 or between times 3 and 4.

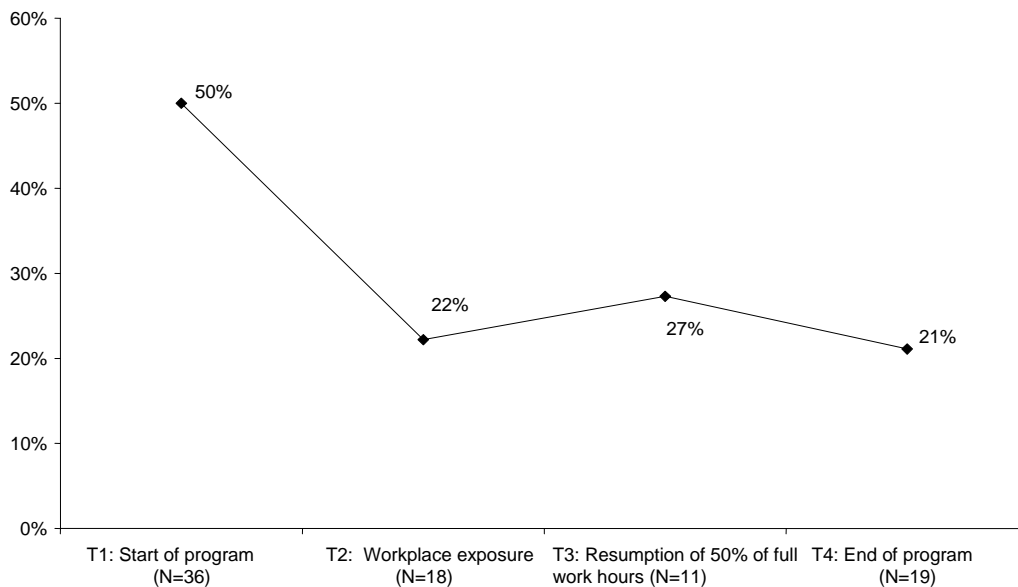


Figure 3: Temporal changes in percentage of participants with generalized anxiety disorder

As we also wanted to document participants with subclinical GAD, we recalculated the results by changing the criterion of having rated “4” on the intensity scale to that of having rated “3,” on all the items. The percentage of participants meeting the GAD criteria, including both subclinical and clinical levels, increased to nearly 64%. Figure 4 shows a significant reduction over time ($\chi^2(3, N = 36) = 19.18, p = 0.0003$). Again here, simple contrasts using the chi-square test revealed a significant reduction in the number of participants with subclinical symptoms between the start of their program (n = 64%) and the time of work exposure (T2: n = 39%; $\chi^2(3, N = 36) = 14.42, p = 0.0001$); between the start of their program and resumption of 50% of full work hours (T3: n = 36%; $\chi^2(3, N = 36) = 23.11, p < 0.0001$), and between the start and end of their program (T4: n = 37%; $\chi^2(3, N = 36) = 14.42, p = 0.0001$). Since the generalized estimating equations took attrition into account, the reduction over time was not associated with the reduction in the number of study participants.

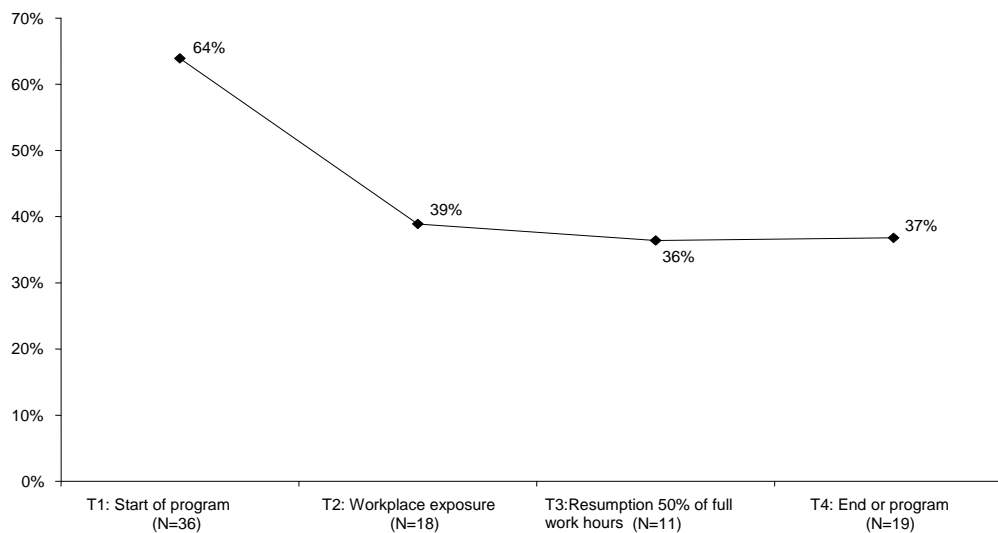


Figure 4: Temporal changes in percentage of participants with symptoms related to generalized anxiety disorder, from subclinical level up

The WAQ was used to document the topics about which the person worried most often. The main themes we identified concerned health (including both illness and well-being), the future, finances, other people's judgments, family and friends, the rehabilitation process, work, leisure and other activities, and the CSST.

Regarding the intensity and temporal changes in the different variables in the Dugas *et al.* GAD model (1998), the adjusted mean values and standard deviations for each measurement time allowed us to observe, using the mean values adjusted for the measurement time, a level of intolerance of uncertainty in the participants at the start of their program (T1: $M = 62.78$; $SD = 4.11$), compared to that for a population with mild GAD ($M = 56.75$; $SD = 12.44$; (Dugas *et al.*, 2007) or with a panic disorder plus agoraphobia ($M = 63.52$, $SD = 20.24$) (Dugas, Marchand and Ladouceur, 2005). The level of intolerance dropped significantly during the rehabilitation program ($t(3, 46) = 8.86$, $p < 0.0001$). A significant reduction was observed between participants' start of their rehabilitation program and the time of their work exposure (T2: $M = 53.59$; $SD = 4.61$; $t(1, 46) = 2.85$, $p = 0.0065$) and between the start of their program and resumption of 50% of their full work hours (T3: $M = 48.64$; $SD = 5.19$; $t(1, 46) = 3.53$, $p = 0.0010$). At the time of resumption of 50% of their full work hours, the results approach those obtained by a student population that did not have GAD ($M = 48.15$, $SD = 4.60$) (Freeston *et al.*, 1994). At the end of their program, the participants' level of intolerance of uncertainty was maintained (T4: $M = 48.14$; $SD = 4.60$). However, the reduction between the start and end of their program remained significant (T1 vs.T4: $t(1, 46) = 4.55$, $p < 0.0001$).

The mean of the participants' scores indicated that they found worry to be useful ($M = 47.92$; $SD = 3.238$). This adjusted mean value was comparable to that of a population with GAD ($M = 45.89$; $SD = 18.82$) (Dugas and Koerner, 2005). It is even comparable to that of a patient profile suffering from severe GAD ($M = 49.91$; $SD = 20.10$) (Dugas *et al.*, 2007). The scores

obtained regarding beliefs about the usefulness of worrying dropped significantly during the rehabilitation program ($t(3, 46) = 8.38, p = 0.0002$). There was a significant reduction between the start of their program and the time of work exposure (T2: $M = 41.24; SD = 3.50; t(1, 46) = 3.25, p = 0.0022$). At that time, the adjusted mean value was comparable to that of a patient profile with moderate GAD ($M = 47.34; SD = 20.63$) (Dugas *et al.*, 2007). A reduction was also observed between the start of their program and the resumption of 50% of their full work hours (T3: $M = 38.47; SD = 3.81; t(1, 46) = 3.70, p = 0.0006$). The results were maintained at the end of their program (T4: $M = 39.57; SD = 3.49$). The reduction between the start and end of their rehabilitation program remained significant ($t(1, 46) = 4.07; p = 0.0002$). The adjusted mean values at times 3 and 4 were comparable to those for a patient profile with mild GAD ($M = 38.55; SD = 10.14$) (Dugas *et al.*, 2007).

With respect to cognitive avoidance, the participants' results at the start of their program (T1: $M = 59.22; SD = 3.75$) were comparable to those obtained for participants with health problems (multiple sclerosis; $M = 56.10, SD = 16.80$) (Léger, Ladouceur and Freeston, 2002). The results again dropped significantly during their rehabilitation program ($t(3, 46) = 8.59, p = 0.0001$). The reduction was significant between the start of their program and the time of work exposure (T2: $M = 52.69; SD = 4.13; t(1, 46) = 2.45, p = 0.0179$) and particularly between the start of their program and Time 3, the resumption of 50% of their full work hours ($M = 49.71; SD = 4.57; t(1, 46) = 2.88, p = 0.0060$), at which time the results were lower than those obtained in a university population of psychology students ($M = 52.15; SD = 17.69$) (Gosselin *et al.*, 2002b). At the end of their program, the participants' results (T4: $M = 46.43; SD = 4.128$) approached those obtained at six-months post-intervention with a sample of GAD patients having received cognitive behavioural therapy for the disorder and benzodiazepine weaning treatment ($M = 41.37; SD = 12.66$) (Gosselin, 2005). The reduction was also significant between the start and end of their rehabilitation program ($t(1, 46) = 4.82; p = 0.0001$).

Regarding problem orientation (T1: $M = 25.61; SD = 1.70; T2: M = 17.78; SD = 1.94$), the results changed significantly over time ($t(3, 46) = 10.42, p < 0.0001$) (T4: $M = 19.63; SD = 7.44; T1$ vs. T4: $t(1, 36) = 7.82; p = 0.0001$), but at baseline, they were comparable to those of a university population of psychology students ($M = 25.03; SD = 7.8$) (Gosselin, 2005).

According to established norms (Bouvard and Cottraux, 2005), at the start of their rehabilitation program ($M = 16.81; SD = 1.83$) the participants suffered from mild depression. This level held at the time of work exposure (T2: $M = 15.44; SD = 2.19$) and until the resumption of 50% of their full work hours (T3: $M = 12.97; SD = 2.58$). A clinically significant reduction occurred during their rehabilitation program ($t(3, 46) = 4.70, p = 0.0061$), particularly between the start and end of their program (T4: $M = 10.02; SD = 2.18; t(3, 46) = 3.64, p = 0.0007$). The adjusted mean indicated an absence of depression at the end of their program (Bouvard and Cottraux, 2005). In summary, all the factors associated with GAD were significantly reduced during the participants' rehabilitation program.

5.3 Secondary objective: A) To document, on an exploratory basis, the relationships between the component factors of the Dugas *et al.* GAD model (1998) and the biopsychosocial factors already recognized in the MSD field

GEE analyses were performed first using the presence of GAD as the dependent variable, which was dichotomous. In light of our literature review, the following independent variables were introduced into the model: uncertainty, problem orientation, cognitive avoidance, beliefs about the usefulness of worrying, depression, kinesiophobia, catastrophizing, fears and avoidance, pain intensity, self-efficacy, perception of organizational practices and policies, and percentage of regular non-work activities and work activities performed. The sociodemographic data (age, sex, contestation, attempts made to return to work, time elapsed before the start of their rehabilitation program, and treatment site) were controlled. Table 2 presents the variables for which a significance level greater than 0.1 was obtained during the GEE analyses. The table shows the odds ratios (the exponential values of the *beta* coefficient). Thus, for a categorical dependent variable, an estimate of less than 1 represents a lower risk of presenting GAD, while an estimate greater than 1 represents a higher risk. Table 2 presents the data obtained using univariate models, as well as adjusted data that take into account the correlation between observations concerning the same person over time. The results show that the presence of clinical GAD is associated with a perception of benefiting from a low level of work safety.

Table B: Temporal changes and significant correlation with presence of GAD

Model (dependent variable)	Associated factors (independent variables)	Univariate model estimates (95% confidence intervals)	<i>p</i>	Adjusted model estimates (95% confidence intervals)	<i>p</i>
Generalized anxiety disorder (clinical level)	Times 1 vs. 2	8.00 (2.34 to 27.31)	0.0009	2.51 (0.42 to 14.94)	0.3113
	Times 1 vs. 3	11.00 (2.69 to 44.91)	0.0008	0.63 (0.13 to 3.13)	0.5690
	Times 1 vs. 4	8.00 (2.60 to 24.66)	0.0003	3.49 (0.79 to 15.44)	0.0998
	Times 3 vs. 4	0.73 (0.14 to 3.81)	0.7061	5.56 (0.92 to 33.60)	0.0615
	Work environment: safety climate	0.46 (0.23 to 0.92)	0.0291	0.43 (0.21 to 0.88)	0.0224

Second, mixed linear models were used to observe the correlations between the GAD model component factors and the biopsychosocial and sociodemographic factors. In this instance, five series of mixed linear models were applied, with the following continuous dependent variables used in each case: intolerance of uncertainty, negative problem orientation, cognitive avoidance, beliefs about the usefulness of worrying, and depression. In the analysis models concerning intolerance of uncertainty, the following independent variables were inserted into the model: problem orientation, cognitive avoidance, beliefs about the usefulness of worrying, and depression. The same principle was applied for the four other models as well. In

light of our literature review, the following independent variables were used: kinesiophobia, catastrophizing, fears and avoidance, pain intensity, self-efficacy, perception of organizational practices and policies, and percentage of regular non-work and work activities performed. The sociodemographic data (age, sex, contestation, attempts made to return to work, time elapsed before the start of the program, and treatment site) were controlled.

Table 3 presents the final results for each of the five mixed linear models applied. To streamline the results presentation, we show only those variables for which a significance level greater than 0.1 was obtained. Overall, the results reveal that the change over time was no longer significant in the adjusted models. This means that the passage of time alone did not correlate with a reduction in intolerance of uncertainty, negative problem orientation, cognitive avoidance, beliefs about the usefulness of worrying, and depressive elements.

The results further show that intolerance of uncertainty and negative problem orientation correlated with both the perception that worrying is useful and the presence of a depressive state. Cognitive avoidance also associated with beliefs about the usefulness of worrying. These beliefs, used as a dependent variable, correlated significantly with cognitive avoidance and negative problem orientation.

Regarding the presence of a depressive state, it is considered a consequence of poorly adapted management of negative emotions. The factors associated with a depressive state are negative problem orientation and intolerance of uncertainty. The results we obtained regarding the presence of a depressive state diverged from those in the current MSD literature. Additional analyses were therefore performed, using univariate models, to document the presence of significant correlations between catastrophizing ($ICC = 0.55$ $p < 0.001$), self-efficacy ($ICC = 0.68$; $p < 0.001$), pain intensity ($ICC = 0.57$ $p < 0.001$), and perception of disability at work ($ICC = 0.62$ $p < 0.001$) and in regular non-work activities ($ICC = 0.61$ $p < 0.001$). In univariate models, over time these variables showed significant correlations ranging from moderate to high. However, when included with the anxiety-related variables, they did not stand out significantly.

Table C: Relationship between GAD model factors and biopsychosocial factors associated with work disability

Model (dependent variable)	Associated factors (independent variables)	Univariate model estimates (95% confidence intervals)	<i>p</i>	Adjusted model estimates (95% confidence intervals)	<i>p</i>
Intolerance of uncertainty	Times 1 vs. 2	9.19 (2.70 to 15.69)	0.0065	3.30 (-3.05 to 9.66)	0.2990
	Times 1 vs. 3	14.14 (6.07 to 22.21)	0.0010	4.17 (-3.40 to 11.74)	0.2711
	Times 1 vs. 4	14.63 (8.15 to 21.11)	<0.0001	-0.70 (-7.48 to 6.09)	0.8363
	Beliefs about usefulness of worrying	0.92 (0.69 to 1.14)	<0.0001	0.45 (0.20 to 0.69)	0.0008
	Depression	1.48 (1.16 to 1.81)	<0.0001	0.92 (0.50 to 1.34)	<.0001
Negative problem orientation	Times 1 vs. 2	4.43 (1.51 to 7.35)	0.0037	1.89 (-1.08 to 4.86)	0.2059
	Times 1 vs. 3	4.25 (0.63 to 7.88)	0.0225	0.56 (-2.99 to 4.11)	0.7526
	Times 1 vs. 4	7.82 (4.91 to 10.74)	<0.0001	2.65 (-0.32 to 5.61)	0.0785
	Times 2 vs. 4	3.39 (0.01 to 6.77)	0.0493	0.76 (-2.55 to 4.06)	0.6449
	Times 3 vs. 4	3.57 (-0.35 to 7.49)	0.0732	2.09 (-1.63 to 5.80)	0.2620
	Cognitive avoidance	0.29 (0.20 to 0.38)	<0.0001	0.074 (-0.02 to 0.17)	0.1084
	Beliefs about usefulness of worrying	0.37 (0.27 to 0.47)	<0.0001	0.20 (0.09 to 0.31)	0.0005
	Depression	0.62 (0.47 to 0.77)	<0.0001	0.37 (0.19 to 0.55)	0.0001
Cognitive avoidance	Times 1 vs. 2	6.53 (1.18 to 11.89)	0.0179	3.96 (-1.61 to 9.52)	0.1583
	Times 1 vs. 3	9.51 (2.86 to 16.16)	0.0060	4.30 (-2.43 to 11.04)	0.2038
	Times 1 vs. 4	12.79 (7.45 to 18.13)	<0.0001	4.60 (-1.67 to 10.87)	0.1456
	Times 2 vs. 4	6.26 (0.06 to 12.45)	0.0480	0.64 (-5.95 to 7.23)	0.8445
	Negative problem orientation	1.08 (0.72 to 1.44)	<0.0001	0.41 (-0.09 to 0.91)	0.1040
	Beliefs about usefulness of worrying	0.66 (0.43 to 0.89)	<0.0001	0.30 (0.03 to 0.57)	0.0324
	Depression	0.84 (0.50 to 1.17)	<0.0001	0.31 (-0.10 to 0.71)	0.1314

Beliefs about usefulness of worrying	Times 1 vs. 2	6.68 (2.54 to 10.82)	0.0022	1.65 (-2.84 to 6.14)	0.4624
	Times 1 vs. 3	9.45 (4.30 to 14.59)	0.0006	4.48 (-0.94 to 9.90)	0.1029
	Times 1 vs. 4	8.35 (4.22 to 12.48)	0.0002	-1.10 (-6.37 to 4.17)	0.6749
	Times 3 vs. 4	-1.10 (-6.64 to 4.45)	0.6925	-5.58 (-11.39 to 0.23)	0.0593
	Negative problem orientation	0.92 (0.05 to 0.64)	<0.0001	0.6971 (0.32 to 1.08)	0.0006
	Cognitive avoidance	0.43 (0.28 to 0.58)	<0.0001	0.22 (0.04 to 0.40)	0.0162
Depression	Times 1 vs. 2	1.37 (-2.39 to 5.12)	0.4680	-3.13 (-6.48 to 0.22)	0.0661
	Times 1 vs. 3	3.83 (-0.83 to 8.50)	0.1051	-1.21 (-5.16 to 2.74)	0.5370
	Times 1 vs. 4	6.79 (3.04 to 10.53)	0.0007	-0.61 (-4.41 to 3.19)	0.7466
	Times 2 vs. 4	5.42 (1.07 to 9.77)	0.0158	2.52 (-1.12 to 6.16)	0.1672
	Intolerance of uncertainty	0.34 (0.27 to 0.41)	<0.0001	0.21 (0.10 to 0.33)	0.0007
	Negative problem orientation	0.75 (0.57 to 0.92)	<0.0001	0.41 (0.14 to 0.68)	0.0038
	Beliefs about usefulness of worrying	0.28 (0.15 to 0.41)	<0.0001	-0.1376 (-0.28 to 0.00)	0.0513

5.4 Secondary objective: B) To document the relationship between all these factors and the return to work

On an exploratory basis, we wanted to document the possible correlations between return to work (back at work or not) and the following factors: uncertainty, problem orientation, cognitive avoidance, beliefs about the usefulness of worrying, depression, kinesiophobia, catastrophizing, fears and avoidance, pain intensity, self-efficacy, perception of organizational practices and policies, and percentage of regular non-work activities and work activities performed. The sociodemographic data (age, sex, contestations, attempts made to return to work, time elapsed before starting their rehabilitation program, and treatment site) were controlled. Table 4 presents the odds ratios for the variables having a significance level greater than 0.1. The variables correlating significantly with a return to work at the end of the rehabilitation program involved both the environmental and individual dimensions. A stronger perception that the employer managed disability correlated with a stronger possibility of a return to work.

Regarding the dimension of disability management covered in the Organizational Practices and Policies questionnaire, on average the participants reported a higher level of agreement with the fact that their employer contacted them quickly to inquire about their condition and offered them help in managing their disability; that the establishment worked with their attending physician to develop a return-to-work plan; that there was a training period or that

work accommodations were possible. Also, a stronger perception of benefiting from ergonomic practices correlated with a stronger possibility of a return to work (i.e. tasks are planned to minimize heavy lifting and repetitive work). Regarding the individual factors, lower levels of kinesiophobia and pain catastrophizing correlated more closely with a return to work. Lastly, beliefs about the usefulness of worrying were also associated with a greater probability of a return to work.

Table D: Factors associated with a return to work

Model (independent variables)	Adjusted model estimates (95% confidence intervals)	<i>p</i>	Univariate model estimates (95% confidence intervals)	<i>p</i>
Negative problem orientation	0.95 (0.89 to 1.02)	0.14	0.97 (0.93 to 1.01)	0.1004
Beliefs about usefulness of worrying	0.99 (0.96 to 1.02)	0.37	1.03 (1.00 to 1.06)	0.0388
Fear of movement Kinesiophobia	0.84 (0.77 to 0.93)	0.0007	0.87 (0.83 to 0.92)	<0.0001
Pain catastrophizing	0.96 (0.91 to 1.00)	0.0694	0.97 (0.95 to 0.99)	0.0146
Self-efficacy	1.05 (1.02 to 1.07)	0.0001	1.01 (1.00 to 1.02)	0.1191
Work environment: ergonomics	2.74 (1.69 to 4.44)	<0.0001	2.04 (1.25 to 3.31)	0.0041
Work environment: disability management	1.66 (1.12 to 2.48)	0.0121	1.46 (1.05 to 2.03)	0.0240

6. DISCUSSION

The aim of this study was to enhance understanding of the nature of the anxiety symptoms exhibited by workers with an MSD that had resulted in a work absence of more than 12 weeks, during their participation in a work rehabilitation program. The primary objective was to document the presence, intensity, and temporal changes in GAD and its maintenance factors, according to the Dugas *et al.* model (1998). These factors are intolerance of uncertainty, worries, negative problem orientation, beliefs about the usefulness of worrying, cognitive avoidance, and depression.

In addition, this study sought, on an exploratory basis, to document the relationships between the component factors of the Dugas *et al.* GAD model (1998) and the main biopsychosocial factors associated with work disability, as well as their correlations with a return to work. The following sections present the main findings derived from the results and their links with the current literature.

6.1 Our findings about the presence, intensity, and temporal changes in the GAD model factors

Our first finding was the very high percentage of participants who met the clinical diagnostic criteria for generalized anxiety disorder. In fact, according to the results obtained on the Worry and Anxiety Questionnaire (Dugas and Freeston, 2001), 50% of the participants presented GAD symptoms as defined in the DSM-IV (American Psychiatric Association, 1994). Including the participants with subclinical symptoms, this rate increases by 14%, to 64% of the sample. The subclinical aspect refers here to symptom intensity, i.e. the participants rated items at 3 rather than 4 on the WAQ. However, despite the participants' high level of anxiety, we observed a significant reduction during the rehabilitation program, i.e. over an average duration of ten weeks, at both clinical and subclinical levels.

Comparing the GAD rates we observed to those in the literature, the data were found to differ. However, the participants in our study probably differed from those in population-based studies. For example, the study conducted by Von Korff *et al.* (2005) was part of the National Comorbidity Survey Replication, involving 9,282 respondents ages 18 years and over. The prevalence rate, at 12 months, of persons reporting chronic pain, was 19%. Of these, 6.4% met the GAD diagnostic criteria defined in the DSM-IV, assessed using the Composite International Diagnostic Interview (CIDI) of the World Health Organization. This rate is clearly lower than our results. On the other hand, their study involved primarily a population of workers. In fact, 76.5% mentioned full work-role performance, unlike our sample, which had been off work for an average of one year and was still actively involved in a rehabilitation program.

Apart from the results associated with the DSM-IV diagnostic criteria, the GAD development and maintenance factors, as defined in the Dugas *et al.* model (1998), were not found to be necessarily typical or characteristic of a population suffering from the disorder with respect to reported symptom intensity. Our participants exhibited the same beliefs about the usefulness of worrying as individuals with GAD. However, their level of intolerance of uncertainty was lower and more comparable to levels observed in a population with an anxiety disorder such as panic disorder or low-level GAD. Intolerance of uncertainty would appear to be the main factor associated with GAD (Dugas *et al.*, 1998; Dugas and Koerner, 2005). They were

also found to have a lower level of cognitive avoidance: the results were nearly half a standard deviation above the scores for a student population and were comparable to that of a population with a health problem. Problem orientation also appeared not to be problematic, as the results obtained approached those reported by a population of psychology students. That said, a student population may not be totally representative of the general population. In fact, a recent study found a difference of nearly half a standard deviation between male students and non-students with respect to intolerance of uncertainty. The deviation was, however, less pronounced for women (Carleton, Collimore and Asmundson, 2010). In summary, our results revealed participants who perceived worrying as useful and had a certain intolerance of uncertainty and some cognitive avoidance strategies.

The topics of worry documented among our study participants encompassed the themes usually reported in persons with GAD, such as family, finances, health, and work. Moreover, for some respondents, worries pertaining to disability caused by persistent pain were observed (e.g. changing jobs, having adequate work skills, medical test results, and autonomy). Even if our participants considered their worries to be excessive, which is one of the GAD criteria, this observation was most interesting because the workers may have been worrying about problems that were current or potentially possible (e.g. divorce or job loss), in relation to their pain and disability. This too is less characteristic of a GAD population.

Research done by Eccleston *et al.* (2007) would seem to explain in part why our results are less characteristic of a GAD population. First, by means of a diary, they documented the worries experienced by 34 individuals who had had pain for nearly eight months (Eccleston, Crombez, Aldrich and Stannard, 2001). Half of the participants were on work disability. They had to keep a record of their daily worries over a one-week period. A total of 473 worry episodes were analyzed, of which more than half (57.3%) were associated with pain. Pain-related worries were reported as harder to reject, causing greater stress, more intrusive, and demanding more attention than worries unrelated to pain. According to these authors, the participants probably did not have GAD, but rather excessive worries related to misdirected problem-solving (Eccleston and Crombez, 2007). Pain could therefore generate worries and hypervigilance. If pain is framed strictly as a biomedical problem, it leads to problem-solving efforts based on strategies to reduce or remove pain. Thus far, this part of the misdirected problem-solving model overlaps with the fear-avoidance model (Vlaeyen and Linton, 2000) presented in the introduction. However, the innovative feature of the misdirected problem-solving model is its tenet that the impasse, generated by the fact that the pain cannot be permanently resolved, serves to fuel worry. The only way of escaping this vicious circle would be to reframe the problem in such a way as to generate possible solutions (Eccleston and Crombez, 2007). According to these authors, the clinical implications consist of intervening with a cognitive behavioural approach, but one that focuses mainly on the factors inherent to the person.

The treatment offered to our study participants was not designed to reduce pain, but rather to reduce the work disability. While we cannot confirm a causality link, the reframing of the problem around the notion of work disability reduction and the various problem-solving strategies used by the clinicians involved may explain the significant reduction over time in the number of persons with GAD and the reduction in the intensity of GAD maintenance factors, since these coincided with work exposure. Again, the average time elapsed between the first measurement time and the initial hours of work exposure was 28 days, or approximately four weeks.

Given this significant reduction, which coincided with the time of work exposure, a complementary hypothesis could partly explain our results: the hypothesis that a workplace phobia was present. In fact, the participants seemed to have a high level of anxiety or anticipation about work, judging from the worries documented. Also, a clinically significant reduction was observed at the time of work exposure, which may correspond more to a phobic or panic component. Muschalla and Linden (2009) defined the workplace phobia problem in terms of three characteristics: (1) intense fear when approaching the workplace; (2) inability to enter the workplace due to severe anxiety symptoms; and (3) a reduction in symptoms when leaving the workplace. Since our study did not document these symptoms, it is difficult to say whether our participants had a workplace phobia as well or instead. Interestingly, Muschalla and Linden (2009) interviewed 230 patients at the rehabilitation centre of a psychosomatic medicine department, and 56.5% of the participants had an anxiety disorder diagnosis. Of this number, 19.7% had a comorbid workplace phobia. We must point out that the latter does not constitute a diagnosis recognized in the DSM-IV. The concept first surfaced in the literature in 2002 (Haines, Williams and Carson, 2002). Workplace phobia is differentiated from specific phobia by the complexity of the stimuli that can trigger and maintain it (Muschalla and Linden, 2009). Also, a specific phobia is rarely associated with reduced work performance (Greenberg *et al.*, 1999).

6.2 Our findings about the relationships between the GAD model factors and biopsychosocial factors

Another interesting finding, this time emerging from the second secondary objective, was that our results seem to support the tenet that the GAD model component factors are distinct from the psychological factors associated with work disability. A few pain-related studies have been conducted to further understanding of the so-called fundamental fears, which include anxiety sensitivity and injury/illness sensitivity (Keogh and Asmundson, 2004).

Injury/illness sensitivity refers to worries related to the fear of becoming sick or injured in the future (Taylor, 1993). Anxiety sensitivity refers to the fear of anxiety-related sensations arising from beliefs that the symptoms will have threatening somatic, psychological, or social consequences (Reiss, Peterson, Gursky and McNally, 1986). Anxiety sensitivity would seem to be a separate construct, but interconnected with intolerance of uncertainty (Carleton, Norton and Asmundson, 2007). When investigated in a student population, anxiety sensitivity appears to affect more the fear of experiencing somatic sensations and mental disability and of exhibiting observable reactions related to social anxiety. In that study, a correlation of 0.68 was found between intolerance of uncertainty and anxiety sensitivity; however, the study focused more on prospective and inhibitory anxiety (Drahovzal, Stewart and Sullivan, 2006).

With regard to persistent pain, anxiety sensitivity has been studied mainly as a predictor of fear of pain (Asmundson, Norton and Veloso, 1999; Zvolensky, Goodie, McNeil, Sperry and Sorrell, 2001). However, when the dependent variables involve factors directly related to pain (e.g. pain intensity or pain tolerance), the results show a stronger correlation between injury sensitivity, pain catastrophizing, and fear of pain (Drahovzal *et al.*, 2006). In this last study, anxiety sensitivity added no significant contribution to the pain model (Drahovzal *et al.*, 2006). These studies concern more the variables included in the fear and pain-avoidance model, which can be regarded as a model of movement-specific phobia. Again here, one might ask whether

this distinction between anxiety sensitivity, which is more associated with intolerance of uncertainty, and the factors essentially related to movement- or pain-specific phobia offers additional support for the hypothesis of a workplace phobia. At this point in time, we cannot conclude that a workplace phobia is present, but future research on this aspect is needed to gain a better understanding of the dynamics at play between a worker and his workplace during the work absence episode.

6.3 Our findings about the relationship between the return to work and both the GAD model factors and biopsychosocial factors

Lower levels of pain catastrophizing and fear of movement stood out as correlating significantly with the factors associated with a return to work. These factors are already recognized in the literature as having an impact on the return to work. Again, what emerged in our study was the correlation between the perception that worrying is useful and the greater probability of a return to work. Our results may appear to contradict the GAD model. It must be recalled that the Dugas model frames reassurance and beliefs about the usefulness of worrying as factors that maintain intolerance of uncertainty and excessive worrying (Dugas *et al.*, 1998). According to this model, beliefs about the usefulness of worrying should therefore have a negative impact on problem-solving. Another hypothesis could, however, be advanced to explain our results. During work rehabilitation, the practitioners involved take concrete measures to reduce the obstacles to the return to work. One way of identifying the obstacles is to ask workers to express their fears and worries. Thus, when workers on sick leave are worried and during this period they perceive or benefit from ergonomic measures and sound disability management practices, they may regard this as a very concrete solution to their problem, hence their beliefs about the usefulness of worrying.

This perspective would be very different from that of the psychopathological model, in which people worry and seek reassurance yet their situation remains unresolved. The results we obtained therefore support our hypothesis that our study participants fit the GAD dynamic partly but not totally. The participants appear to have experienced real and excessive worries about the return to work, and certain organizational factors contributed to reducing or not these anticipatory worries or fears. However, the questionnaire we used does not document the reality as objectified by a third party, but rather the worker's perception. In the clinical context, the practitioner involved should, therefore, also pay considerable attention to the workers' perceptions in making his clinical judgment.

6.4 Strengths and limitations of the study

This exploratory study is one of the first to document workers' GAD-type and kinesiophobia-related anxiety symptoms during a rehabilitation program. Regarding GAD factors, the comparison of our results with empirical and normative data also allowed us to interpret and better understand the difficulties experienced by workers with a work disability. The type of statistical analyses performed allowed the sample size to be maximized by using 85 observations. Despite the high number of variables analyzed, the analysis models converged, further supporting the validity of the results (Blackwell *et al.*, 2006; Gravetter and Wallnau, 2008; Maxwell and Delaney, 2004). The analyses were performed using different approaches,

and each time, the final models remained essentially the same. For example, we created a correlation matrix among the various factors to identify significant correlations and then included only the significantly correlated factors in univariate models. This matrix is included in the appendix to this report strictly for information purposes. However, we did not retain this more traditional approach because it did not take into account correlations over time, which mixed linear models do.

In addition, given the large number of independent variables, it was not possible to do analyses of the questionnaire subscales. Future studies should examine the potential contribution of these subscales with a larger number of participants, in order to obtain a more accurate understanding of the mechanisms involved. The results might show, for example, that belief in the usefulness of worrying is perceived specifically as allowing problem solving or as preventing negative emotions. A new version of the Intolerance of Uncertainty Scale is now available (Gosselin *et al.*, 2008). One of the significant features of this new version is that it documents the need for reassurance. When our study was conducted, no questionnaire documenting this aspect existed, yet it may play a key role in preventing work disability.

Regarding the generalizability of the results, it is important to state that the GAD rate documented is simply an indicator, since no questionnaire can replace a psychological or psychiatric assessment performed by a qualified practitioner. The participants were also representative of workers who were compensated for their injury and had been absent from work for an average of nearly one year. Also, patients referred to an interdisciplinary work rehabilitation program may not be representative of all individuals referred for care services in Québec. Other available services use intervention methods that do not integrate the workplace. It would be important in these cases to document the GAD maintenance factors, because without exposure to the real workplace, the anxiety component could vary in a very different way over time. Another limitation of this study is the considerable number of dropouts at the last measurement time. Statistically, it was, however, possible to include all the participants even if they did not complete the questionnaires at all the measurement times. In summary, the profile drawn up corresponds to a French-speaking population with an MSD who had been absent from work for an average of one year, still had a relationship with their employer, and were enrolled in a work rehabilitation program that included exposure to the real workplace.

6.5 Contributions of the study

The results of this study highlight the impact of personal and environmental factors, once again attesting to the importance of tackling the work disability itself and solutions for reducing it rather than focussing essentially on treating pain. The treatment of pain alone would appear to place the worker in an impasse position serving to maintain excessive worry.

Another contribution of this study is that it underscores the importance of including work in the rehabilitation process for therapeutic purposes. In fact, the results reveal a significant reduction in the level of worry and anxiety as of the second measurement time, which was initially to take place when the return to work was announced. However, due to logistical constraints, for the most part, the evaluation was carried out after a few hours of work exposure. It was therefore possible to observe the effect that even a few hours of work exposure can have on the various anxiety components. This is a considerable contribution because the reductions were found to be clinically as well as statistically significant.

Regarding indirect contributions, this study highlights the importance of a sound analysis of the problem faced by workers who are absent for disability. If judgments are made solely on basis of the results on the Worry and Anxiety Questionnaire (Dugas and Freeston, 2001), the clinical risk is that of labelling the worker, whereas a more in-depth analysis could reveal very real fears that must be tackled first. In this regard, the use of the Organizational Practices and Policies questionnaire (Truchon *et al.*, 2003) may prove to be an added value to ensure that the worker's perception is documented.

7. CONCLUSION

In conclusion, workers with an MSD that had caused a work disability averaging one year in length and who were enrolled in a work rehabilitation program were found to exhibit a high level of anxiety at the start of their program. They also considered their worries excessive. Moreover, the workers may have been worrying about problems that were current or potentially possible, in connection with their pain and disability. In addition, these workers perceived worrying as useful and presented a certain intolerance of uncertainty as well as some cognitive avoidance strategies. All the various anxiety components diminished significantly, however, during the rehabilitation program offered over an average of ten weeks. One of the main components of this rehabilitation program was both a reduction of the return-to-work obstacles and exposure to the real workplace. The fact that the reduction in anxiety symptoms coincided with the *in vivo* exposure supports the relevance and importance of this intervention strategy. Future research is definitely warranted to document the hypothesis advanced here, namely that a workplace phobia may be involved, ultimately to enhance understanding of the dynamics occurring between workers and their workplace during work absence episodes.

8. PAPERS AND ARTICLES RESULTING FROM THIS STUDY

Coutu, M.F., Durand, M.J., Marchand, A., Labrecque, M.E., Berbiche, D., (2011) *Documenting the presence of generalised anxiety disorder and its maintaining factors in patients in work rehabilitation program for persistent musculoskeletal pain* [sic]. Musculoskeletal Disorders and Chronic Pain Conference: Evidence-based approaches for clinical care, disability prevention and claims management, California.

Coutu, M.F. (Dec. 2010 and Jan. 2011) *L'intolérance à l'incertitude en réadaptation*. Noon videoconference offered as part of non-credit continuing education at the Université de Sherbrooke. Fourteen centres/clinics viewed the presentation.

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APPENDICES

Table A. 1: Correlations among secondary variables

	TAMPA	CATAST.	FABQ-A	FABQ-W	Pain	Self-Eff.	OPP 1	OPP 2	OPP 3	OPP 4	BEHAV. 1	BEHAV. 2
TAMPA	1.000	0.569**	0.566**	0.414**	0.355*	-0.521**	-0.329	-0.320	-0.159	-0.217	-0.451**	-0.128
CATAST.	0.569**	1.000	0.673**	0.386*	0.483**	-0.377*	0.027	-0.006	-0.101	0.023	-0.455**	-0.021
FABQ-A	0.566**	0.673**	1.000	0.611**	0.462**	-0.352*	-0.063	-0.160	-0.228	-0.216	-0.363*	-0.094
FABQ-W	0.414**	0.386*	0.611**	1.000	0.437**	-0.546**	-0.364*	-0.320	-0.236	-0.498**	-0.457**	-0.137
Pain	0.355*	0.483**	0.462**	0.437**	1.000	-0.479**	-0.243	-0.315	-0.486**	-0.321	-0.703**	-0.148
Self-Eff.	-0.521**	-0.377*	-0.352*	-0.546**	-0.479**	1.000	0.301	0.223	0.215	0.143	0.613**	0.150
OPP 1	-0.329	0.027	-0.063	-0.364*	-0.243	0.301	1.000	0.655**	0.383*	0.676**	0.248	-0.054
OPP 2	-0.320	-0.006	-0.160	-0.320	-0.315	0.223	0.655**	1.000	0.561**	0.741**	0.244	0.102
OPP 3	-0.159	-0.101	-0.228	-0.236	-0.486**	0.215	0.383*	0.561**	1.000	0.621**	0.295	0.110
OPP 4	-0.217	0.023	-0.216	-0.498**	-0.321	0.143	0.676**	0.741**	0.621**	1.000	0.303	0.149
BEHAV. 1	-0.451**	-0.455**	-0.363*	-0.457**	-0.703**	0.613**	0.248	0.244	0.295	0.303	1.000	0.433**
BEHAV. 2	-0.128	-0.021	-0.094	-0.137	-0.148	0.150	-0.054	0.102	0.110	0.149	0.433**	1.000

*p < 0.05 ** p < 0.001

TAMPA = kinesiophobia; CATAST. = pain catastrophizing; FABQ-A = fears and beliefs, activity subscale; FABQ-W = fears and beliefs, work subscale; Self-Eff. = self-efficacy (*Échelle de mesure du sentiment d'efficacité personnelle*); OPP 1 = organizational practices and policies, people-oriented culture subscale; OPP 2 = organizational practices and policies, safety climate subscale; OPP 3 = organizational practices and policies, disability management subscale; OPP 4 = organizational practices and policies, ergonomic practices subscale; BEHAV. = perception of competent work behaviours (1) and behaviours in regular non-work activities (2).

Table A. 2: Correlations among secondary and sociodemographic variables

	Days	Sex	Contest.	Attempted RTW
Days	1.000	-0.014	0.026	0.025
Sex	-0.014	1.000	-0.050	-0.040
Contest.	0.026	-0.050	1.000	0.408*
Attempted RTW	0.025	-0.040	0.408*	1.000
End	0.019	0.129	-0.273	0.136
TAMPA	0.021	-0.291	-0.038	0.086
CATAST.	-0.093	-0.258	-0.001	0.113
FABQ-A	0.123	-0.234	-0.040	0.093
FABQ-W	-0.111	0.181	-0.126	0.125
Pain	0.084	0.083	-0.294	-0.018
Self-Eff.	0.239	-0.117	-0.033	0.055
OPP 1	0.132	-0.260	-0.005	-0.361*
OPP 2	-0.021	-0.135	0.232	-0.267
OPP 3	-0.078	0.003	0.231	-0.092
OPP 4	-0.082	-0.209	0.223	-0.294
BEHAV. 1	0.047	-0.004	0.107	-0.017
BEHAV. 2	0.194	0.099	0.383*	0.325

* $p < 0.05$ ** $p < 0.001$

Days = average number of days off work; Contest. = contestation present; Attempted RTW= attempts made to return to work; End = work status at end of rehabilitation program; TAMPA = kinesiophobia; CATAST. = pain catastrophizing; FABQ-A = fears and beliefs, activity subscale; FABQ-W = fears and beliefs, work subscale; Self-Eff. = self-efficacy (*Échelle de mesure du sentiment d'efficacité personnelle*); OPP 1 = organizational practices and policies, people-oriented culture subscale; OPP 2 = organizational practices and policies, safety climate subscale; OPP 3 = organizational practices and policies, disability management subscale; OPP 4 = organizational practices and policies, ergonomic practices subscale; BEHAV. = perception of competent work behaviours (1) and behaviours in regular non-work activities (2).

Table A. 3: Correlations among Dugas model variables (including sociodemographic data)

	Days	Sex	Contest.	Attempted RTW	End	IUS	WAQ	NPOQ	CAQ	WW-II	BDI-II
Days	1.000	-0.014	0.026	0.025	0.019	-0.188	0.029	-0.123	-0.242	-0.038	-0.005
Sex	-0.014	1.000	-0.050	-0.040	0.129	-0.066	0.000	-0.033	0.003	-0.197	-0.035
Contest.	0.026	-0.050	1.000	0.408*	-0.273	-0.151	-0.351*	-0.145	-0.152	-0.038	-0.133
Attempted RTW	0.025	-0.040	0.408*	1.000	0.136	0.050	0.000	0.135	0.260	0.219	0.104
End	0.019	0.129	-0.273	0.136	1.000	0.360*	0.399*	0.423*	0.444**	0.362*	0.402*
IUS	-0.188	-0.066	-0.151	0.050	0.360*	1.000	0.444*	0.761**	0.526**	0.736**	0.728**
WAQ	0.029	0.000	-0.351*	0.000	0.399*	0.444**	1.000	0.443**	0.265	0.291	0.422*
NPOQ	-0.123	-0.033	-0.145	0.135	0.423*	0.761**	0.443**	1.000	0.625**	0.653**	0.782**
CAQ	-0.242	0.003	-0.152	0.260	0.444**	0.526**	0.265	0.625**	1.000	0.492**	0.593**
WW-II	-0.038	-0.197	-0.038	0.219	0.362*	0.736**	0.291	0.653**	0.492**	1.000	0.491**
BDI-II	-0.005	-0.035	-0.133	0.104	0.402*	0.728**	0.422*	0.782**	0.593**	0.491**	1.000

*p < 0.05 ** p < 0.001

Days = average number of days off work; Contest. = contestation present; Attempted RTW= attempts made to return to work; End = work status at end of rehabilitation program; IUS = Intolerance of Uncertainty Scale; WAQ = Worry and Anxiety Questionnaire; NPOQ = Negative Problem Orientation Questionnaire; CAQ = Cognitive Avoidance Questionnaire; WW-II = Why Worry II; BDI-II = Beck Depression Inventory II.

Table A. 4: Correlations among secondary variables and Dugas model variables

	IUS	WAQ	NPOQ	CAQ	WW-II	BDI-II
TAMPA	0.364*	0.378*	0.166	0.168	0.344*	0.276
CATAST.	0.572**	0.396*	0.498**	0.280	0.388*	0.531**
FABQ-A	0.428**	0.239	0.327	0.105	0.321	0.298
FABQ-W	0.312	0.283	0.411*	0.295	0.231	0.297
Pain	0.407*	0.457**	0.441**	0.171	0.375*	0.387*
Self-Eff.	-0.131	-0.248	-0.081	-0.111	-0.079	-0.133
OPP 1	0.029	-0.025	0.052	-0.219	0.074	-0.026
OPP 2	0.003	-0.375*	-0.033	-0.122	0.035	-0.115
OPP 3	-0.215	-0.139	-0.306	-0.185	-0.058	-0.292
OPP 4	-0.128	-0.192	-0.248	-0.352*	-0.166	-0.216
BEHAV. 1	-0.248	-0.318	-0.406*	-0.320	-0.313	-0.330*
BEHAV. 2	0.021	-0.140	-0.030	-0.160	0.151	0.045

*p < 0.05 ** p < 0.001

TAMPA = kinesiophobia; CATAST. = pain catastrophizing; FABQ-A = fears and beliefs, activity subscale; FABQ-W = fears and beliefs, work subscale; Self-Eff. = self-efficacy (*Échelle de mesure du sentiment d'efficacité personnelle*); OPP 1 = organizational practices and policies, people-oriented culture subscale; OPP 2 = organizational practices and policies, safety climate subscale; OPP 3 = organizational practices and policies, disability management subscale; OPP 4 = organizational practices and policies, ergonomic practices subscale; BEHAV. = perception of competent work behaviours (1) and behaviours in regular non-work activities (2); IUS = Intolerance of Uncertainty Scale; WAQ = Worry and Anxiety Questionnaire; NPOQ = Negative Problem Orientation Questionnaire; CAQ = Cognitive Avoidance Questionnaire; WW-II = Why Worry-II; BDI-II = Beck Depression Inventory II.