Occupational Rehabilitation

Studies and Research Projects

REPORT **R-759**

A Systematic Approach for Identifying the Psychological Health and Work-Related Determinants of Occupational Disability in a Target Sector

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Lastly, our thanks go to the IRSST for its financial support. We especially appreciate their openness to and support of our multidisciplinary approach, which aimed to develop a method that will provide a better understanding of the determinants of the inability of workers with psychological problems to maintain a healthy and active working life.

ABSTRACT

Occupational health and safety issues and objectives: The inability of workers with psychological health problems to remain at work is a matter of growing social concern. It is therefore important to develop a systematic approach for identifying the determinants of occupational disability in order to target valid instruments in wide use and thereby allow them to be compared in different contexts.

The general objective of this project was to develop a systematic approach for identifying the determinants of the inability of workers with psychological problems to maintain an active working life. To accomplish this, the following specific objectives were necessary: (1) to develop and perform an initial validation of a survey mechanism designed to identify the determinants, prevalence, and distribution of psychological distress and presenteeism; and (2) to develop and perform an initial validation of an ergonomic instrument (diary) for describing and assessing the workload and its determinants in the work activity.

Method: This was a developmental research project that used a descriptive design. The survey and diary were developed according to the guidelines devised by Dillman et al. (2003), specifically: (1) develop the battery of questionnaires, (2) implement it, and (3) reduce the sampling error. A mixed methodology with a qualitative component and a quantitative component, as defined by Dillman et al. (2003), was used to perform these steps. Several data sources were consulted, including a review of the scientific and grey literature, consultation of documents from agency officials, and interviews ofkey informants. For validation purposes, an initial pre-test was carried out in order to document the instruments'relevance and implementation. The internal validity of both instruments was documented using factor analyses and by calculating internal factor consistency.

Results: For Objective 1, a battery of validated French-language questionnaires was assembled. A total of 2,368 participants completed the survey, which corresponds to a 48% participation rate. The respondents were representative from a gender, age, seniority, job category, and geographical distribution standpoint. Analyses of the battery of questionnaires revealed a six-factor structure that accounted for 54% of the total variance. The factors were: relationship with the supervisor; motivation at work; stress related to external demands; the efforts to be made at work; emotional labour; and self-esteem as a worker. For Objective 2, the workload assessment was based on five concepts, including prescribed and actual work, perceived workload, fatigue, and work-related difficultand satisfying aspects. Within this framework, a diary was developed and pre-tested in a centre. The final version was validated with 193 participants. The analyses revealed a four-factor structure that accounted for 50.88% of the total variance. These factors were the impact of the work activity demands pertaining to performance; the impact of the work activity demands pertaining to service (customer management); the perceived workload; and the impact of the work activity demands pertaining to unforeseen events and interruptions.

Benefits: The proposed instruments are applicable to several job categories and are designed to be useable in other work contexts where the issue of occupational disability is present. The added value of this study is that it documents the factors related to the work environment as well as those related to the individual's environment. The study innovated by proposing a pre-tested instrument that both focuses on employees' actual and prescribed work in terms of the perceived difficulties and takes into account the workload perceived by the employees.

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1. SUMMARY OF THE ISSUE AND CURRENT KNOWLEDGE

Work constitutes the main activity of more than two-thirds of Canada's population. It is also an activity that is beneficial to psychological health and physical well-being (Waddell & Burton, 2005). The worker role confers financial independence, social status, and a certain quality of life (Limoges, 1987). However, every year a large number of workers find it difficult to maintain an active working life or to return to work due to a psychological health problem, thereby creating an occupational disability. Psychological health problems and musculoskeletal disorders are among the two main causes of short- and long-term occupational disability and they generate significant social and economic costs (Watson Wyatt, 2005). In 1998, as part of a study on the burden of psychological health problems, 677,000 Canadians were diagnosed as having had a depressive episode, generating $451 million in costs (Health Canada, 1998). In the United States, the International Labour Organization estimated the cost of absenteeism related to a mental disorder at $200 billion a year (International Labour Organization, 1993). As its definition suggests, presenteeism is one of the problems associated with maintaining an active working life. However, there is no consensus regarding its definition. It may be defined by the fact that a person is physically present at work without being mentally present or ready to take on work-related tasks (Normandeau, 2006). Presenteeism can lead to a decline in work productivity (Normandeau, 2006). The costs of presenteeism, including decreased work productivity, appear to be higher than those associated with absenteeism (Francoeur, 2004). In the United States, the costs associated with presenteeism among workers experiencing major depression, for example, increased 23% between 1990 and 2000, going from $12.4 to $15.3 million (Greenberg et al., 2003). The difficulty of staying at or returning to work caused by a worker's disability is thus a significant issue not only for the worker and those in his* circle but also for employers, insurers, and health care professionals seeking to improve workers' quality of life. For these groups, it is also important to reduce the duration and costs associated with presenteeism and absenteeism. This is all the more important in view of the anticipated phenomenon of labour shortage and the aging of the labour force.

Overall, according to Health Canada, one worker in five —or nearly six million Canadians— is likely to experience a psychological health problem during his career. More specifically, the lifetime prevalence of major depression in the general public varies between 15% and 20% (Blazer, Kessler, McGonagle, et al., 1994; Liu & Van Liew, 2003; Marcotte, Wilcox-Gök, & Redmon, 1999). In Canada, in 1998, nearly 678,000 Canadians in the labour market amassed the equivalent of 39,000 person-years of short-term absence from work due to a depressive episode (Stephens & Joubert, 2001). The prevalence of anxiety disorders of all types ranges from 10% to 25% (Kessler, McGonagle, Zhao, et al., 1994; Somers, Goldner, Waraich, & Hsu, 2006), whilethat of adjustment disorders ranges from 5% to 20% in the general public (American Psychiatric Association, 1998). The term "mental disorder" refers simply to a diagnosis recognized in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association, 2000). The common mental disorders related to work are mainly major depression, generalized anxiety disorder, panic disorder with agoraphobia, and adjustment disorder (Shiels, Gabbay, & Ford, 2004; van der Klink & van Dijk, 2003). The last is

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

also widely referred to as "burnout." While some authors distinguish between burnout and adjustment disorder, burnout is not a diagnosis recognized in the DSM-IV (American Psychiatric Association, 2000). Although the prevalence of these mental disorders in a working population remains significant, it is difficult to establish with precision. The results obtained indifferent studies should be interpreted and compared with caution due to the variability of the methodology used to obtain the prevalence rates (Antony & Swinson, 1996; Blazer et al., 1994; Lépine, 2002). Some claim that more than 50% of persons who are off work due to a mental disorder can be diagnosed as having an adjustment disorder (Nieuwenhuijsen, Verbeek, Siemerink, & Tummers-Nijsen, 2003; van der Klink & van Dijk, 2003). Lastly, between 20% and 100% of these individuals will remain off work for more than one year (Nieuwenhuijsen et al., 2003; van der Klink & van Dijk, 2003).

The various studies published to date have adopted a diagnostic approach to mental disorders. Thus, when prevalence is being determined, the individuals must meet a number of criteria defined by the DSM-IV (American Psychiatric Association, 1998), in order to be diagnosed with a specific disorder. However, a percentage of the individuals will not meet all the criteria. They will have a so-called "subclinical" symptomatology profile. Prevalence is rarely documented at this level. Yet, as the intensity of pathological symptoms is distributed across a continuum, an individual may not meet all the diagnostic criteria but may exhibit significant distress related to his subclinical symptomatology. Distress is defined as a negative reaction to a stressor,i.e. a demand for adaptation that taxes and exceeds a person's resources (Lazarus & Folkman, 1984). Negative reactions include anxious, depressive, or irritable moods. Also, a distressed individual may have more trouble concentrating or remembering things (Preville, Potvin, Boyer, & Boulerice, 2000). Distress is thus part of psychological health problems and can be positioned on a continuum upstream from mental disorders. Based on 1998 Canadian census data, distress was found to cause more than 115,000 person-years of work absencesin two million workers (Stephens & Joubert, 2001). The Canadian study examining the burden of psychological health problems estimates distress-related costs at $1.7 billion, practically four times higher than the costs generated by depressive episodes (Health Canada, 1998).

Consequently, distress in working employees, who may exhibit presenteeism, could be placed on a continuum where aggravation could lead to a mental disorder and an episode of absenteeism from work. It would then be important to identify the determinants of occupational disability across the entire psychological-symptom severity continuum. Once the determinants are identified, it would be feasible to determine the possible solutions to implement in order to reduce the occupational disability and, as a result, act on workers' psychological health. In view of the scale of this process, this research design aims first to establish a rigorous methodology based not only on the investigators' interdisciplinary networking but also on several sources of information. This type of methodology could be adopted in various organizations in order to identify all the factors involved inoccupational disability.

1.1 Origin of the activity

1.1.1 Need for a better understanding of occupational disability in a Québec government agency

Our partner in this project was one of the largest agencies of the Québec government. For several years, the agency had experienced a high rate of absenteeism. More than half the absences from work were related to a psychological health problem, as is the case in several government organizations (APSAM, 2005; Brun, Biron, Martel, & Ivers, 2003). The costs of absenteeism have significantly increased in recent years to reach slightly more than $12 million in fiscal 2005–2006, which corresponds to approximately 5% of the agency's payroll. Short-term absences generate eight times more costs than do long-term absences. In addition, this agency has seen a significant decrease in the size of its workforce in recent years, even as it grew 2% in the overall public service. However, the reduction in the size of agency's workforce was not accompanied by a reduction in the workload for the remaining employees, which has resulted in a high rate of short-term absenteeism. These data led us to think that the employees who remained at work might exhibit distress and presenteeism. Moreover, the determinants of this disability are not well known.

The significant absenteeism rate and the labour shortage worried the agency officials. The situation at the time required an in-depth assessment of the determinants of occupational disability based on the psychological-symptom severity continuum. The agency's desire was to prioritize its employees' health. To this end, the officials were looking to implement a rigorous and independent process to determine the determinants of occupational disability specific to the public service. This assessment will make it possible to identify the determinants in order to prevent distress and presenteeism, which, in turn, will offer the possibility of implementing the best practices for preventing occupational disability that are appropriate to their context.

With this in mind, we felt it best to adopt a systematic approach. This would make it easier to compare Québec employers on the basis of various indicators and to identify the most important factors on which to take action. Accordingly, the scientific literature was consulted in order to draw a portrait of the known data but also,using data that had yet to be documented, to better understand the overall picture of disability in the more specific context of the public service.

1.2 Current scientific knowledge

Presenteeism and, more obviously, absenteeism are manifestations of a problem with staying at or returning to work that gives rise to a disability in a worker. To obtain a portrait that accurately reflects the complexity of occupational disability, a perspective different from the traditional biomedical model must be adopted. For this purpose, the biopsychosocial perspective makes it possible to understand the individual based on his interactions with his environment (Caruso & Myette, 2008; Loisel et al., 2001). In this way, several determining factors that contribute to the development and persistence of an inability to maintain a healthy and active working life can be understood. These include factors related to the person, the work

environment, compensation policies, the health care system, and insurance (Briand, Durand, St-Arnaud, & Corbière, 2007; Frank et al., 1998; Krause, Frank, Dasinger, Sullivan, & Sinclair, 2001; Loisel et al., 2005; Loisel et al., 2001). In this research project, which concerns working employees in particular, the factors related to work and to the individual were specifically documented.

1.2.1 Work-related determinants

With regard to work-related determinants, role ambiguity and conflict are associated with workers' psychological distress. More specifically, a role is defined as a set of expectations and behaviours for a specific position in an organization. It is thus a broader concept than job, which basically consists of a description of tasks (Katz & Kahn, 1966). When roles are clear, they help guide the person's daily behaviours and enable him to know whether his behaviours are appropriate. Role ambiguity exists when there is no clear agreement between the employer and the worker regarding the expectations around work (Katz & Kahn, 1966). Thus, role ambiguity occurs when the expected behaviours are not clearly defined (Katz & Kahn, 1966). For example, the worker may lack information that would enable him to adequately perform his tasks. He may also have vague objectives, or deadlines of which he is unaware. For its part, role conflict occurs when there is a discrepancy or incompatibility among the various expectations conveyed to a person (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). For example, role conflict occurs when the worker is required to engage in behaviours that are contrary to his values or quality standards and/or when he lacks the time or resources to meet all expectations. Role ambiguity and conflict increase the perception of work overload and psychological distress and, at the same time, affect presenteeism and the rate of absenteeism at work (Cascio, 1991; Greenhaus & Beutell, 1985).

Beyond these two role-related factors, there also exist theoretical models that focus specifically on the interaction between the individual and his work environment as well as its direct and indirect effects on physical and mental health at work. Among these are the demand-control model (Karasek, 1979) and the effort-reward imbalance model (Siegrist et al., 2004).

1.2.2 Factors related to the interaction between the individual and his environment

- **Demand-control model**

The demand-control model (Karasek, 1979) has greatly influenced research work concerning the influence of psychosocial factors on workers' health. The model makes it possible to observe the impact on workers' health of the interaction between the perceived job demands and the control held. The perception of demands includes physical and psychological demands arising from work, such as the quantitative and qualitative workload. As for control, it is comprised of the autonomy that the person has regarding the use of his knowledge and skills, his decision latitude, and his authority. Thus, a heavy workload in combination with a fast pace of work and limited control over demands represents a risk for the worker of developing a physical or psychological health problem. Johnson and Hall (1988) suggested adding social support at work as a health-protecting factor. More recently, the social support provided by supervisors has also been studied. Communication, empathy, and flexibility from the supervisor

are factors that facilitate returning to work (Shaw, Robertson, Pransky, & McLellan, 2003). In that respect, the supervisor is often on the front line during the accommodation or return-to-work step. It is therefore not surprising to note in the literature that lack of support from and/or lack of flexibility on the part of the supervisor are risk factors for occupational disability (Akabus & Gates, 1991; Elfering, Semmer, Schade, Grund, & Boos, 2002; Marhold, Linton, & Melin, 2002). The supervisor's support is also thought to have a mediating effect on work stress and to improve employee productivity (El-Bassel, 1999; House, 1981; Packard, 1989).

- **Effort-reward imbalance model**

The effort-reward imbalance model (Siegrist, 1996) is complementary to the demand-control model. It is based on medical sociology and views work as crucial for adults, since work allows individuals to achieve their goals. The general principle is that of a cost/benefit ratio. The model makes it possible to identify the pathological conditions associated with work, i.e. when the worker's efforts are greater than the rewards received. There are two sources of effort: intrinsic and extrinsic. In the model, extrinsic efforts are identified as job strainsrelated to time, interruptions, responsibilities, physical workload, and increasing work requirements. Intrinsic efforts are defined by factors inherent in the worker, reflecting his attitudes and his motivations associated with an over commitment to work. The proposed rewards in the Siegrist (1996) model include compensation, self-esteem, and control over one's occupational status from a promotion and job security standpoint.

- **The concept of workload and the contribution of ergonomics**

In ergonomics, the notion of effort as described in the effort-reward imbalance model is comprised in the notion of resource. This latter notion is central to assessment of the workload concept. There are two types of workload: physical and mental. Physical workload is usually associated with activities such as handling or carrying loads, postures, and work schedules (Bernaards, Ariëns, & Hildebrandt, 2006; Bernaards, Ariëns, Knol, & Hildebrandt, 2007; Chung & Wang, 2001; Feng, Chen, & Mao, 2007; Hamon-Cholet & Rougerie, 2000; Johnston, Landsittel, Nelson, Gardner, & Wassell, 2003; Leijon, Wiktorin, Härenstam, & Karlqvist, 2002; Wiktorin, Hjelm, Winkel, & Koster, 1996), while mental workload refers to a hypothetical quantity of mental resources that the worker must use when performing a task (Kramer, 1991; Tsang, 2006; Wilson, 2002). Mental workload comprises two dimensions: cognitive workload and psychological workload. The former relates to processing information and the latter to the notion of psychological distress (Montmollin, 1995).

For several years now, the ergonomics field has been looking into methods for assessing mental workload in order to establish levels beyond which the workload would beconsidered excessive and thus capable of reducing work performance and efficiency (Kramer, 1991; Montmollin, 1995; Tsang, 2006; Wilson, 2002), but these measurements have not proved to be very reliable or specific. Among the assessment methods are the physiological activation indices. These include heart rate, pupil diameter, catecholamine rate, and electrodermic reactions, and are associated withstress response, among other things, yet none of the activation indices is currently recognized as a valid or reliable measure of mental workload. The same is true for the dual task technique (Montmollin, 1995): studies published in this field almost always start from the

hypothesis that it is possible to speak of a mental workload, with reference to resources, whose nature does not vary as a function of the tasks (DiDomenico & Nussbaum, 2008 ; Mazet & Guillermain, 1997; Wilson, 2002). Tasks that are performed in a laboratory using arithmetic calculation tasks or repetitive attention tests cannot, however, be generalized to work actually performed. An additive conception of mental workload implies that risk is associated mainly with fatigue. Yet it is more desirable to perform a tiring but interesting and stimulating job than a less tiring but uninteresting job (Montmollin, 1995). Given the current limits of the psychological indicators and laboratory-based task simulations, it is recommended to use subjective assessments (Montmollin, 1995).

Along these lines, several subjective methods for assessing mental workload can be found in the literature, such as the Cooper-Harper Scale (Eggemeier & Wilson, 1991), the Bedford Scale (Eggemeier & Wilson, 1991), the Subjective Workload Assessment Technique (SWAT); (Eggemeier & Wilson, 1991; Rubio, Diaz, Martin, & Puente, 2004), and the NASA-Task Load Index (NASA-TLX) (Byers, Bittner, & Hill, 1989; Hart & Staveland, 1988; Rubio et al., 2004). These methods involve assessing the perceived workload by asking the worker himself to assess his mental workload at the moment he is performing a task or a specific activity or immediately after completing it. The worker may assess the perceived mental workload directly or by comparing it with a reference task. These methods are based on the principle that the worker is the person best positioned to assess his own workload when carrying out an activity or after completing it. The basic premise is the worker's good faith. However, it should be noted that these methods taken alone are incomplete and do not consider all the factors determining mental workload. Among other things, they do not allow a connection to be drawn with what is objectively at the source of the mental workload or what is felt by employees with respect to the context in which they carry out their work activities. Another important aspect that can be assessedusing subjective methods is fatigue. As was noted earlier, although a job can be both interesting and tiring, it should also be borne in mind that cumulative and persistent fatigue can have an impact on the perceived workload.

In addition to the mental workload perceived by the worker, it is also important to document the prescribed work and actual work that are at its source (Brun, 2008). Prescribed work is what is required of the worker; it corresponds to the production requirements, including the performance objectives, both those called quantitative (number, duration) and those called qualitative (satisfaction, confidence, reputation) (Brun, 2008). Prescribed work can be documented based on task descriptions and performance objectives. It determines the work to be done and is an essential framework for workers to be able to work. Actual work corresponds to what is in fact done. It is the performance of the task, as determined by the worker's abilities, under real-life conditions and with effective results (Guérin, Laville, Daniellou, Duraffourg, & Kerguelen, 2007). It is influenced both by the prescribed work and by what the worker perceives (Brun, 2008). Studies by ANACT, the French National Agency for the Improvement of Working Conditions, regarding the measurement of mental workload (Association Nationale pour l'Amélioration des Conditions de Travail, 2004) stress the need to take into consideration the prescribed and actual work as well as the work perceived by the worker. However, to our knowledge, there is no publication that deals with the development or validation of such tools.

Ergonomics studies have highlighted the limits of physiological indicators and laboratory-based task simulations for measuring workload. By documenting the perceived workload, subjective measurements would be an interesting alternative. In addition, it would appear important to triangulate the perceived workload with the prescribed work and actual work. Indeed, an underlying premise of our work is that assessing workload is of no use in the field if it does not take into account both what is required of workers in terms of prescribed work and what workers experience when performing their work. Thus, in the context of our study, the hypothesis underlying the development of an instrument is that workers' perceptions are the best path for documenting their workload. As for the determinants of the workload so assessed, the difficulties and problem situations experienced by the workers in performing their daily work activities are essential elements to take into account when exploring ways of improving work.

1.2.3 Personal determinants and interaction with work

Work and family are two important spheres of adult life (Netemeyer, McMurrian, & Boles, 1996). Various common sayings fuel the dualistic perception of work and personal life; for example, "you should leave your personal problems at home when you go to work" and vice versa. Yet an individual's personal preoccupations and work-related preoccupations always accompany him because they are all part of his make-up. Work and family responsibilities may entail certain incompatibilities (Greenhaus & Beutell, 1985; Kahn, 1981; Kahn et al., 1964; Pleck, Staines, & Lang, 1980). The conflict stems from the pressure associated with the responsibilities related to the fact of being a member of various social organizations, including work and the family (R.L. Kahn et al., 1964). The performance that an individual is required to maintain in one organization may make it difficult to maintain his performance in another organization (Katz & Kahn, 1978). The conflicts that arise between work and family are based on three factors: the overall demand associated with the role; the time required to perform the role; and the stress related to the role (Bachrach, Bamberger, & Conley, 1991; Cooke & Rousseau, 1984; Greenhaus, 1988; Greenhaus & Beutell, 1985; Gutek, Searle, & Klepa, 1991; Kahn & Byosiere, 1992; Kahn et al., 1964; Pleck et al., 1980; Voydanoff, 1988). For example, having the role of parent of a child with learning or developmental disorders may require a greater investment of time, reducing the person's availability at work. Stress events, such as the death of a loved one or legal or financial problems, may also contribute to the conflict.

Work-family and family-work conflicts have been associated with job dissatisfaction, change of job, psychological distress, and marital discord (Burke, 1988; Frone, Russell, & Cooper, 1992; Greenhaus, 1988; Greenhaus & Beutell, 1985; Gutek et al., 1991; Pleck et al., 1980; Voydanoff, 1988). Conflicts are also associated with presenteeism (Cascio, 1991). In view of these aspects, understanding an occupational disability must necessarily take into consideration such non-work-related stress factors in order to better grasp the work-family and family-work conflicts and their impact on the occupational disability.

Based on our review of the literature on the state of knowledge, we developed a conceptual framework, which is diagrammed in Figure 1. The innovative aspect of this framework is that, among other things, it encompasses the entire continuum of psychological-symptom severity leading to an occupational disability (from presenteeism to absenteeism). The added value is that it documents the factors related to the work environment as well as those

related to the individual's environment, which will, among other things, improve understanding of work-family balance. This conceptual framework will therefore lead to a more accurate and precise understanding of all the factors related to occupational disability. To our knowledge, this has never before been done.

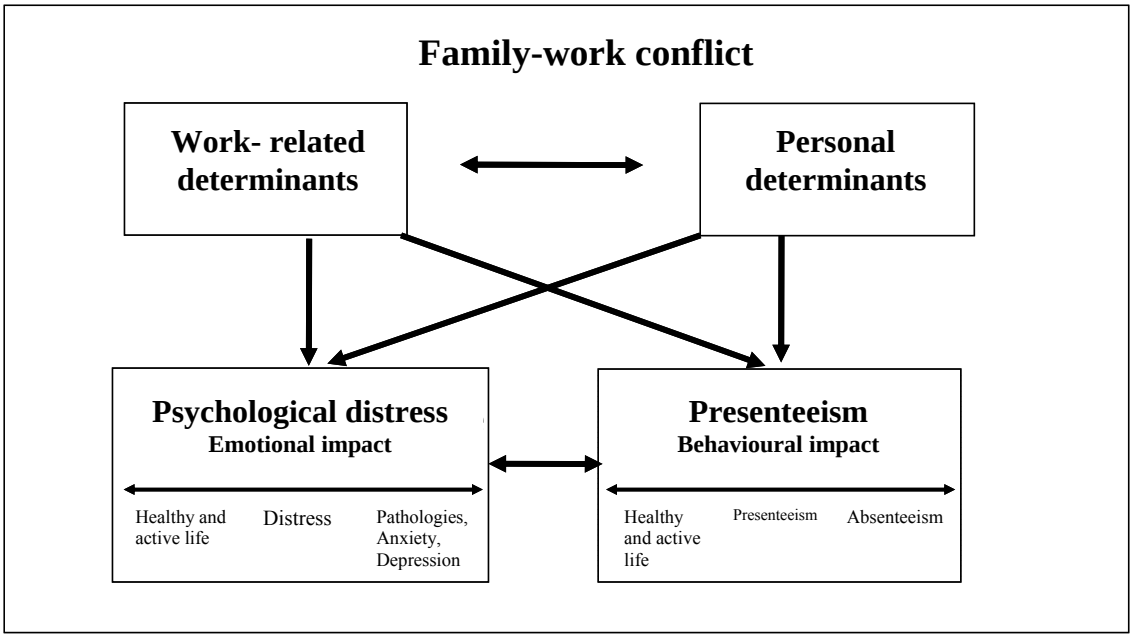

Figure 1: Conceptual framework

The rate of absenteeism within the agency has been well documented. However, the scale of distress and presenteeism among working staff members has yet to be documented. Also, for employees in a presenteeism situation as well as those absent from work, the determinants of their occupational disability are not well known. As mentioned earlier, the results of different studies are difficult to compare due to the different measures they use. It is therefore important to focus on valid and widely used tools in order to provide a comparison with other contexts. Various factors contributing to disability have been identified and theoretical models have been developed for the process. Among these factors, the notion of workload appears repeatedly and at various levels. Our survey highlighted the difficulties involved in measuring mental workload. There does not appear to be a comprehensive assessment instrument that takes into account the complexity surrounding the notion of workload. Also, to address the agency's concerns about documenting the workload and to increase knowledge of the determinants of occupational disability, we planned to develop an instrument for assessing the workload, an instrument we called the diary.

2. RESEARCH OBJECTIVES

The general objective of this research design was to develop a systematic approach for identifying the determinants of the inability to maintain an active working life in workers with psychological problems. Only the public sector was considered in this project. Although the agency, as our partner, was specifically targeted, the method and measurement tools for identifying all the factors related to occupational disability that were developed as part of this projectare applicable or adaptable to other organizations. Thus, this approach can be applied to all service sector employees, other agencies,and government departments, and so on.

The general objective posed a number of methodological challenges that it was possible to address respectively by this research design through the following specific objectives:

1. To develop and perform an initial validation of a survey mechanism designed to identify the determinants, prevalence, and distribution of psychological distress and presenteeism.
2. To develop and perform an initial validation of an ergonomic instrument (diary) for describing and assessing the workload and its determinants in the work activity within the agency context.

This activity is part of a larger study aimed at identifying the determinants of occupational disability across the entire psychological-symptom severity continuum. The ultimate goal is to discover possible solutions in order to reduce the modifiable factors generating occupational disability and, consequently, to take action on employees' mental health.

3. METHODOLOGY AND RESULTS

The specific objectives proposed in this project are congruent with a developmental research approach and use a descriptive design. For clarity's sake, the methodology and the results for the two objectives are discussed separately.

The entire proposed study was submitted beforehand to the Research Ethics Committee at Hôpital Charles LeMoyne, which approved it. To ensure that participants' privacy was maintained, the collected data were thoroughly anonymized and accessible only to the members of the research team. To obtain the participants' informed consent, the goal of the study, reason for their participation, risks and drawbacks, confidentiality mechanisms, and the right to withdraw without prejudice at any time were clearly explained on the consent form. Written consent was required only for the diary. As the survey was anonymous, written consent was not required according to the Ethics Committee.

3.1 Methodology for Objective 1: develop and perform an initial validation of a survey mechanism

To develop the survey mechanism, the guidelines developed by Dillmanet al. (2000; 2003) were followed. These recommend three main steps: (1) develop the questionnaire (drafting items and constructing the questionnaire); (2) conduct the survey; and (3) reduce the sampling error. To perform these steps, a qualitative methodology involving several data sources was followed. First, a review of the scientific literature was conducted, including the models and the studies carried out in the occupational disability field and relating to psychological health. Also, a review of the scientific and grey literature regarding the technological platforms available for conducting such a survey was performed. In addition, various documents from agency officials as well as interviews of key informants were examined to obtain a detailed picture of this organization. The literature review and document analysis were then subjected to a simple content analysis. Following these analyses, an initial consensus process between two research assistants and the main investigator was carried out. The results of this consensus were submitted to all the investigators on the team in order to obtain agreement on the measures and variables to be included in the survey, the employee selection criteria, and the data collection criteria for the survey.

The survey mechanism was validated at various levels using a mixed methodology that combined a qualitative component and a quantitative component, as defined by Dillman et al. (2000; 2003). An initial qualitative pre-test was carried out by submitting the battery of questionnaires to members of senior management and union representatives in order to obtain their comments on the questionnaires' relevance to the agency's problems. Subsequently, a limited number of participants answered the battery of questionnaires online. In addition to inquiring about relevance, we sought to document the completion time and any logistical problems in order to check that the questionnaires were indeed implementable. Lastly, a validation using quantitative methods was performed. First, to document the internal validity of the battery of questionnaires, factor analyses were performed and the internal consistency was documented. To document the possible sampling error, the response rate was then calculated and the participants' representativeness verified.

3.1.1 Review of the scientific and grey literature

In preparation for developing the questionnaire, a review of the scientific literature was carried out in the following bibliographical databases: PsychINFO, MedLINE, PubMed, and CINAHL, from the 1970s to the present. The start date corresponded to the inauguration of the National Institute for Occupational Safety Health (NIOSH). This organization is one of the pioneers in studying the impact of work stress on workers' health. Working from the theoretical framework that we had selected (see Figure 1), two groups of keywords were used to select the articles: (1) keywords relating to the concepts identified in our theoretical framework; and (2) keywords relating to the nature or type of assessment. The first group included the following keywords: *stress*; *distress*; *presenteeism*; *mental health*; *effort-reward*; *support*; *workload*; *work demand*; *work family conflict*; and *motivation*. They were then cross-tabulated with the second group of terms, namely: *questionnaire*; *self-report measure*; *measurement*; *scale*; and *assessment*. The studies concerning the validation of measurement tools related to the variables identified in our conceptual model were analyzed to identify instruments that exhibited satisfactory psychometric properties and had been validated in French. When comparable psychometric properties were noted, the questionnaires most frequently used in the literature were retained.

To document the various online tools available and also to check whether a survey of these types of instrument had been made, we searched the following databases: PsychINFO, Web of Science, and Social SciSearch with a start date of 1996, when the first studies using this method appeared. The following keywords were identified: *computer software*; *Web-based research*; *Web-based survey*; *online research*; and *data collection*. They were paired with the following terms: *evaluation* and *review*. The search was limited to terms included in article titles. The same search was then performed using the Google search engine.

3.1.2 Interviews of key informants and examined documentation

Key informants were interviewed in order to triangulate part of the results obtained from the literature and the consensus among the investigators regarding the relevance of the tools selected in connection with the agency's set of problems. The interviews allowed more information to be obtained about the organizational context with an eye to facilitating the implementation, thereby reducing sampling errors. The key informants were required to meet the following criteria: (1) have extensive knowledge of human resources, specifically the employee categories, job titles, and job descriptions; (2) know how the organization's various levels (management, operations) worked; and (3) have been employed by the agency for more than ten years in order to ensure they understood the changes that the organization had gone through and were familiar with the earlier efforts made to better understand and take action on employee health.

Documents provided by the officials and by the agency's Human Resources Department were also consulted to obtain another source of information for each of the three steps recommended by Dillmanet al. (2000; 2003). These documents made it possible to, among other things, better understand the organization structure and the issue of psychological health in the agency. The documents included the strategic action plan, which set out the agency's mission,

context, and issues. In addition, a detailed organization chart of the agency, which diagrammed the overall structure and the various levels, was consulted. Lastly, a document in the form of a diagram that summarized the objectives and the means to be implemented for better understanding the deterioration in health and the increase in absenteeism was consulted.

3.1.3 Results –Objective 1

- **Step 1: Developing the battery of questionnaires**

Variables and measurements used for the survey

The review of the literature based on our conceptual framework, the interviews of the agency's key informants, and the examination of the agency documents made available to us allowed us to identify the variables to be documented in the survey. According to Dillmanet al. (2000; 2003), the first step consists of drafting the items in the questionnaire. As the literature review enabled us to identify validated questionnaires in French, we decided to develop a battery of questionnaires. This would allow for comparison with other studies and, if appropriate, population standards.

Dependent variables

Psychological distress

The Psychological Distress Inventory (PDI) is a self-administered questionnaire comprising 14 items adapted from the Psychiatric Symptom Index (Illfeld, 1976). It measures psychological distress, that is, negative reactions to stress, such as depressive or anxiety symptoms, anger, and attention and concentration difficulties. For each question, the respondent replies using a four-point frequency scale (never = 1 to very often = 4). The PDI has excellent internal consistency (Cronbach's alpha = 0.89) (Préville, Boyer, & Potvin, 1992). The DPI has a good construct validity for affective and cognitive symptoms (Preville et al., 2000). The questionnaire's factorstructure supports the hypothesis that distress measures a mixed symptomatology, which could reflect adjustment problems combined with a mixed anxious and depressive mood (Preville, Potvin, & Boyer, 1995). The total score ranges from 0 to 100, with a high score indicating a high level of distress. The questionnaire is used as part of the Enquête Santé Québec, which made it possible to provide population standards. The average psychological distress score for the Québec population is 16.23 (Institut de la statistique du Québec, 2001, Boyer, 1993). This threshold corresponds to a common emotional condition associated with life stress and everyday ups and downs. A score higher than 26.19 corresponds to a psychological stress level higher than the 80th percentile of the Québec population. Lastly, a score above 30.95 is an indicator of a very high stress level (Boyer, Préville, Légaré, & Valois, 1993). All the items in the questionnaire can be found in the Préville et al. (1992) document.

Presenteeism

The French-language version (Durand et al., 2004) of the Work Role Limitations Questionnaire (Amick, Lerner, Rogers, Rooney, & Katz, 2000) assesses the impact of a health

problem on work performance. The questionnaire has 27 items graded on a five-point Likert scale (never difficult = 0 to always difficult = 4) corresponding to the percentage of time, during the preceding four weeks, that the employee had difficulty in fulfilling his work requirements. Respondents can also indicate that an item does not apply to their work. Five dimensions correspond to the following categories of work demands: work scheduling demands, output demands, and physical, mental, and social demands. The score on each of the subscales and the total score range from 0 to 100%. A high score means few functional limitations on performing the work (Durand et al., 2004). When more than 20% of the items are ticked as not applying to work, the questionnaire or the subscale concerned cannot be interpreted. The instrument's internal consistency is satisfactory (α = 0.66 to 0.92). The social demands subscale, which consists of only three items, has the weakest internal consistency (α = 0.66) (Durand et al., 2004). The results show that the instrument has a satisfactory construct validity (Durand et al., 2004). By way of information, the validation study of the French-language version, which was conducted using a population receiving rehabilitation services for a musculoskeletal disorder, had average subscale scores that ranged from 56% to 87% and an average total score of 69.8% (Durand et al., 2004). A copy of the questionnaire is included in Appendix 1 of the report.

Independent work-related variables

Efforts and rewards

The French-language version of the Effort-Reward Imbalance Scale (ERI-Q) (Niedhammer, Siegrist, Landre, Goldberg, & Leclerc, 2000; Siegrist et al., 2004) is based on the model of the same name. The scale has 46 items, which are divided into three scales. The extrinsic efforts include the job strains related to workload (quantitative and qualitative), workload over time, and physical workload. The intrinsic efforts include the attitudes and motivations associated with an over commitment to work. The Intrinsic Effort Scale comprises four subscales: need for approval; competitiveness; disproportionate irritability; and inability to withdraw from work. The rewards include financial reward (that is, salary), esteem reward, and reward related to promotion prospects (career) and job security (Niedhammer et al., 2000, Siegrist et al., 2004). For the Extrinsic Effort and Reward scales, the participant first indicates whether he agrees with the statement. If he agrees, he continues by indicating the extent to which he is distressed by the situation, using a four-point Likert-type scale (1 = not at all distressed to 4 = very distressed). For the intrinsic effort scale, the participant indicates on a four-point Likert-type scale the extent to which he agrees with the statement. The extrinsic effort score ranges from 6 to 24 and the intrinsic effort score from 29 to 116; the higher the score, the more distressed the person is by the efforts to be made. The reward score ranges from 11 to 44; the higher the score, the more the person reports being distressed by low rewards. It is also possible to calculate the ratio of the extrinsic efforts to the reward score (ratio = 11/6 multiplied by the extrinsic efforts/rewards). The closer the ratio is to 1, the better the balance between the extrinsic efforts and the rewards. The internal consistency of the subscales ranges from 0.61 to 0.88. The ERI-Q also has satisfactory discriminant validity (Niedhammer, Tek, Starke, & Siegrist, 2004; Siegrist et al., 2004). All of the questionnaire's items can be obtained from the Niedhammer et al. (2000) article.

Emotional labour

A French-language adaptation of the Emotional Labor Scale (Brotheridge & Lee, 2003; Brotheridge & Taylor, 2006) was retained. Emotional labour corresponds to the emotional demands inherent in the work (Brotheridge & Grandey, 2002). The original version assesses the duration, intensity, and variety of the emotions experienced by the individual. The results of a recent study do not support the hypothesis that these components are related to burnout (Brotheridge & Grandey, 2002). The adapted scale assesses an initial dimension, that of "surface acting," in which the person alters and controls the expression of his emotions (Brotheridge & Taylor, 2006). This dimension comprises two aspects, namely hiding emotions and putting on a mask, i.e. faking the expressed emotions (Brotheridge & Taylor, 2006). The inauthenticity of the emotions so expressed is thought to create a gap between what is felt and what is expressed. This gap would appear to be associated with increased stress (Pugliesi, 1999). The second dimension is called "deep acting." In this case, the person engages in a process whereby he regulates his thoughts and emotions in order to meet the expected standards and actually feel the expressed emotions (Brotheridge & Grandey, 2002). It is a way to reduce emotional dissonance, which would make it possible to reduce emotional exhaustion and the tensions felt (Brotheridge & Grandey, 2002). The results of a confirmatory factor analysis support the use of the "hiding emotions" and "putting on a mask" subscales (Brotheridge & Taylor, 2006). The French-language version was provided by the author and is currently being validated. This version also made it possible to document the participant's emotional labour in interaction with three different players: his supervisor; his colleagues; and his clients. Based on a workday, the participant identifies the frequency at which he experiences the described situations, using a seven-point Likert-type scale (never = 1 to always = 7). The score for each of the scales ranges from 9 to 63. In all cases, a high score corresponds to high emotional labour. For the English-language version, the internal consistency obtained is satisfactory, with Cronbach's alpha coefficients of 0.74 for surface acting and 0.83 for deep acting (Brotheridge & Grandey, 2002). Also, the scale's convergent and divergent validities were deemed satisfactory; among other things, surface acting was associated with a reduction in the feeling of effectiveness and the presence of negative affectivity (Brotheridge & Lee, 2003). The French-language version is available from Céleste Grimard-Brotheridge of the Université du Québec à Montréal.

Work stress

The assessment of work stress (Job Content Questionnaire)(Karasek et al., 1998) is based on the demand-control model (Karasek & Theorell, 1990). The French-language version consists of 18 items divided between two scales, namely psychological demands and decision latitude (Larocque, Brisson, & Blanchette, 1998). The latter scale comprises two subscales: skill discretion and decision authority (Larocque et al., 1998). The participants indicate their level of agreement with each of the statements on a four-point Likert-type scale (strongly disagree = 1 to strongly agree = 4). The Cronbach's alpha coefficients range from 0.68 to 0.85, supporting the instrument's internal validity. The discriminant validity is also satisfactory (Larocque et al., 1998). The scores of the psychological demand scale range from 9 to 36. A score greater than or equal to 24 is seen as indicating high demand (Larocque et al., 1998). The scores of the decision latitude scale range from 24 to 96. When the score is less than or equal to 72, the decision latitude is considered low (Larocque et al., 1998). The questionnaire is available from Robert A.

Karasek of the University of Massachusetts Lowell. User fees may apply, and the data must be shared with the investigator at the end of the study.

Relationship with supervisor

The French-language version of the Motivational Supervisory Style Questionnaire (MSSQ) (Blais, Lachance, Brière, Dulude, & Richer, 1991) provides a means for assessing the worker's perception of his relationship with his supervisor. The questionnaire consists of 24 items divided among six subscales: competence; control; laissez-faire; incompetence; autonomy; and involvement with employees. Using a six-point Likert-type scale (never = 0 to always = 5), the participant indicates how often the situation described in a statement occurs. The total score for the skills, control, and involvement subscales ranges from 0 to 20; for the laissez-faire subscale, from 0 to 15; and for the autonomy subscale, from 0 to 25. The total score for the questionnaire ranges from –18.33 to 21.67. The more negative the score, the more the supervisory style is characterized by incompetence, control, and laissez-faire. The instrument's internal consistency is very good, with Cronbach's alpha coefficients greater than 0.80 (Blais et al., 1991). The questionnaireis available from its author, Marc Blais of the Université du Québec à Montréal.

Work motivation

The Inventaire des Motivations au Travail de Blais (IMTB) makes it possible to document the reasons for which a person performs his work (Blais, Brière, Lachance, Riddle, & Vallerand, 1993). This inventory consists of 31 items and assesses eight types of work motivation grouped into three categories: intrinsic motivation; extrinsic motivation; and amotivation. Intrinsic motivation corresponds to the motivation whereby the individual performs his work for satisfaction and pleasure. Intrinsic motivation is comprised of three subscales: stimulation-related; knowledge-related; and accomplishment-related. Stimulation-related intrinsic motivation allows the individual to feel stimulation from pleasure and excitement. Knowledge-related intrinsic motivation stems from the pleasure of learning, while accomplishment-related intrinsic motivation concerns the pleasure derived from accomplishing or from taking on a challenge (Blais et al., 1993). Extrinsic motivation corresponds to instrumental reasons that motivate behaviour. It has three subscales: external regulation; introjected regulation; and identified regulation. Extrinsic regulation-type motivation focuses on obtaining rewards and avoiding punishment; for example, the person is dependent on external recognition or tries to avoid a grievance, which can make him dependent upon his environment (Blais et al., 1993). Extrinsic motivation by introjected regulation enables the individual to self-regulate his behaviour, but by imposing pressure on himself at work out of necessity—for example, out of fear of failure. Extrinsic motivation by identified regulation always leads to work being done for instrumental reasons, but in this case the individual does it by choice. Amotivation corresponds to no longer knowing why one is doing a job, because one expects that outcomes are not necessarily contingent upon behaviours. According to Blaiset al. (1993), this concept matches that of acquired resignation. The IMTB includes two subscales for amotivation: external and internal amotivation. External motivation corresponds to resignation related to an external source, such as being subject to unrealistic demands from a supervisor. Internal amotivation stems from an internal source, such as perceiving that one lacks the skills to do a job

(Blais et al., 1993). The respondent indicates the extent to which the statements correspond to the reasons why he performs his work using a seven-point Likert scale (1 = not at all to 7 = exactly). The score obtained for each of the eight forms of motivation can range from 4 to 28, except for internal amotivation, for which the scores range from 3 to 21. In each case, a high score corresponds to high motivation or high amotivation. The instrument's internal consistency ranges from 0.73 to 0.93. The instrument's temporal stability was also demonstrated for relatively long time periods, namely six to 18 months, with coefficients ranging from 0.54 to 0.72 (Blais et al., 1993). The IMTB is available from its author, Marc Blais of the Université du Québec à Montréal.

Role conflict – Role ambiguity

The French-language version (Lachance, Tétreau, & Pépin, 1997) of the Role Conflict and Ambiguity Scale (Rizzo et al., 1970) consists of 14 items. The respondent indicates his level of agreement with the statement using a seven-point Likert-type scale (1 = very false to 7 = very true). A high score corresponds to low role ambiguity. Conversely, a high conflict score indicates the presence of role conflict. The Cronbach's alpha coefficients demonstrate satisfactory internal validity (0.78 to 0.85). All of the questionnaire's items can be obtained from the Lachance et al. (1997) article.

Independent personal variables

Sociodemographic profile

The sociodemographic profile includes age; gender; job category; work position; administrative region; education level; number of dependent children; number of children diagnosed with a pervasive developmental disorder and/or a serious learning disability; family/civil status; caring for a person with a chronic disease; family income; and main family income earner.

Organizational commitment

A revised, translated (into French), and validated version (Stinglhamber, Bentein, & Vandenberghe, 2002) of the Organizational Commitment Scale (Meyer & Allen, 1991) was used. It consisted of 18 items scored on a seven-point Likert-type scale (strongly disagree = 1 to strongly agree = 7). The instrument has three subscales. The affective subscale covers the employee's attachment to, commitment to, and identification with his organization: the employee is involved because he wants to be. The continuity subscale depicts the employee's tendency to remain an employee of the organization due to the costs associated with leaving it: the employee stays because he needs to. The normative subscale focuses on the employee's loyalty, based on his perceived obligations to the organization: the employee feels a duty to stay (Meyer & Allen, 1991). The commitment profile is determined by the total score for each scale and not by the sum of the three subscales combined. A high score indicates a strong commitment for each subscale. All the items of the questionnaire can be obtained from the Stinglhamber et al. (2002) article.

Social support

The French-language version of the Social Support Questionnaire (Shumaker et al., 1989) consists of seven items that assess the person's perception of his social support. For each item, the person indicates how often he can count on those in his circle. A five-point Likert-type scale that goes from 0 (never) to 4 (always) is used. The internal consistency is 0.88 (Shumaker et al., 1989). The total score ranges from 0 to 28, and a low score corresponds to a perception of low social support. A copy of the questionnaire can be found in Coutu (2002).

Stress events

The French-language version of the Life Stress Events Scale (Shumaker et al., 1989) has ten questions that measure the number and average intensity of the stress events experienced in the preceding six months. The participant indicates the perceived intensity of each event on a six-point Likert-type scale that ranges from 0 (not at all) to 5 (extremely). A low score corresponds to low stress intensity or few stress events. The internal consistency is 0.87. The scale makes it possible to get around one of the limitations of the Holmes Rahe Scale, because it allows the person to rate his own perceived stress intensity. A copy of the questionnaire can be found in Coutu (2002).

Work-family and personal life balance

Conflict that may arise between work and family is measured by the Work-Family Conflict and Family-Work Conflict scales (Netemeyer et al., 1996). As the name suggests, two scales, each with five items, make up the questionnaire. The participants answer using a seven-point Likert-type scale (strongly disagree = 1 to strongly agree = 7). The higher the score, the greater the presence of conflict between work and family.When estimated using three samples, the two scales' internal consistency ranges from 0.83 to 0.89 (Netemeyer et al., 1996). The confirmatory factor analyses support the use of two scales (GFI=0.90 to 0.93; AGFI=0.84 to 0.88). The discriminant and convergent validities are also satisfactory (Netemeyer et al., 1996). All the questionnaire's items can be found in the proceedings of the Association Francophone de Gestion des Ressources Humaines symposium (Belghiti-Mahut, 2003).

Self-esteem as a worker

The Self-esteem as a Worker Scale, adapted from the Rosenberg (1965) Self-esteem Scale, is comprised of ten items (Corbière, Lanctôt, Sanquirgo, & Lecomte, 2009). The scale measures a person's self-esteem as a worker. The results show that, in workers with a mental disorder, there is a line between an individual's self-esteem as a worker and his overall self-esteem, the feeling of effectiveness in a job, and satisfaction with work (Corbière & Amundson, 2007; Corbière et al., 2009). The answers are measured on a four-point Likert-type scale (1 = strongly disagree to 4 = strongly agree). The results of the factor analysis support the use of two dimensions: individual and social. The internal consistency coefficients range from 0.76 to 0.85, demonstrating satisfactory internal consistency. The "individual self-esteem" dimension is also sensitive to change (Corbière et al., 2009). The total score obtained by adding together the scores

for each item can range from 10 to 40. According to the author, a score of 25 or less indicates low self-esteem as a worker. A copy of the questionnaire can be found in Appendix 2.

Validity of respondents' answers

Social desirability

The French-language version of the Social Desirability Scale measures an individual's tendency toward social desirability through his answers (Crowne & Marlowe, 1960). The scale consists of 33 statements to which the subject answers "true" or "false." The score can range from 0 to 33. A high total score suggests that the participant exhibits a tendency toward social conformity. This would appear to correlate with a tendency to underestimate one's difficulties (Smith & Campbell, 1973). The scale's internal consistency is satisfactory, with a Cronbach's alpha of 0.88. Significant correlations were also obtained by comparing the social desirability scale with two other scales, namely the Edwards SD Scale (Edwards & Dryden, 1957) and the Lie Scale of the Minnesota Multiphasic Personality Inventory (Fordyce, 1956). Besides being one of the most widely used scales, the items of the Crowne & Marlowe Scale are less associated with psychopathological problems, in contrast to the Edwards SD Scale.

Order of the questionnaires within the battery

For the most part, the order of the questionnaires used in the survey meets the criteria developed by Tremblay (1991). Thus, in order to reduce the halo effect, questions of a more intrusive nature, such as those concerning self-esteem as a worker, stress events, and psychological distress, were placed at the end of the survey so as to create an initial climate of trust with the participant by beginning with questions of a more general nature (work-related questions). As it was a study about the employees' psychological health, the order of the questionnaires was an important factor for maximizing the study's response rate, which is why the questionnaires could not be counterbalanced. Questions of an identifying nature (age, gender, job title) were asked at the end of the survey in order to reduce the participants' mistrust and thereby increase the response rate. As the survey had a very large number of questions, the potential for boredom was controlled by varying the variables addressed and making the survey visually appealing, which helped to maintain participants' interest from start to finish. Each of the questionnaires was contained on a single page in order to present the questions by variable according to the title and instructions. The variables covered were arranged in the following order:

1. Work stress;
2. Work motivation;
3. Perceptions of the style of supervision at work;
4. Role conflict and role ambiguity;
5. Effort-reward imbalance;
6. Emotional labour;
7. Work-family and personal life balance;
8. Organizational commitment;
9. Social support;

10. Stress events;
11. Psychological distress;
12. Self-esteem as a worker;
13. Presenteeism;
14. Social desirability;
15. Socio-demographic profile.

- **Steps 2 and 3: Implementing the survey and reducing sampling error**

Based on the inclusion criteria, two key informants were identified at the management level, namely the operations manager and the human resources manager. The interviews with them enabled us to better document the set of problems experienced by the agency's employees, to clearly identify the population to be surveyed, and to select the best strategy for collecting data with a view to survey implementation. These interviews were conducted in various ways (in person, by telephone, by email) as needed, taking into account the participants' constraints regarding their geographic location and availability.

To facilitate the implementation and reduce the sampling error, we also presented the battery of questionnaires and the rationale for their use to three union representatives very familiar with the set of problems within the organization. After this meeting, we obtained a copy of a letter of support that the unions had sent to their members.

Population to be surveyed

Analysis of the documents about the organization structure, types of position, types of employment status, and geographical distribution gave a clearer overview of the population to be surveyed. The analysis showed that employees who held a regular or casual position were the population to be surveyed in this study. As it turned out, the persons with casual status had worked for the agency for several years. Employees who had been on the job for less than six months were excluded from the study in order to avoid recruiting employees who were in the process of returning to work and might exhibit different characteristics. The results of these analyses identified a potential population of nearly 5,000 employees who could take part in the survey.

Recruitment procedure

The employees working at the agency who met the study's eligibility criteria were emailed an invitation to take part in a survey on a volunteer basis. The message was emailed by the employer. The process was aligned with the hierarchical structure; in other words, each manager delivered the invitation to his staff members. This made it possible to send the invitations only to employees eligible for the survey and to show that the process was supported by every level of the organization. The hyperlink pointing the participants to the Survey Monkey platform was included in the invitation. The volunteer participants could access and complete the battery of questionnaires anonymously and at their convenience.

Data collection procedure

Choosing the Web-based platform

In order to collect data across Québec, it was decided to use a Web-based instrument. This approach would provide a considerable reduction in the costs associated with administering the questionnaires compared with those involved in photocopying and surface-mailing the questionnaires. The method would also significantly reduce the workload by eliminating data entry, the related errors, missing data, and data clean-up. Moreover, it would be environmentally friendly.

To make an informed choice, a review of the literature was performed to learn about the various available online tools. The review results identified several platforms and software packages for collecting data online. The candidate platforms offered questionnaire building and hosting capabilities as well as data collection via their own Web server. However, the software packages would have to be downloaded onto the respondent's computer, and the research team would have to use their own Web server for data collection and storage. Among the examined platforms and software packages, some were available free of charge while others charged a fee. Although some (e.g. Netlink Survey Engine, MakeSurvey, Free Online Surveys) were free, they had several limitations, including the maximum number of questions that the questionnaire could contain (around 10 questions) and the number of respondents allowed (around 100 participants). In addition, the data hosting period was limited to approximately one month.

Pay-to-use platforms and software packages can be grouped into three categories: basic, intermediary, and advanced, as proposed by Crawford (2002). According to that author, the basic category consists of programs that make it possible to construct questionnaires for low-budget research projects requiring little technical knowledge. The questionnaire layout is similar to that found in Microsoft Word, and the questionnaires and collected data have to be hosted on the research team's server. The intermediate category encompasses Web-based platforms where all steps related to the design of the survey —from constructing the questionnaire to analyzing the data— can be done on the platform's website. These platforms generally provide access to their secure network and technical support around the clock. Questionnaire design functions are also provided; these feature a user-friendly interface and require a minimum of programming. Using a server other than the research team's has several advantages, such as eliminating problems related to incompatibilities between information systems, mandatory updates, and in-house IT support. The advanced category groups together programs that offer a number of functions but also require advanced programming skills (e.g. SPSS). Training is necessary to use this type of program. In addition, these programs do not provide a server for hosting data and supporting data collection for surveys that involve simultaneous large samplings.

Based on the population targeted for the survey, various criteria emerged for choosing a software package or online platform geared to our requirements. The selected instrument would need to be able to handle, under the best scenario, some 5,000 participants simultaneously answering a given questionnaire and to save the collected data. The instrument would also have to allow us to host the data collection on an external server other than the research team's server, which could not support such a large-scale data collection. In addition, the instrument would

have to let us quickly and easily construct a questionnaire of more than 250 questions and to provide the necessary technical support to the research team. The tools identified as meeting these criteria were the platforms in the intermediate category.

The intermediate-type platforms included Survey Writer, E-Questionnaire, Question Builder, Vovici, Survey Monkey, and Survey Writer. Their features are presented in Appendix 3. The Survey Monkey platform was selected because it met all the criteria predefined by the research team. The platform had also been successfully and easily used by one of the team's co-investigators as part of a pan-Canadian study. Survey Monkey is an affordable ($20/month), user-friendly, flexible, easy-to-use, and easy-to-program platform that provides a sophisticated level of design. The platform also allows data to be collected securely and anonymously from a population distributed across Québec. Only the research team could access the participants' answers. The platform makes it easy to modify content as needed and to quickly extract and transfer data (full or summary report) to other programs for analysis (Microsoft Excel, SPSS and SAS). In addition, the platform supports the simultaneous collection of data from sample populations of up to 5,000 participants and allows for data entry on an external server other than the research team's. The platform also helps reduce sabotage of research results by making it difficult for a given participant to complete the questionnaire more than once (for this to be true, it was necessary for each employee to have his own workstation). From the participant's standpoint, the platform has several advantages, such as a progress bar showing what percentage of the questionnaire has been completed, ease of access, the option of taking a break from answering the questionnaire and resuming later from where one left off, and anaesthetically pleasing, professional appearance adapted to the surveyed public. These elements are also recognized as increasing the response rate.

- **Validating the survey mechanism**

To carry out the pre-test, the participants were emailed a hyperlink that gave them access to the online platform where they could answer the questions. In all, nine persons completed the battery of questionnaires, including two research assistants, two investigators, and five agency employees. The pre-test took place over a two-week period.

To validate the survey's feasibility, when taking the pre-test the respondents were asked to inform us of any problems they encountered and of the time they needed to complete the survey. They also provided us with their comments on the overall experience. Following the pre-test, various issues related to spelling and the clarity of certain items were raised. Some of these issues were dealt with before the survey was launched; others relating to clarity could not be changed, as doing so could have had a negative impact on the validity of the battery of questionnaires. The average time needed to complete the survey was one hour. For the most part, the general comments were positive, although some respondents found the time required to complete the survey long. In view of this, it was agreed that employees would be freed up by their superior in order to favour a higher response rate.

Another goal of the pre-test was to assess the speed and quality of the transfer of the collected data to the analysis software and the relationship between the questionnaires. At the

end of the pre-test period, the data were successfully exported in Excel format. Once the database had been received, it could be saved and transferred to the SPSS analysis program.

Response rate

The data collection period lasted one month. A total of 4,929 employees were invited to take part in the survey. Of that number, 2,956 participants began filling out the battery of questionnaires and 2,368 completed the survey, a participation rate of 48%. At the end of the first week, a reminder was sent to all potential participants. That pushed the participation rate to nearly 50% one week after the survey launch.

Of the participants who began the survey, 19% did not finish it. Survey Monkey makes it possible to see the percentage of respondents for each questionnaire. Thus, 12% of the respondents quit at the halfway point (after about 30 minutes). At that point, a page appeared notifying the participant that he had reached the halfway point and could either take a break or continue. It should also be borne in mind, then, that the 19% figure includes a number of participants who temporarily stopped filling out the questionnaire but were unable to complete it. This problem was due to the deletion of the temporary files, either for technical reasons at the agency (server updates, information system repairs during the weekend) or personal reasons (the participant himself deleted the temporary files, as might be the case after visiting a banking website, for example). This resulted in the loss of the temporary files used by the Survey Monkey website, which prevented the participantfrom returning to the questionnaire at the point where he had left off. After checking, the agency informed us that it had updated its information systems in some regions. The officials informed all the agency's personnel of the situation and encouraged the participants to take the survey over again. It is therefore not possible to know the actual percentage of persons who began but did not complete the survey. With Survey Monkey, the IP address normally allows a respondent to be identified. However, according to our files, at the agency, all the respondents have the same IP address. Thus, it was impossible to identify doubles and know the number of participants who had to take the survey over again.

Characteristics of the respondents

The majority of the participants who completed the survey were between 40 and 59 years of age (77%), and single, widowed, separated, or divorced (67%). The majority were also women (76%). In addition, more than one-third of the respondents (29%) had a gross annual income of between $40,000 and $59,999, and 46% were the main family income earners. Nearly half of the participants (43%) had no dependent children at the time of the survey. In terms of seniority, participant distribution was as follows: more than 20 years at the agency (37%); between six and ten years of seniority in the same unit (29%); and with the same job title (31%). Also, nearly one-third of the participants had been absent from work due to illness for periods of three to five days during the previous year, but the vast majority of them were absent for no more than ten consecutive days. After checking with agency officials, the respondents' characteristics were deemed representative of all the agency's employees and of the job categories specific to the agency as well as the employees' geographic distribution.

Internal validity of the battery of questionnaires

The collected data were exported to Microsoft Excel format and then exported again to the SPSS data analysis software for further analysis. Verifications were performed to ensure correspondence between the data before and after export. Frequency and descriptive analyses were then performed to validate the methods used to compute the scales and subscales for the measurement instruments used. Two research assistants performed these verifications until interrater agreement was reached. The analyses were conducted only on the data collected from participants who had completed all the survey questionnaires. Homogeneity tests were performed to validate the internal consistency of the scales and subscales. Table 1 shows the means, standard deviations, and variability of the scores, as well as the Cronbach's coefficient alpha for each questionnaire used and the corresponding subscales. The "physical" subscale of the presenteeism questionnaire had to be removed because too many items were not applicable to the work. Overall, the results support the homogeneity of the dimensions measured on the questionnaires used. No Cronbach's coefficient alpha could be computed for the "financial reward" subscale, as it consisted of only one item. The variability and distribution of the sample population's scores, obtained by computing skewness and kurtosis for each datum, fell within the norms. There were therefore no floor or ceiling effects found in the respondents' results.

Table 1: Internal consistency, means, and variability of the survey scales and subscales

Questionnaire	Scale	Cronbach's alpha	Mean score (standard deviation)	Minimum/ maximum values
DEPENDENT VARIABLES				
Psychological distress		.903	24.54 (16.40)	0 to 97.62
Presenteeism	Work scheduling demands	.849	81.99 (16.91)	0 to 100
	Output demands	.879	83.73 (15.58)	0 to 100
	Mental demands	.874	82.48 (14.04)	0 to 100
	Social demands	.632	90.04 (12.01)	8 to 100
	Total score	.942	84.69 (12.56)	14 to 100
WORK-RELATED VARIABLES				
Efforts and rewards	Extrinsic efforts	.782	10.19 (3.49)	6 to 24
	Intrinsic efforts (IE)	.818	68.79 (8.92)	41 to 105
	IE – Need for approval	.561	17.45 (2.39)	8 to 24
	IE - Competitiveness	.535	13.29 (2.56)	6 to 22
	IE - Disproportionate irritability	.565	18.95 (2.87)	9 to 30
	IE – Inability to withdraw from work	.726	19.10 (4.07)	9 to 36
	Rewards (R)	.841	17.33 (6.28)	11 to 44
	R – Esteem reward	.827	7.10 (3.11)	5 to 20
	R – Reward related to promotion prospects	.740	8.36 (3.46)	5 to 20
	R – Financial reward	N/D	1.88 (1.05)	1 to 4
Emotional labour	Deep acting	.867	26.63 (11.84)	9 to 63
	Hiding emotions	.912	33.61 (11.38)	9 to 63
	Faking	.875	19.97 (8.64)	9 to 54
Work stress	Decision latitude	.792	71.38 (10.77)	26 to 96
	Decision latitude – skill discretion	.691	37.41 (5.19)	12 to 48
	Decision latitude – decision authority	.577	33.98 (6.54)	12 to 48
	Psychological demands	.792	24.89 (4.09)	9 to 36
Relationship with supervisor	Competence	.892	9.54 (4.81)	0 to 20
	Control	.779	6.09 (4.15)	0 to 20
	Laissez-faire	.881	2.36 (3.11)	0 to 15
	Incompetence	.849	3.27 (3.51)	0 to 20
	Autonomy	.811	12.31 (4.92)	0 to 25
	Involvement	.842	10.65 (4.32)	0 to 20
	Total score	.600	6.93 (6.87)	-18.33 to 21.67
Role conflict and ambiguity	Role ambiguity	.791	31.82 (6.28)	6 to 42
	Role conflict	.809	28.48 (9.40)	8 to 56

PERSONAL VARIABLES				
Motivation	Intrinsic	.947	48.09 (14.01)	12 to 84
	To accomplish	.844	16.96 (5.04)	4 to 28
	To know	.918	16.80 (5.17)	4 to 28
	To experience stimulation	.880	14.33 (4.92)	4 to 28
	Extrinsic	.799	47.71 (10.57)	14 to 81
	Identified regulation	.843	16.67 (5.17)	4 to 28
	Introjected regulation	.774	14.85 (5.11)	4 to 28
	External regulation	.778	16.20 (4.70)	4 to 28
	Amotivation	.854	17.33 (7.41)	7 to 47
	External	.911	12.13 (5.91)	4 to 28
	Internal	.754	5.20 (2.69)	3 to 21
Organizational commitment	Affective commitment	.776	24.92 (7.55)	6 to 42
	Normative commitment	.720	21.50 (7.15)	6 to 42
	Continuance commitment	.692	27.64 (6.80)	6 to 42
Social support	Total score	.876	18.85 (5.55)	0 to 28
Stress events	Total score	.661	5.75 (5.05)	0 to 32
Work-life balance	Work-family	.920	13.94 (7.57)	5 to 35
	Family-work	.859	10.03 (5.41)	5 to 35
Self-esteem as a worker	Social	.813	10.94 (1.78)	3 to 12
	Individual	.803	24.20 (3.21)	7 to 28
	Total score	.797	35.14 (4.24)	10 to 40
VALIDITY OF RESPONDENTS' ANSWERS				
Social desirability		.605	22.42 (4.51)	5 to 33

Factor analysis of the battery of questionnaires

An exploratory factor analysis (EFA) was performed to identify the latent structure of the battery of questionnaires. All the variables reported in Table 1 were used, i.e. the subscale scores, and where there were no subscales, the total scores. A principal component analysis (PCA) with a Varimax rotation and orthogonal transformation was applied to the data. Eigenvalues of more than 1.00 were retained. The number of factors, six in this case, was chosen on the basis of the scree test. Item factor loading was fixed at $r \geq 0.30$. The Kaiser-Meyer-Olkin measure of sampling adequacy was excellent (KMO = 0.901). Based on all the analyses, it was possible to identify six factors explaining 54% of the total variance, which is a perfectly acceptable percentage. Table 2 shows the variables contributing to the factors. The first factor concerns the employee's perception of his relationship with his supervisor on various levels, including the rewards, role, and control offered to the employee. The second factor concerns work motivation and serves to document the degree to which the employee performs his work by choice, for satisfaction, and for pleasure. The possibility he has of using his qualifications and of making decisions, as well as his commitment to work are assessed within this factor. The third factor concerns stress related to external demands. These include perception of psychological demands, role conflict, difficulty in withdrawing from work, work-family conflict, and resignation associated with amotivation. The fourth factor, efforts, includes the attitudes and motivations associated with overcommitment to work, where the employee self-imposes time pressure out of necessity. The fifth factor concerns emotional labour and its three subscales, as well as extrinsic motivation in which the employee is dependent upon external recognition and/or tries to avoid negative consequences. The sixth and last factor concerns self-esteem as a worker.

Table 2: Variables included in factors identified during factor analysis

QUESTIONNAIRES AND SUBSCALES	FACTORS 1	2	3	4	5	6
SUPERVISOR						
Relationship with supervisor: Laissez-faire	0.81					
Relationship with supervisor: Involvement	-0.80					
Relationship with supervisor: Competence	-0.79					
Relationship with supervisor: Autonomy	-0.79					
Relationship with supervisor: Incompetence	0.76					
Relationship with supervisor: Control	0.65					
Efforts and rewards: Esteem reward	0.67					
Role conflict: Role ambiguity	-0.48					
WORK MOTIVATION						
Intrinsic motivation: Accomplishment		0.88				
Intrinsic motivation: Knowledge		0.86				
Intrinsic motivation: Stimulation		0.82				
Extrinsic motivation: Identified regulation		0.79				
Stress at work: Skill discretion		0.60				
Stress at work: Decision authority		0.60				
Organizational commitment: Affective commitment		0.61				
Organizational commitment: Normative commitment		0.42				
STRESS RELATED TO EXTERNAL DEMANDS						
Stress at work: Psychological demands			-0.76			
Work-family balance			0.70			
Efforts and rewards: Extrinsic efforts	0.41		0.70			
Amotivation : External			0.63			
Role conflict: Conflict	0.44		0.59			
Efforts and rewards: Intrinsic efforts: Inability to withdraw from work			0.51	0.46		
Family-work balance			0.49			
Amotivation: Internal			0.43			
EFFORTS						
Efforts and rewards: Intrinsic efforts – competitiveness				0.73		
Efforts and rewards: Intrinsic efforts – need for approval						
Extrinsic motivation: Introjected regulation				0.74		
Efforts and rewards: Intrinsic efforts: disproportionate irritability		0.46		0.55		
			0.49	0.55		
EMOTIONAL LABOUR						
Emotional labour: Deep acting				0.70		
Emotional labour: Faking				0.75		
Emotional labour: Hiding emotions				0.54		
Extrinsic motivation: External regulation				0.49		
SELF-ESTEEM AS A WORKER						
Self-esteem as a worker – Individual						0.65
Self-esteem as a worker – Social						0.58
Sum of the squares of the factors retained	5.5	4.9	4.3	2.4	2.1	1.9
Explanation of the variance after rotation	14.18	12.54	11.14	6.03	5.27	4.82

Linear regression analysis models were developed to verify the correlations between the variables for each factor with distress and presenteeism. The correlation between distress and social desirability as well as that between presenteeism and social desirability were documented

beforehand. Low correlation was observed for each of the dependent variables. For each model, the variables significantly correlating with distress or presenteeism were retained for the purpose of developing two final regression models for each of the dependent variables. The first model explains 36.8% of the total adjusted variance for psychological distress ($F (9, 2351) = 153.032$; $p < .000$). With regard to presenteeism, the final regression model explains 36.9% of the total adjusted variance ($F (10, 2333) = 136.757$; $p < .000$). The significant variables for each of the two models are shown in tables 3 and 4.

Table 3: Variables most closely correlated with psychological distress

Model	Standardized beta coefficient	Value *t*	Value *p*
Supervisor – Competence	0.071	3.496	.000
Intrinsic motivation – Stimulation	-0.108	-5.827	.000
Emotional labour – Faking	0.094	5.512	.000
Efforts-rewards – Extrinsic efforts	0.208	8.795	.000
Efforts-rewards – Rewards – Esteem	0.088	3.815	.000
Efforts-rewards – Intrinsic efforts – Need for approval	0.143	7.913	.000
Efforts-rewards – Intrinsic efforts – Inability to withdraw from work	0.105	5.117	.000
Work-family balance	0.127	6.395	.000
Self-esteem as a worker – Individual	-0.196	-11.056	.000
Adjusted R^2	**36.8**		

Table 4: Variables most closely correlated with presenteeism

Model	Standardized beta coefficient	Value *t*	Value *p*
Supervisor – Control	-0.101	-4.639	.000
Supervisor – Autonomy	-0.077	-3.531	.000
Intrinsic motivation – Accomplishment	0.147	7.189	.000
Internal amotivation	-0.093	-5.225	.000
Organizational commitment – Affective	0.087	4.209	.000
Efforts-rewards – Extrinsic efforts	-0.240	-10.578	.000
Efforts-rewards – Intrinsic efforts – Inability to withdraw from work	-0.109	-5.281	.000
Efforts-rewards – Intrinsic efforts – Need for approval	-0.093	-5.108	.000
Work-family balance	-0.122	-6.084	.000
Role ambiguity	0.125	6.160	.000
Adjusted R^2	**36.9**		

3.2 Methodology for Objective 2: develop and perform an initial validation of an ergonomic instrument (diary) for describing and assessing the workload and its determinants in the work activity

To attain the study's second objective, a questionnaire-type workload assessment instrument called a "diary" was developed for the purpose of examining in greater depth the relationships between the agency employees' work and workload. Again, the guidelines defined by Dillman et al. (2000; 2003) were followed, particularly the development and implementation phases. Several information sources, such as the scientific literature, documents provided by agency officials, interviews with key informants, and observations of the work activities of certain employees, were used in the process of developing the workload assessment instrument. These various information sources made it possible to define the various items and categories of information to be included in the diaryand, in addition, to describe the workload perceived by the employees.

The diary was validated using a mixed methodology that had qualitative and quantitative components (Dillman, 2000; Dillman et al., 2003). A qualitative pre-test was conducted on ten employees from a regional centre, where they were observed and interviewed. The validation per se consisted of verifying the diary content in terms of item clarity and comprehensibility. The feasibility of completing the diary via the Survey Monkey platform was also verified. A quantitative validation was carried out by documenting the diary's internal validity through factor analyses. Lastly, the internal consistency of each factor emerging from the analysis was documented.

3.2.1 Review of the scientific and grey literature

An exploratory search was first conducted online using bibliographic databases, including PubMed, MedLINE, AgeLine, and the Google search engine. Two sets of French keywords were combined and two sets of English keywords were combined: (1) keywords related to the concept being investigated, including *workload* or *cognitive workload* or *mental workload*, and (2) keywords related to the nature or type of assessment, including *subjective assessment* or *measurement method* or *questionnaire* or *scale* or *ergonomic study of workload*. Apart from language (French or English) and relevance to the subject, no specific selection criteria were applied in selecting the studies. To ensure the relevance of the identified studies, a selection was made based on consensus between a research assistant trained in ergonomics and one of the co-investigators involved in the study whose specialty is ergonomics (Iuliana Nastasia). In addition, websites related to the issue under study were consulted, such as that of the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST), the journal *PISTES*, the Theses Canada portal, and the website of the Société d'ergonomie de langue française (SELF).

3.2.2 Agency documents consulted

Based on an analysis of the internal documents provided by the agency's key informants (the same as those for the survey), which included job descriptions, organization charts, and lists

of expected quantitative and qualitative outcomes, we identified the main tasks, activities, knowledge, and skills common to the different job categories for the purpose of asking questions about the difficulties experienced by the employees with regard to the prescribed work.

3.2.3 Interviews of key informants and observations of work activity

Interviews and observations were conducted in a regional centre to gain a better understanding of the work associated with the different job titles. This centre was chosen by one of the key informants as it appeared to be representative of the agency. A total of six interviews of various stakeholders were conducted: a director, a team leader, and employees. The interviews lasted an average of 45 minutes and were audio recorded. The work activity was also systematically observed on October 16 and 21, 2008, in order to clarify the work dynamic among the Centre's employees. Three employees were observed in the afternoon from behind the counter to ascertain their movements, communicative interactions, and interruptions to their work, as well as from the waiting room to observe client flow. The entire observation process took two hours. A first draft of the diary was developed using the information collected from all data sources.

3.2.4 Results - Objective 2

- **Step 1: Developing the diary**

Building a conceptual framework

Based on the review of the literature dealing with the notion of workload and its various determinants, a workload-specific conceptual framework was constructed. The framework illustrated in Figure 2 shows the elements that had to be taken into account in order to assess the workload of the agency's employees, as well as the main determinants of the work activity that had to be incorporated into the development of the diary.

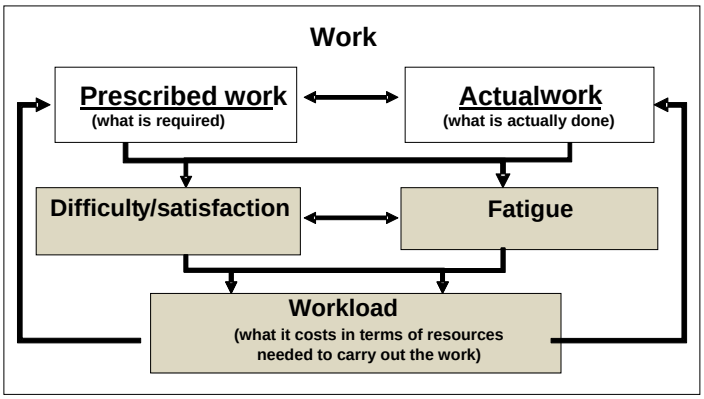

Figure 2: Conceptual workload-assessment framework operationalized in the diary

Variables and measures used

The literature review provided an overview of the main factors that have impact on subjective assessments of workload and of existing assessment methods, which enabled us to choose the items to be included in the diary. We first identified a method that would be applicable in the field and then selected pertinent items for inclusion in order to relate the subjective assessments to the underlying determinants in the employees' work, whether prescribed or actual. In fact, one of the main criticisms levelled at the subjective assessment methods used is that they do not allow the assessments to be related to the underlying determinants in the work (activity-related causes). The document analysis, interviews, and observations improved our understanding of the employees' work reality and allowed us to adapt the diary to the agency's particular context.

Perceived workload and fatigue level

Several subjective methods for assessing mental workload were identified in the literature, including the Cooper-Harper Scale (Cooper & Harper, 1969; Eggemeier & Wilson, 1991; Harper & Cooper, 1984), the Bedford Scale (Corwin et al., 1989; Eggemeier & Wilson, 1991), the Subjective Workload Assessment Technique (SWAT) (Eggemeier & Wilson, 1991; Reid & Nygren, 1988; Rubio et al., 2004), and the NASA-Task Load Index (NASA-TLX) (Byers et al., 1989; Hart & Staveland, 1988; Rubio et al., 2004). Table 5 summarizes the main criteria used to assess how well the various methods fit with our study context.

One of the methods that appeared both relevant and economical in terms of field use was the NASA-RTLX (Raw Task Load Index) (Byers et al., 1989), a simplified version of the NASA-TLX (Hart & Staveland, 1988). In fact, the NASA-RTLX uses only that part of the NASA-TLX which includes the assessment of six dimensions of mental workload by means of graduated rating scales but excludes paired comparisons between the various dimensions and the tasks considered. The NASA-RTLX therefore examines six dimensions. Three concern the types of resources used by the worker (mental demand, physical demand, and temporal demand) and three, the interaction between worker and task (performance, effort, and frustration) (Hart &

Staveland, 1988; Leplat, 2002). This version eliminates the process of weighting the different dimensions relative to each other, thereby simplifying the administration process and reducing both completion and results analysis time. This method would appear to have high face validity (Byers et al., 1989) and the advantage of being useable in diverse work contexts, making it easily adaptable to that of the agency. For all these reasons, it was selected for integration into the diary for the purpose of assessing perceived workload using the same six dimensions as in the original version. Moreover, Borg's CR-10 Scale (Borg, 1998), well recognized in the literature for its validity in evaluating effort, difficulty, and discomfort, was retained for the purpose of assessing perceived fatigue at the end of the workday.

Table 5: Correspondence between mental-workload assessment methods and selection criteria

Method	Easily adaptable to the customer service environment	Free	Easy to use in the field	Completion time	Workload dimensions assessed
NASA-TLX NASA-RTLX	Yes	Yes	Yes	≥ 30 minutes ≤ 30 minutes	Mental, Physical, Temporal, Performance, Effort, Frustration
SWAT	Yes	Yes	No	≥ 30 minutes	Time, Mental effort, Psychological stress
Cooper-Harper Scale	No	Yes	No	≥ 30 minutes	Unidimensional
Bedford Scale	No	Yes	No	≥ 30 minutes	Unidimensional

Actual work and prescribed work

The literature review brought out the importance of relating the assessments to the underlying determinants, i.e. the causes inherent in the work activity. More specifically, in terms of the individual worker, the work activity itself is influenced by the general work context, the demands to be met, the means provided to the worker to perform the work, and lastly the factors inherent to the individual, such as personal characteristics, experience, and condition at the time (Durand et al., 2008). It is therefore conceivable that these factors also influence people's subjective assessments of the resulting workload. It is now recognized that staff cutbacks, interpersonal difficulties, time pressure, physical conditions at the workplace, inadequate information, and software incompatibility are all factors that increase the workload (Cazabat, Barthe, & Cascino, 2008; ISO 10075-1, 2000; ISO 10075-2, 1996). Added to this are demands related to the frequency of interruptions during work, which lead to task fragmentation and a continual updating of priorities (Cazabat, Barthe, & Cascino, 2006; Cazabat et al., 2008). Indeed,

interruptions interfere substantially with getting the job done and are a major source of irritation (Brun, 2008). According to Brun (2008), work that is either not done or uncompleted, that is abandoned, or that a person tries but does not manage to do, also constitutes part of the workload. Interruptions logically imply that some work remains either uncompleted or, at worst, not even begun.

The importance of assessing the prescribed work and the actual work has already been emphasized. Several categories of items were therefore chosen to describe the employees' work. The actual work, described on the basis of the interviews, was defined as that actually carried out in terms of the number of cases handled, telephone contacts made, or other established parameters, but also in terms of problem situations requiring management during the work activity. The prescribed work, described on the basis of task descriptions and interviews with the employees, was defined as what is required by the organization in terms of task performance.

Difficult and satisfying aspects

The difficulties experienced in doing the required tasks ("what is required"), the difficulties related to the knowledge and skills required to mobilize the necessary resources for doing the work, and the satisfaction derived from doing the work are all important variables to consider. Our initial premise in developing the diary was the existence of a link between the difficulties experienced when performing the work, satisfaction regarding the performance of the work, and the subjectively evaluated workload.

Scales used in the diary

Workload can be described in terms of intensity, duration, and temporal distribution of the efforts required of the worker to perform the task (Cail, Morel, & Aptel, 2000; Costes, Augros, & Kerbal, 2006; ISO 10075-2, 1996). It can also refer to the perceived level of difficulty compared with the resources needed to perform a particular task or activity and with the presence and frequency of problem situations in the work. Different measures and scales were chosen for the diary, depending on the type of variables and aspects being queried. First, a five-point Likert-type scale (never, rarely, sometimes, quite often, continually) was used to question the frequency with which problem situations arise. Another five-point Likert-type scale (not at all, a little, moderately, a lot, a great deal) was used to ascertain the impact of these situations, i.e. the degree to which this affected the employee in terms of intensity. For questions concerning the difficulties associated with the prescribed work (e.g. task description statements) and what is required in order to do the actual work (e.g. the competencies/skills needed to do the work), the participants rated the level of difficulty on a five-point Likert-type scale (ranging from "not at all" to "extremely"). Questions concerning the subjective assessment of the various components of the workload used graduated rating scales, most of which ranged from "low" (1/10) to "high" (10/10), with the exception of the "performance" component scale, which was graduated from "good" (1/10) to "poor" (10/10). Lastly, the scale used to measure the fatigue experienced ranged from "no fatigue" (0/10) to "extreme fatigue" (10/10).

Diary sections and the order of questions and items

To allow for a description of what is done during the workday in terms of work content and the various difficult or satisfying aspects, the diary has a total of seven sections, as follows:

1. Introduction;
2. Information about the actual work;
3. Difficult and satisfying aspects encountered during the workday;
4. Components of the perceived workload;
5. Level of fatigue;
6. General information;
7. Information about the respondent.

The questions were arranged in an order designed to gain the respondent's trust, beginning with the description of the work performed. For example, the respondent was asked to indicate the number of cases handled or calls taken. Questions on the actual work followed. Table 6 summarizes for each question the various aspects inquired about, the source of the information, and the scientific references, if applicable. In addition, various types of questions (such as simple statements, lists of items, or rating scales) and answer structures (closed, semi-closed, open-ended) were used in all sections to obtain the information sought. The diary (in French) is shown in Appendix 4 of this report.

Table 6: Aspects covered and questions, by type and source of information

Aspects covered	Questions	Sources of information used to develop items
Introduction to the diary	No questions. Explanations regarding the data collection procedure and diary content.	
Actual work: tasks	Number of new cases and total number of cases	Internal documents, observations, and interviews
	Number of contacts with clients on the phone and in person	
	Total time spent giving information on the phone and in person	
	Total time spent assisting a colleague on the phone or in person	
	Number of emails received	Interviews
	Number and planning of meetings and compliance with time allotted	
Actual work: problem situations	Presence, frequency, andintensity (impact) of unforeseen events	Literature (Caroly, 2006; S.Cazabat et al., 2006; Costes et al., 2006), observations, and interviews
	Presence, frequency, and intensity of interruptions	
	Presence and intensity of tasks they did not have time to do	
	Presence, frequency, and intensity of lack of work	
	Presence, frequency, and intensity of tasks that are not their responsibility	
	Typical day	Internal documents, interviews, observations
Prescribed work	Level of difficulty of prescribed tasks	Internal documents, interviews, observations
Actual work: mobilization of resources	Level of difficulty of tasks carried out	Internal documents, interviews, observations, literature (Daniellou & Davezies, 2006; Harvey et al., 2006; ISO 6385, 2004; ISO 10075-3, 2005)

Actual work: determinants	Possible causes of the difficulties: Lack of training Communication problem Lack of support Lack of means, etc.	Internal documents, interviews, observations, literature (Costes et al., 2006; Harvey et al., 2006; Leplat, 1997)
	Pleasant and unpleasant events	Interviews, observations
	Aspects in need of improvement to make the work more pleasant and more efficient	Interviews, observations
Workload	Mental demand Temporal demand Performance Effort Frustration	Literature (Byers et al., 1989; Hart & Staveland, 1988; ISO 10075-3, 2005; Rubio et al., 2004)
Fatigue	Level of fatigue felt at the end of the day	Literature (Borg, 1998), interviews
General information	Other comments about work	Validation: pre-test only
	Other comments about the measurement instrument	Validation: pre-test only
Sociodemographic profile	Questions about the respondent	Interviews with the key informants

Introduction to the diary

This section explains the diary's nature and purpose to the participants as well as the main principles governing the collection of information.

Information about the actual work

This section contains 25 questions. They are based on information collected during the observation sessions and interviews. In order to document the amount of work done by the employee/respondent, among other things, questions are asked about the actual work performed during the workday. They concern the number of cases handled (new cases or caseload), the number and duration (in minutes) of contacts with various interlocutors on the phone or in person, the approximate number of email messages received, the presence of planned meetings, and compliance with the meeting time allotted. This section also includes questions on various problem situations which, according to the literature (Brun, 2008; Caroly, 2006; Cazabat et al., 2006; Cazabat et al., 2008; ISO 6385, 2004) can affect work performance. These problem situations include work interruptions, lack of time to perform certain tasks, lack of work to do, and tasks perceived as not being the employee's responsibility. Three questions are asked about each of the problem situations, namely whether or not the situation is present, how frequently it occurs, and the impact of the situation, i.e. to what extent it affects the employee. The participants can also express their views by specifying, in some instances, the circumstances surrounding these situations. One final question asks the participants if they consider the day to be typical of other workdays during the year and, if not, to explain why.

Difficult and satisfying aspects encountered during the workday

First, as can be seen from Table 6, two initial questions are asked: one about the difficulties related to the prescribed work (what is required), and the other about the difficulties related to what is required to perform the actual work in terms of the knowledge and skills needed. These questions were derived from analysis of the documents provided by the agency. For each question, the participants have to assess the level of difficulty encountered. In another question, the participants are asked if they experience any other work-related difficulties that might not have been mentioned, and if so, to specify what they are. A 20-item question is asked to find out the causes (see Table 7 for details on the causes) that, according to the employees, explain the difficulties they experience at work. These causes had previously been cited by employees during the interviews. Next, three long-answer questions are asked: to describe one or two of the most unpleasant work-related events they had experienced, to describe the most pleasant work-related event they had experienced, and to identify the aspects that could be improved to make their work more pleasant and more efficient.

Components of the perceived workload

The NASA-RTLX method (Byers et al., 1989; Hart & Staveland, 1988; Rubio et al., 2004) was used in this section. The procedure associated with this method, as well as the form of the rating scales, was modified to ensure applicability in the employees' actual work context and compatibility with the diary (using the *Survey Monkey* software program). In other words, the participants had to evaluate their work, i.e. all the tasks they performed during the workday, by indicating the level corresponding to their experience on each rating scale.

Level of fatigue

This section contains a question that also comes from the literature. The method used is an adaptation of Borg's CR-10 Scale (Borg, 1998). This scale was used to measure the level of fatigue felt by the employees at the end of their workday; they were given the option of adding comments to explain their assessment as needed.

General information

Two questions were asked in this section: whether there was any other important information that the participants wanted to add and whether they had any comments or suggestions to make regarding possible improvements to the diary.

Information about the respondent

This section contained a total of 13 questions. These were identical to some of the questions used in the survey, and their purpose was to collect information about the participant. First, the date, participant number, and password (assigned earlier by email) were requested in order to protect and ensure confidential handling of the data obtained. Closed questions were then asked in order to document the participants' sociodemographic profiles. These consisted of age, gender, job category, job title, administrative region, job status, seniority, number of days off work during the past year, and number of absences lasting more than ten consecutive days during the previous year. Pull-down menus make it easier for respondents to find the desired response categories.

Table 7: Difficult aspects of prescribed and actual tasks and their causes

Prescribed tasks	Actual tasks	Causes
• Assessing and analyzing the situation, case and/or needs • Looking for information • Providing information (verbal or written) • Advising a client • Advising a superior • Advising an organization • Advising an agent • Referring a client to the appropriate resource • Making decisions • Carrying out follow-up and coaching activities • Organizing and/or coordinating the work • Organizing, running, and/or attending a meeting, committee, round table discussion, or group activity • Conducting orientation interviews • Supporting the management of the organization • Negotiating and entering into agreements • Assisting or training a colleague • Assisting or training a client	• Knowing and understanding the programs, measures, services, and resources available, as well as procedures, laws and regulations in force, and their updates • Communicating with a colleague • Communicating with a superior • Communicating with an organization • Communicating with a client • Communicating with a community organization • Communicating with an external resource • Using the computer system • Managing time(time pressure, waiting lines, or other) • Attaining quality and quantity standards in their work • Paying close attention and maintaining focus • Not taking clients' problems upon oneself • Not feeling responsible for their organization's decisions • Doing part or all of a colleague's work	• Lack of training • Problem communicating with a colleague • Problem communicating with a superior • Problem communicating with external resources • Lack of support • Lack of recognition of work • Lack of personnel • No possibility of replacement • Competitive feelings among employees • Performance indicators not representative of actual work • Performance objectives too high • Extra tasks • Intensity (increased pace) of the work • Major delays in information searches • Particular characteristics of certain clienteles • Physical or verbal violence from clients • Budget cutbacks • Uncertainty about the future • I don't know the possible causes

- **Step 2: Pre-testing and launch of the diary**

Sample population

A convenience sample was recruited for this objective, using the following inclusion criteria: (1) being employed at the operational level; (2) being based in one of Québec's 17 administrative regions; (3) having professional, technician, or support status; and (4) having been assigned to the same job for more than six months in the agency. The last criterion excluded individuals who were in the process of returning to work or newly hired, and who might have had different characteristics.

Data collection procedure

First, to ensure that the data collection procedure was relevant, applicable, and could be completed in the allotted time, and that the questions were easy to understand within the agency's context, a pre-test was administered to ten employees working in one centre, the same centre where the interviews and observations had been carried out when developing the diary. Based on the results obtained, all potential participants were contacted in order to document the instrument's internal validity, among other things. Specifically, a letter was sent to the employees by a key person at the agency inviting them to express whether they were interested in completing the diary. The employees who agreed then signed a consent form approved by Hôpital Charles LeMoyne's Research Ethics Committee. The diaries were completed during working hours and, generally speaking, at the end of the workday, using the same Web-based platform as was used for the survey. They took approximately 45 minutes to complete the diary. To prevent the computer problems that had occurred during the survey, the participants were given one week after receiving the hyperlink to complete their diary. They were instructed to do so at the end of a workday that could be considered representative of their work. Data collection took place between October 24 and November 13, 2008.

- **Validation of the diary**

Results of the pre-test

A total of ten participants agreed to complete the diary as part of the pre-test. At the end of the data collection period, nine participants had done so and, in response to the instrument's last two questions, had provided five comments regarding possible improvements. Overall, the participants indicated that the diary was relevant and easy to complete within the allotted time. We were thus able to develop and officially launch a final version. None of the comments questioned the instrument's content, so the same format was retained for the next step.

Internal validity of the diary

Characteristics of the respondents

In response to the letter inviting employees to sign up for the diary project, 220 individuals expressed their interest in taking part. Of these, 200 participants began the questionnaire and 193 completed it in its entirety.

The majority of the respondents were women between 40 and 59 years of age (80%). In terms of the job-related variables, the results showed that the majority of the participants held the job of technician (70%). The respondents came mainly from the Montréal (16%) and Montérégie (15%) regions. In addition, the majority had between 11 and 20 years of seniority at the agency (37%) and between six and ten years at the same regional centre (32%), and had held the same job (32%) for six to ten years. As well, in the previous year, 26% had been absent due to illness for three to five days, and the majority had not been absent due to illness for more than ten consecutive days. These characteristics were representative of the agency's employees.

Factor analysis of the diary data

The items completed and rated on a ratio scale were analyzed in order to document the diary's internal validity. Certain items could not be analyzed as they were relevant to too few respondents. Since the diary concerned various types of jobs, some items did not apply to some of the jobs or were not applicable to the workday analyzed. The vast majority of these data related to the items taken from documents concerning task descriptions. In fact, ten of the 17 items in the "prescribed tasks" section were not included in the analysis. Six of these were excluded primarily because they did not apply to the respondent's job. The items concerning activities/tasks performed by the employees that were developed on the basis of observations and interviews had a much lower non-response rate, and involved only four out of 14 items. Of these four, three were excluded, mainly because they did not apply to the workday analyzed. For the items retained, the distribution of the sample population's scores, which was obtained by computing skewness and kurtosis for each datum, was within the norms.

Principal component analysis was performed applying a Varimax rotation and an orthogonal solution. Eigenvalues greater than 1.00 were retained. Four factors were retained after observing the scree test. Item factor loading was $r \geq 0.30$. The Kaiser-Meyer-Olkin measure of sampling adequacy obtained was 0.53. The four other factors retained explain 50.88% of the total variance. The first factor was composed of items measuring the impact of the work activity demands pertaining to performance of the prescribed work. The second factor included the different work activity demands pertaining to customer service, whether external clients or internal clients, i.e. colleagues and superiors. The third factor involved the assessment of the perceived workload. Lastly, the fourth factor concerned the impact of the work activity demands pertaining to unforeseen events and interruptions.

Table 8: Factors identified during factor analysis and variables that make them up

QUESTIONNAIRES & SUBSCALES	FACTORS 1	2	3	4
IMPACT OF THE WORK ACTIVITY DEMANDS PERTAINING TO PERFORMANCE				
Task K: organizing and/or coordinating the work	0.65			
Activity H : using the computer system	0.43			
Activity I : managing time	0.86			
Activity J : attaining quality and quantity standards in their work	0.72			
Activity K : paying close attention and maintaining focus				
Activity L : not taking clients' problems onto oneself	0.75			
Activity M : not feeling responsible for the decisions made by one's organization	0.69 0.45	0.42		
Workload : performance				
Frequency of interruptions during the day	0.52			
Impact of interruptions on overall day's work	0.41 0.53			
IMPACT OF THE WORK ACTIVITY DEMANDS PERTAINING TO SERVICE (INTERNAL AND EXTERNAL CLIENTS)		0.65		
Task A: assessing and analyzing the situation, case, or needs		0.60		
Task B: looking for information		0.57		
Task e C: providing information		0.49		
TaskD: advising a client		0.58		
Task G: advising an agent		0.66		
Task I: making decisions	0.58	0.73		
Activity A : knowing about and understanding the programs, measures, services, available resources, procedures, laws and regulations in force, as well as updates		0.47		
Activity B : communicating with a client	0.62	0.57		
Activity C : communicating with a colleague		0.57		
Activity D : communicating with a superior				
ASSESSMENT OF THE PERCEIVED WORKLOAD				
Workload : Mental demand			0.68	
Workload: Physical demand			0.49	
Workload: Temporal demand			0.73	
Workload: Effort			0.68	
Fatigue felt at the end of the day		0.47	0.47	
Impact of lack of work during the day			0.51	
IMPACT OF THE WORK ACTIVITY DEMANDS PERTAINING TO UNFORESEEN EVENTS AND INTERRUPTIONS				0.52
Workload : Frustration	0.54		0.40	0.42
Impact of lack of time to complete the day's work				0.88
Frequency of tasks perceived as not being one's responsibility				0.89
Impact of tasks perceived as not being one's responsibility	0.43			0.45
Impact of unforeseen events during the day				
Cronbach's alpha	0.83	0.84	0.73	0.71
Sum of the squares of the factors retained	5.71	4.40	3.43	3.25
Explanation of variance after rotation	17.32	1.32	1.40	9.84

4. DISCUSSION

The purpose of this research design was to develop a systematic approach for identifying the determinants of the inability to maintain an active working life in workers with psychological problems. To this end, two specific objectives posing different methodological challenges were defined: (1) to develop and perform an initial validation of a survey mechanism designed to identify the determinants, prevalence, and distribution of psychological distress and presenteeism; and (2) to develop and perform an initial validation of an ergonomic instrument (diary) for describing and assessing the workload and its determinants in the work activity, within the agency context.

Various information sources applicable to the overall study were consulted. This information triangulation process was very fruitful. First, it provided a thorough understanding of the problems within the agency, but also allowed for rectification of the inclusion and exclusion criteria and for their alignment with public service realities. The outstanding support received from the agency officials throughout the process and the extraordinary cooperation of the unions concerned should also be mentioned. In such a process, it is important for employees to understand that the exercise they are being asked to do is part of a process endorsed by both their employer and their union. The invitation to participate in the study, signed by both parties, signalled that they were interested in taking concrete measures based on the results obtained. This served to reinforce the message that the process was important. That the invitation was also signed by the union gave additional moral credence to the process, encouraging employees to respond without fear of employer reprisal. The results obtained could not have been better. This modus operandi also gave the research team additional credibility. In short, the joint action, good communication, and collaboration among the parties were key contributing factors to the attainment of the study objectives. In addition, the agency officials succeeded in providing effective ways of allowing the employees to complete the survey and/or diary on their work time. Both the survey participation rate (48%) and the respondents' representativeness clearly indicate that the various strategies used worked well and limited the risks of selection bias. This response rate is also comparable to that obtained on other surveys of similar organizations involving a recruitment period of between four and 12 weeks (APSAM, 2005; Brun et al., 2003).

The choice of an intermediate-level platform, specifically Survey Monkey, proved to be a good one given the length of the instruments, the number of participants involved for each objective, and the fact that each participant completed all the instruments at the same workstation. Using an online platform made it possible to collect data across Québec, while considerably reducing the costs of administering the battery of questionnaires compared with a mail-out. The software also requires the user to respond, which limits the amount of missing data. However, on the effort-reward questionnaire, the participant was first asked to indicate whether he agreed or disagreed with the statement and then to rate his level of distress. In this case, the obligation-to-respond command could not be activated, and data might therefore be missing. Also, certain limitations in the response format sometimes required adaptations to the original questionnaire. For example, for the diary, Borg's CR-10 Scale, which is normally presented vertically, had to be presented horizontally. Another advantage noted at the outset was that using an online platform eliminated the need for data entry and the errors potentially associated with that process. The data, i.e. the answer to each question, were transferred directly

to a data analysis program. Even so, we had to verify the correspondence between each column and item on the questionnaire. And although the items were in chronological order, various strategies had to be used to ensure that there were no errors of this type or errors made during calculation of all the questionnaire scores.

4.1 The survey

The battery of questionnaires assembled for the survey constituted a set of instruments with good validity. The analyses revealed satisfactory internal validity for each instrument. The "decision authority" scale of the Job Content Questionnaire had a lower Cronbach's alpha, which was nonetheless acceptable as the scale consisted of only three items. The lower coefficients were obtained mainly on the questionnaire concerning efforts and rewards. During their validation of the French-language version of the instrument, Niedhammer et al.(2000) made the same observation, although their coefficients were slightly higher. While the Cronbach's alpha may represent a limitation of this instrument, the instrument was still retained, as it is the only one currently available that measures all the factors in the effort-reward-imbalance model. In light of our results, we can, however, make one recommendation regarding a modification that should be made to the rating scale. The current form asks the respondent to indicate first whether he is experiencing a difficult event (e.g. "I am constantly under time pressure because of a heavy workload"). If the answer is affirmative, the person must rate his level of distress. If the answer is negative, the person's score must be reported as "0" on the distress scale. Thus, the average score for all the respondents may be skewed lower. One way of sidestepping this problem would be to change the distress scale. The rating scale could instead assess "To what degree is the situation problematic for you?"

The factor analysis conducted on the questionnaires included in the survey highlighted the relevance of all the questionnaires selected. Only two questionnaires did not reach the desired level of significance. These questionnaires concerned the so-called personal variables, i.e. those related to perceived social support and to stressful events experienced in the preceding six months. Despite this result, we do not recommend dropping the use of these questionnaires because, theoretically, the variables they measure could contribute to family-work conflict in the case of stressful events or be stress moderators in the case of social support. The possibility that these variables may have some importance in another organizational context cannot therefore be ruled out. The regression analyses performed on the distress and presenteeism data also highlight the relevance of the questionnaires retained for the purpose of identifying the determinants of distress and presenteeism. For the most part, our results are also comparable to those obtained by Brun et al. (2003) for four Québec organizations (higher education institution, industrial establishment in the metallurgical sector, hospital, and nursery), in which the main risk factors for psychological distress were found to be work overload, low recognition in terms of esteem shown, a difficult relationship with the supervisor, and low participation in decision making (Brun et al., 2003). In fact, Britain's National Safety Executive recently issued management standards designed to prevent the risks of psychological health problems from developing. They involve assessing demands, control, support from colleagues and superiors, relationships at work, role conflict and ambiguity, and organizational change (Cousins et al., 2004).

In addition to documenting the main factors associated with psychological health problems, one of the added values of our study is that it documented emotional labour. This concept originates in the field of psychology concerned with emotion regulation. As a factor associated with burnout, it is a relatively recent focus of study in the literature (Brotheridge & Grandey, 2002; Brotheridge & Lee, 2003; Brotheridge & Taylor, 2006; Mann, 1998). Emotional labour was initially used in reference to jobs in human relations ("people work"). However, the social or "customer service" component is increasingly present in various types of jobs. Moreover, a certain level of emotional demand was observed in clerical- and physical labour-type occupations (Brotheridge & Grandey, 2002). According to these authors, beyond these types of occupation, supervisors would also warrant being studied in greater depth due to the nature of their work.

The concept of emotional labour would appear helpful for documenting a particular aspect of the demands and control constructs in the Karasek model (1979). Specifically, it is not only the fact of interacting with clients or coping with high emotional demands that appears to be associated with psychological health problems, as in some cases such employees will say that their work is gratifying. It is also the fact that they face high emotional demands and have very little control over emotional expression. The "surface acting" component (faking, hiding one's emotions) would seem to be a way of detaching from people at work and to contribute to a lower sense of personal accomplishment (Brotheridge & Grandey, 2002). In light of this hypothesis put forward by Brotheridge and Grandey (2002), the addition of a measure of one's self-esteem as a worker would appear to be totally justified.

The battery of questionnaires proposed in this research design also allows presenteeism to be documented. Surprisingly, although presenteeism is increasingly cited in the context of the work-related psychological health issue, few studies have actually documented it. We therefore chose an instrument currently used in the musculoskeletal research field. The Work Limitation Questionnaire (Lerner et al., 2001) and the Work Role Limitation Questionnaire (WRLQ) (Amick et al., 2000) are among the most frequently used instruments. Both have the same underlying theoretical bases and there is a 90% overlap in their items. They differ in terms of recall duration(four weeks versus two weeks) and rating scales. The middle category of the WRLQ rating scale corresponds to "half the time," compared to "sometimes" on the Work Limitation Questionnaire. The WRLQ also includes two more items than the WLQ. Unfortunately, the results obtained on the two questionnaires cannot be compared due to these differences.

The task of comparing the results of the various existing studies proved to be extremely laborious. In fact, scores appear to be calculated differently from one study to the next. Also, the questionnaires are regularly adapted to the needs of the study, sometimes to fit the organizational context for reasons of thrift or to limit the imposition on the respondents. However, what is clear is that it is difficult for us to present the organization with comparative data. This observation was also made by Rick et al. (2001) and regrettably, it still holds true today.

4.2 The diary

The purpose of developing the diary was to further investigate workload assessment. The results emerging from the survey and the scientific literature highlighted the importance of developing an instrument that takes into account the actual, prescribed, and perceived workload. Workload can vary from one person to another under the same working conditions. The concept is therefore difficult to measure, and few if any validated instruments exist for evaluating mental workload and fewer still in the service sector. Consequently, unlike the survey, the diary was developed without the benefit of any previously validated instruments other than for the components of the perceived workload, for which the NASA-RTLX method and Borg's CR-10 Scale were used. A rigorous process was nonetheless followed to develop the diary, based on a conceptual framework for workload assessment, among other things. The scientific and grey literature was consulted in light of this framework. Interviews with key informants and observations provided additional information for developing a diary that was useable in the field.

The NASA-RTLX was adapted to the context of this study. This measurement instrument was designed to evaluate one task at a time during execution or immediately thereafter in order to optimize the work sequences. By contrast, in our study, the instrument was used at the end of the workday to evaluate all the tasks performed. Obtaining the respondents' perception of their workload in terms of physical, mental and temporal demands, performance, effort, and fatigue for each task yielded extremely valuable information. However, given the wide range of tasks performed by the various groups of employees, it may not be practical to carry out such an exhaustive evaluation at the agency. Similarly, the possibility of modifying the work sequence may not be realistic in this context.

The results of the pre-test of the first version of the diary supported its use with no major changes. All the analyses performed to assess its internal validity showed an acceptable level. The factors emerging from the factor analysis can be easily related to the conceptual workload-assessment framework. In fact, the first factor highlights the performance component related to the actual work and the prescribed performance. The second factor essentially covers the actual work. The third factor includes nearly all the items evaluating the perceived workload as assessed using the NASA-RTLX. It did not include the "performance" item because it was associated with the performance factor. Similarly, the item on frustration is associated more closely with interruptions, which also makes sense. Lastly, the fourth factor documented the difficult aspects that interfere with the performance or execution of the actual work.

The diary would thus appear to allow refinement of the survey results by documenting the workload perceived by the employees of a government agency. The study conducted by Brun et al. in 2003 had already brought to light the importance of workload, as it emerged as one of the main risk factors for psychological health problems at work. Our study therefore innovates by proposing the use of a pre-tested workload assessment instrument, which, as designed, investigates the employees' work while taking into account their perceptions. The closed questions add a degree of precision to the data collected, while the open-ended questions allow participants to expand on or clarify their answers. In addition, the diary concerns several of the job categories into which the agency's personnel fall: professional, technician, and support staff.

Our wish to take into consideration the realities of several job categories and job titles involving highly variable tasks meant that we retained questions with a more general scope. Ideally, for more precise quantitative results, the participants should be informed in advance of the variables that will be measured so that they can make note, for example, of the number of contacts they had during their work day. The more general nature of the questions also complicated the factor analysis performed on the diary, as the participants had the option of answering that the statement "was not applicable to their job" or "to the work day." Some statements were therefore excluded from the factor analysis due to their relevance to too few respondents. This could be attributable to the fact that the respondents had a harder time relating their real workload to the prescribed workload. The diary was also administered on an ad hoc basis during the year and covered only one work day. The variability of the work depending on the period of the year was not therefore evaluated, which could constitute a limitation. Nor is it possible at this time to quantify the workload separately for each task or to compare it with other results, given that the literature does not currently provide any norms or specific threshold defining work overload or underload and that the assessment contexts differ greatly from one study to the other.

This methodological approach was intended to lend itself to use in other work contexts where the occupational disability problem is present. However, it is essential that the diary be used in combination with observations in the workplace to allow for its adaptation to the organization's specific context and to document, in greater detail, aspects of the prescribed work and real work, as well as the worker strategies used to reduce the gap between the two. The questions in the diary that can be adapted to a different work context are those concerning the job held, the real work (e.g. types of contact or number of cases handled), level of difficulty of the tasks prescribed and performed, and the causes of this difficulty as perceived by the employees.

4.3 Scope and limitations of the study

One of this study's limitations may be that no systematic literature review was carried out to guide the choice of instruments or questions to be used in the survey and the diary. As regards psychosocial measures, we referred to a critical review of these measures conducted by Rick et al. (2001) for Britain's National Safety Executive. They were unable to carry out a systematic review due to the scarcity of studies focusing specifically on the development and validation of instruments pertaining to psychosocial hazards. Psychosocial hazards refer to work characteristics that can act as stressors (Rick et al., 2001). The approach we took, namely that of starting with a conceptual framework followed by a search for instruments and a consensus process among the investigators, was therefore entirely warranted. With respect to development of the diary, a systematic review might have enabled us to find instruments in the process of development since, to our knowledge, no validated instruments currently exist that document the different components of workload or the determinants of the prescribed or actual work, as developed in this study.

This research study is relevant for the following reasons. First, the entire study is based on a conceptual framework. In addition, the diary is based on fundamental ergonomic concepts organized within a conceptual workload-assessment framework. In their critical review of instruments measuring psychosocial hazards, Rick et al. (2001) lament the fact that few instruments have theoretical foundations. Tellingly, of the 126 employers surveyed in one study, 74 said they had evaluated psychosocial hazards, yet of this number, only 34% had used a risk assessment framework (IRS, 1999). Our study therefore addresses one of the observations made by Rick et al. (2001) concerning the flagrant lack of studies that examine the psychometric properties of psychosocial measures in the field of psychological health at work. With regard to the instruments' internal validity, we made a particular effort in our research activity design to present all the elements needed to assess the rigour of the process.

The respondents' characteristics in terms of gender, employment status, geographic distribution, and seniority were representative of all the agency's employees. In real terms this meant that the instruments were validated with predominantly female employees between the ages of 40 and 59 working in the major centres and having technician status within the agency. Validation of the instruments in other workplaces with other characteristics is therefore needed. On the other hand, in our study, if we had sought to artificially equalize the number of respondents across the different job categories and genders, it might have reduced the results' generalizability to the entire organization (Tabachnick & Fidell, 2001).

4.4 Specific characteristics of research conducted in collaboration with the workplace

One specific characteristic of research conducted in collaboration with the workplace is clearly the different time constraints faced by the employer and the researchers. When an employer agrees to participate in a research project or asks a research team to conduct an intervention in its workplace, it expects to receive deliverables within a relatively short timeframe. Most workplaces undergo many and regular organizational changes, obliging senior management to make fast decisions to implement measures in response to the various changes introduced. This reality may not correspond to the researchers' reality, in which the validation of data, systematic literature reviews, and scientific discussions among peers, among other things, necessarily require longer time frames. Agreements must therefore be reached with the employer at the outset regarding the various deadlines. For example, it could be agreed that the employer will have access to certain preliminary information so that it can proceed to implement measures or carry out certain interventions before the study's completion, provided that these changes do not interfere with the results.

A somewhat similar problem arises with the union, which is regularly questioned by its members as to the study's progress and when they can expect the employer to take action to remedy or improve the situation. The union is subject to the same time pressures and anxious to see concrete action taken quickly. The speed with which interventions are introduced thus becomes an important factor in carrying out the study.

4.5 Context for using these instruments: recommendations

From the perspective of evaluating distress and presenteeism at work, apart from the need to obtain valid instruments, it is important to see this evaluation as part of a broader process. In fact, one must ask questions about the aims of the evaluation. While establishing prevalence and identifying determinants clearly constitutes an important step, it is not an end in and of itself. The evaluation must be part of a broader process that includes implementing intervention measures adapted according to prior findings. To successfully obtain employee participation, employees must have a clear commitment from their employer that it will then take action to address the factors causing distress or presenteeism. The employer must therefore be totally aware of what this involves. Simply identifying the determinants without subsequently taking corrective action will have a very negative impact on the employees consulted, and could in turn lead to frustration and disillusionment among them. Any future attempts by the employer to identify problem situations would result in a degree of scepticism in many employees, who would still recall that management had done nothing in the past to correct a problem situation already clearly identified. Hence there is a very real danger that an employer will only want to be partially involved in such a process. The fact of announcing management's interest in assessing distress and presenteeism at work to employees automatically creates high expectations, particularly among employees who perceive that they are facing this situation, and they then expect management to take steps to remedy or improve it.

Furthermore, even if for totally justified reasons an employer does not intend to take concrete action following an assessment of distress or presenteeism at work within the

organization, it must be aware of the possible negative impacts. In summary, evaluating distress or presenteeism is an extremely worthwhile exercise for the entire organization, provided management is committed to taking measures to rectify problem situations that are identified in the process.

5. CONCLUSION

The systematic approach for identifying the determinants of occupational disability proposed in this study forms part of a cycle of activities designed to evaluate these determinants, implement a change, and evaluate the effectiveness of the strategies, ultimately to reassess employees' psychological health. This approach must necessarily be adopted jointly by the employer and the unions, if applicable. It includes administering a battery of validated questionnaires that may first be used to identify the main occupational disability determinants in all the employees of a given organization. The proposed diary evaluates in greater depth one of the aspects documented in the survey, specifically, the employees' workload during a typical workday. The development of the workload assessment instrument therefore fit into the overall research project, whose aim wasto achieve a deeper understanding of the factors that explain occupational disability while being specific to a particular work environment, that of an agency's departments. This instrument could also be adapted and adjusted for use in other organizations, such as Canada's public service and public- and private-sector corporations.

Large numbers of companies are already conducting surveys to evaluate the health of employees in their workplaces. One of the main advantages of doing so with an external research team present in the workplace is the high level of credibility they bring to the process and the decreased risk of conflicts of interest, compared with the use of a survey developed by members of the organization.

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APPENDICES

APPENDIX 1:
French version of the *Work Role Functioning Questionnaire (WRFQ)*

Nom: _____ Date : _____

Work Role Functioning Questionnaire

Ces questions vous demandent d'évaluer la fréquence, **au cours des quatre dernières semaines**, où vous avez eu de la difficulté à réaliser certaines parties de votre travail à cause de votre état de santé physique ou émotionnelle.

- Cochez la case « ne s'applique pas à mon travail » seulement si la question décrit quelque chose que vous ne faites pas dans votre travail.

Au cours des quatre dernières semaines, à quelle fréquence votre état de santé physique ou émotionnelle vous a-t-il donné de la difficulté à :	**Tout le temps difficile (100%)**	**La plupart du temps difficile**	**La moitié du temps difficile (50%)**	**Quelquefois difficile**	**Jamais difficile (0%)**	**Ne s'applique pas à mon travail**
1. Travailler le nombre d'heures demandé	☐1	☐2	☐3	☐4	☐5	☐0
2. Commencer votre journée de travail avec entrain	☐1	☐2	☐3	☐4	☐5	☐0
3. Commencer à travailler dès votre arrivée au travail	☐1	☐2	☐3	☐4	☐5	☐0
4. Faire votre travail sans prendre une pause supplémentaire	☐1	☐2	☐3	☐4	☐5	☐0
5. Maintenir une routine ou un horaire régulier	☐1	☐2	☐3	☐4	☐5	☐0
6. Assumer votre charge de travail	☐1	☐2	☐3	☐4	☐5	☐0
7. Avoir un rythme de travail suffisant	☐1	☐2	☐3	☐4	☐5	☐0
8. Terminer le travail à temps	☐1	☐2	☐3	☐4	☐5	☐0
9. Faire votre travail sans faire d'erreur	☐1	☐2	☐3	☐4	☐5	☐0
10. Satisfaire les personnes qui jugent votre travail	☐1	☐2	☐3	☐4	☐5	☐0
11. Sentir que vous vous accomplissez dans votre travail	☐1	☐2	☐3	☐4	☐5	☐0
12. Avoir l'impression que vous avez fait ce dont vous étiez capable de faire	☐1	☐2	☐3	☐4	☐5	☐0

Adaptation trans-culturelle du WRFQ, 2004
Durand, Vachon, Hong, Imbeau, Vézina, Amick & Loisel

Nom: _____ Date : _____

Au cours des quatre dernières semaines, à quelle fréquence votre état de santé physique ou émotionnelle vous a-t-il donné de la difficulté à :	Tout le temps difficile (100%)	La plupart du temps difficile	La moitié du temps difficile (50%)	Quelquefois difficile	Jamais difficile (0%)	Ne s'applique pas à mon travail
13. Marcher ou se déplacer dans différents endroits de travail	☐1	☐2	☐3	☐4	☐5	☐0
14. Lever, transporter ou déplacer des objets de plus de 10 livres au travail	☐1	☐2	☐3	☐4	☐5	☐0
15. Rester assis, debout ou dans la même position plus de 15 minutes en travaillant	☐1	☐2	☐3	☐4	☐5	☐0
16. Répéter les mêmes mouvements à de nombreuse reprises en travaillant	☐1	☐2	☐3	☐4	☐5	☐0
17. Travailler penché, en torsion ou en s'étirant	☐1	☐2	☐3	☐4	☐5	☐0
18. Utiliser des outils ou des équipements à l'aide de vos mains	☐1	☐2	☐3	☐4	☐5	☐0
19. Maintenir votre attention sur votre travail	☐1	☐2	☐3	☐4	☐5	☐0
20. Planifier et organiser efficacement votre travail	☐1	☐2	☐3	☐4	☐5	☐0
21. Travailler avec soin	☐1	☐2	☐3	☐4	☐5	☐0
22. Se concentrer sur votre travail	☐1	☐2	☐3	☐4	☐5	☐0
23. Travailler sans perdre le fil de vos idées	☐1	☐2	☐3	☐4	☐5	☐0
24. Lire ou utiliser vos yeux en travaillant	☐1	☐2	☐3	☐4	☐5	☐0
25. Parler avec les gens en personne, en réunion ou au téléphone	☐1	☐2	☐3	☐4	☐5	☐0
26. Maîtriser votre humeur en présence d'autres personnes pendant le travail	☐1	☐2	☐3	☐4	☐5	☐0
27. Aider les autres pour que le travail soit fait	☐1	☐2	☐3	☐4	☐5	☐0

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APPENDIX 2:
Self-Esteem as a Worker

WORKER SELF-ESTEEM QUESTIONNAIRE (translation of the French-language original)

Instructions:

Below is a list of statements concerning how you feel about yourself as a WORKER.

Indicate how strongly you agree or disagree with each of the characteristics or descriptions listed, by circling the appropriate number.

1	2	3	4
Strongly disagree	**Disagree**	**Agree**	**Strongly agree**

General feelings about yourself as a worker	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
1. As a worker, I see myself as a person with at least the same worth as any other worker.	1	2	3	4
2. As a worker, I think I have number of great qualities.	1	2	3	4
3. All things considered, as a worker, I tend to see myself as a failure.	1	2	3	4
4. As a worker, I am able to do things as well as most of the other workers.	1	2	3	4
5. As a worker, I don't see many reasons to be proud of myself.	1	2	3	4
6. As a worker, I have a positive attitude toward myself.	1	2	3	4
7. As a worker, I would like to have more self-respect.	1	2	3	4
8.As a worker, overall I am satisfied with myself.	1	2	3	4
9. As a worker, sometimes I feel really useless.	1	2	3	4
10. As a worker, sometimes I see myself as a good-for-nothing.	1	2	3	4

APPENDIX 3:
COMMENTS ON SOME OF THE WEB-BASED PLATFORMS RETAINED FOR THE SURVEY

Web-based Platforms Retained for the Survey

Name	*Survey Monkey*	*e-questionnaire*	*Question builder*	*Vovici*	*Zoomerang*	*Survey Writer*
Website	surveymonkey.com	e-questionnaire.com	questionbuilder.com	vovici.com	zoomerang.com	surveywriter.com
Strengths	Possibility of taking breaks while completing the survey. Low price.	Data collection tracking using the dashboard.	Possibility of taking breaks while completing the survey.	Desktop software that allows for working offline. High-level analyses.	Free training. Respondents can complete the survey via cell phone. Multi-user access.	Possibility of taking breaks while completing the survey. Free training.
Weaknesses	Limited level of programming. No question/answer library.	No question/answer library.	Confusing interface	Limited space on one page.	Costly.	Error message involves having to scroll down all pages. Poor aesthetic quality.
Design	Aesthetically appealing and sophisticated. Allows for question sections.	Sections available. Questionnaire browser. Flexible layout.	Sections available. Flexible layout.	Several pages can be opened at the same time. Flexible layout.	Sections available.	Sections available.
Characteristics of the questions	Open-ended, closed or mixed. Validation of responses. Randomization available. Flexible layout.	Open-ended, closed or mixed. Filter management.	Open-ended, closed or mixed. Validation of responses. Randomization available. Question/answer library.	Open-ended, closed or mixed. Validation of responses. Randomization available. Question/answer library. Models can be created.	Open-ended, closed or mixed. Validation of responses. Randomization available. Question/answer library.	Open-ended, closed or mixed. Validation of responses. Randomization available. Question/answer library. Filter management.
Personalized mailings and reminders	Yes	Yes	Yes	Yes	Yes	Information not available.
Multiple data collection at each work station	Yes	Information not available.	Information not available.	Information not available.	Information not available.	Information not available.

Basic statistical analyses and data transfers	Yes	Yes Regression and cluster analyses possible.	Yes	Yes Regression and cluster analyses possible.	Yes	Yes
Data hosting	Yes	Yes	Yes	Yes	Yes	Yes
Confidentiality	Yes	Yes	Yes	Information not available.	Yes	Yes
IP address filtering	Yes		Yes	Yes	Information not available.	Yes
Single data collection per respondent	Yes	Yes	Yes	Information not available.	Information not available.	Information not available.
Online assistance	Yes	Yes	Yes	Yes	Yes	Yes
Password protection	Yes	Yes	Information not available.	Information not available.	Information not available.	Yes
Multi-media add-ons	Yes	Yes	Yes	Information not available.	Yes	Yes
Sub-contracting possible	No	Yes	Information not available.	Information not available.	Yes	Yes
Rates	Free: max. 10 questions, 100 respondents. $19.95/mo.: unlimited no. of questions, max. 1000 respondents per month (5¢/additional respondent). $200.00/yr.: unlimited no. of questions and respondents.	Free: 15 respondents. $735.00 to $1,200.00 for 5,000 respondents.	Free: 1 month, 10 questions, 2 surveys, 100 respondents. $29.00 /mo.: Unlimited no. of surveys and questions. $79.00/mo.: Unlimited no. of surveys and questions. More complex group and personalized analyses. $299.00/mo.: Unlimited no. of	Information not available.	Free: 30 questions, max. 100 respondents. $199 to $899 /yr.: Pro to Premium plus versions.	$1.25/questionnaire (200 min.). $300.00 analyses per project. $0.10 to $0.25 email $100.00/hr. design & programming. Package available.

			surveys and questions. Complex surveys, reports and personalized analyses. Online assistance.			
Language	Multilingual	Multilingual	Multilingual	Information not available	Multilingual	
Training available	Yes	Yes	Empty box	Yes	Yes	Yes

APPENDIX 4: DIARY

DIARY TO BE COMPLETED BY PERSONNEL

1. Presentation of the diary

Welcome to the secure website that will allow us to perform an ergonomic analysis of your workload. This analysis process targets certain study participants in light of the results obtained in the survey on conditions conducive or detrimental to a healthy working life.

By means of a diary, the analysis aims to document, as faithfully as possible, the real work activity carried out during a work day and the perceived workload. You will be asked a variety of questions selected by the research team, including multiple-choice questions and long-answer questions. These questions focus mainly on the content of your work, the various difficulties you may encounter, and the work-related factors that may give you satisfaction. However, some questions will be more personal in nature in order to enhance our understanding of the impact that real-work factors have on the individual. In addition, you will note that a few questions in the first were already asked in the survey. However, as the survey data are confidential, we are unable to obtain information from that part of the study.

You will need approximately 45 minutes to fill out the diary.

We wish to assure you of the security of the confidential information collected about you during your participation in this research project. You may also rest assured that the information you provide will under no circumstances be passed on to your employer or any other entity.

If you agree to fill out the diary, please click the following button.

If not, click the “Withdraw from the study” button in the upper right-hand corner of the screen. You will automatically be redirected to the CAPRIT (Centre d’action en prévention et réadaptation de l’incapacité au travail) website.

If you have any questions or comments about this diary, please feel free to contact:
Sara Pettigrew, research professional, at 450-674-5908, ext. 227, or by email at: sara.pettigrew@usherbrooke.ca

Remember to send us your signed consent form if you have not already done so. We cannot process your answers without this form.

Thank you for your invaluable cooperation. Your input will help us find a winning formula for promoting healthy, active working lives.

We hope you enjoy filling out this diary!

Marie-France Coutu, Ph.D., principal investigator
Iuliana Nastasia, Ph.D., co-investigator
Sara Pettigrew, M.Sc., research professional

2. Information on your real work

The following questions concern the work that you performed TODAY.

1. If applicable to your work, how many new cases did you handle?

2. If applicable to your work, how many cases in total did you have to manage?

The next two questions concern the tasks you perform on the TELEPHONE.

3. How many contacts did you have ON THE TELEPHONE, with:

Clients?

Co-workers?

Supervisors or managers?

Individuals at a company?

Individuals at an external resource?

Individuals other than those mentioned above?

4. How much time in total did you spend today ON THE TELEPHONE with: (give the number of minutes)

Clients?

Co-workers?

Supervisors or managers?

Individuals at a company?

Individuals at an external resource?

Individuals other than those mentioned above?

The next two questions concern the tasks you performed directly with contacts IN PERSON.

5. How many direct contacts did you have IN PERSON with:

Clients?

Co-workers?

Supervisors or managers?

Individuals at a company?

Individuals at an external resource?

Individuals other than those mentioned above?

DIARY TO BE COMPLETED BY PERSONNEL

6. How much time in total did you spend today IN PERSON with: (give the number of minutes)

Clients?

Co-workers?

Supervisors or managers?

Individuals at a company?

Individuals at an external resource?

Individuals other than those mentioned above?

7. Approximately how many emails did you receive today?

The next three questions concern any meetings you may have attended.

8. Did you attend any meetings today?

☐ NO

☐ YES (please specify the number of meetings)

9. Answer this question only if you answered YES to the preceding question.

Were these meetings…

☐ Scheduled in advance?

☐ Scheduled at the last minute?

☐ Both, depending on the meeting?

10. Answer this question only if you answered YES to question 8.

Did the meetings last as long as planned?

☐ YES

☐ NO (please explain why)

The next three questions concern UNPREDICTABILITY in your work.

DIARY TO BE COMPLETED BY PERSONNEL

11. Did you have to cope with unpredicted events in your work today?

☐ NO

☐ YES (please describe the circumstances)

12. How frequently did you have to cope with unpredicted events in your work today?

☐ Never

☐ Rarely

☐ Occasionally

☐ Fairly often

☐ Continually

13. How much did this unpredictability in your work affect you today?

☐ Not at all

☐ A little

☐ Somewhat

☐ A lot

☐ A great deal

The next three questions concern INTERRUPTIONS in your work.

14. Were you interrupted today when performing your work?

☐ NO

☐ YES (please describe the circumstances)

15. How frequently were you interrupted in your work today?

☐ Never

☐ Rarely

☐ Occasionally

☐ Fairly often

☐ Continually

16. How much did these interruptions impact on your work as a whole today?

☐ Not at all

☐ A little

☐ Somewhat

☐ A lot

☐ A great deal

The next two questions concern tasks you might not have had time to perform.

17. Were there any tasks that you did not have time to perform today?

☐ NO

☐ YES (please describe the circumstances)

18. How much were you affected by the fact that you did not have time to perform one or more tasks today?

☐ Not at all

☐ A little

☐ Somewhat

☐ A lot

☐ A great deal

The next three questions concern lack of work.

DIARY TO BE COMPLETED BY PERSONNEL

19. Did you lack work at any time today?

☐ NO

☐ YES (please describe the circumstances)

20. How frequently did you lack work today?

☐ Never

☐ Rarely

☐ Occasionally

☐ Fairly often

☐ Continually

21. To what extent did the fact that you lacked work affect you today?

☐ Not at all

☐ A little

☐ Somewhat

☐ A lot

☐ A great deal

The next three questions concern the description of your tasks.

22. Did you perform any tasks today that, in your opinion, were not your responsibility?

☐ NO

☐ YES (please describe the circumstances)

23. How frequently today did you perform tasks that, in your opinion, were not your responsibility?

☐ Never

☐ Rarely

☐ Occasionally

☐ Fairly often

☐ Continually

24. How much did the fact that today you performed tasks that, in your opinion, were not your responsibility affect your work as a whole?

☐ Not at all

☐ A little

☐ Somewhat

☐ A lot

☐ A great deal

25. In your opinion, was today typical of your other work days during the year?

☐ YES

☐ NO (please describe the circumstances)

3. Difficulties encountered and satisfaction experienced today

The questions below concern difficulties you may have encountered in your work and aspects that may have given you satisfaction.

1. Evaluate the level of difficulty you encountered today in the following tasks by checking (√) the answer that best corresponds to your experience.

If the task does not apply to your job, answer "N/A to my job," and if it does not apply to the work you did today, answer "N/A to today."

	Not at all difficult	A little difficult	Somewhat difficult	Very difficult	Extremely difficult	N/A to my job	N/A to today
a) evaluating or analyzing the situation, case, and/or needs?	☐	☐	☐	☐	☐	☐	☐
b) looking for information?	☐	☐	☐	☐	☐	☐	☐
c) giving information (verbal or written)?	☐	☐	☐	☐	☐	☐	☐
d) advising a client?	☐	☐	☐	☐	☐	☐	☐
e) advising a superior?	☐	☐	☐	☐	☐	☐	☐
f) advising a company?	☐	☐	☐	☐	☐	☐	☐
g) advising an agent?	☐	☐	☐	☐	☐	☐	☐
h) referring a client to the proper resource person?	☐	☐	☐	☐	☐	☐	☐
i) making decisions?	☐	☐	☐	☐	☐	☐	☐
j) carrying out follow-up and support activities?	☐	☐	☐	☐	☐	☐	☐
k) organizing and/or coordinating work?	☐	☐	☐	☐	☐	☐	☐
l) organizing, facilitating, and/or attending a meeting, a committee, a roundtable, or a group activity?	☐	☐	☐	☐	☐	☐	☐
m) conducting orientation interviews?	☐	☐	☐	☐	☐	☐	☐
n) assisting in the organization's management	☐	☐	☐	☐	☐	☐	☐
o) negotiating or signing agreements?	☐	☐	☐	☐	☐	☐	☐
p) assisting or training a co-worker?	☐	☐	☐	☐	☐	☐	☐
q) assisting or training a client?	☐	☐	☐	☐	☐	☐	☐

DIARY TO BE COMPLETED BY PERSONNEL

2. Evaluate the level of difficulty you encountered today in the following activities by checking (√) the answer that best corresponds to your experience.

If the activity does not apply to your job, answer "N/A to my job," and if it did not apply to your day, answer "N/A to my work day."

	Not at all difficult	A little difficult	Somewhat difficult	Very difficult	Extremely difficult	N/A to my job	N/A to today
a) knowing about and understanding programs, measures, services, available resources, procedures, regulations and laws in force, as well as their updates?	☐	☐	☐	☐	☐	☐	☐
b) communicating with a client?	☐	☐	☐	☐	☐	☐	☐
c) communicating with a co-worker?	☐	☐	☐	☐	☐	☐	☐
d) communicating with a superior?	☐	☐	☐	☐	☐	☐	☐
e) communicating with a company?	☐	☐	☐	☐	☐	☐	☐
f) communicating with a community organization?	☐	☐	☐	☐	☐	☐	☐
g) communicating with an external resource person?	☐	☐	☐	☐	☐	☐	☐
h) using the computer system?	☐	☐	☐	☐	☐	☐	☐
i) managing time (time pressure, waiting lines, etc.)?	☐	☐	☐	☐	☐	☐	☐
j) attaining the work quality and quantity standards required?	☐	☐	☐	☐	☐	☐	☐
k) maintaining close attention and concentration?	☐	☐	☐	☐	☐	☐	☐
l) not taking clients' problems upon yourself?	☐	☐	☐	☐	☐	☐	☐
m) not feeling responsible for your organization's decisions?	☐	☐	☐	☐	☐	☐	☐
n) performing a co-worker's tasks or some of his/her tasks?	☐	☐	☐	☐	☐	☐	☐

3. Did you experience any other difficulties today with work-related tasks or activities that were not covered in the preceding questions but that you feel are important to mention?

☐ NO

☐ YES (please describe the circumstances)

4. What do you think could explain these difficulties? You may check (√) more than one box.

- ☐ Lack of training
- ☐ Problem communicating with a co-worker
- ☐ Problem communicating with a superior
- ☐ Problem communicating with external resource persons
- ☐ Lack of support
- ☐ Lack of means for performing the work properly
- ☐ Lack of recognition of the work
- ☐ Lack of personnel
- ☐ No possibility of being replaced
- ☐ Competitive feeling among employees
- ☐ Performance indicators not representative of the real work
- ☐ Performance objectives too high
- ☐ Additional tasks
- ☐ Intensity of the work (accelerated work pace)
- ☐ Major delays in looking for information
- ☐ Particular nature or needs of certain clients
- ☐ Physical or verbal violence from clients
- ☐ Budget cuts
- ☐ Uncertainty about the future
- ☐ I don’t know of any possible causes
- ☐ OTHER (please specify)

DIARY TO BE COMPLETED BY PERSONNEL

5. Describe the work-related event that you found THE MOST UNPLEASANT today.

6. Was there any other UNPLEASANT event today that you would like to describe?

If YES, please describe.

7. Describe the work-related event that you found THE MOST PLEASANT today and explain why.

8. Name the aspects of your work that should be improved to make it more pleasant and more efficient.

Please explain.

4. Workload components: rating scales

Six rating scales will be displayed in this section. You are asked to use them to evaluate various components of your workload (mental demands, physical demands, time demands, performance, effort, frustration).

Before you begin, read the following definitions carefully as they explain each of the components. It is extremely important that they be clear in your mind.

You must then evaluate your work, in other words, all the tasks you performed today, by marking on each rating scale the level that corresponds to your experience. All but one of the scales runs from "low" to "high," and the remaining scale runs from "good" to "poor."

1. MENTAL DEMANDS

How much mental and perceptual activity was required to perform your work (e.g. thinking, decision-making, calculating, remembering, watching, looking for)? Was your work easy or demanding, simple or complex?

	Low									High
Mental demands	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2. PHYSICAL DEMANDS

How much physical activity was required to perform your work (e.g. pushing, pulling, turning, operating, activating)? Was your work easy or difficult, slow or fast, calm or stressful?

	Low									High
Physical demands	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

3. TIME DEMANDS

How pressed for time did you feel due to the pace or speed at which your tasks had to be performed? Was the pace slow and comfortable or fast and strenuous?

	Low									High
Time demands	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

4. PERFORMANCE

To what extent do you think you succeeded in achieving your work objectives?

Are you satisfied with the results you obtained?

	Good									Poor
Performance	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

5. EFFORT

How much effort did you have to make at work (mentally or physically) to achieve your level of performance?

	Low									High
Effort	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

6. FRUSTRATION

How insecure, discouraged, irritated, stressed, and bored did you feel in your work today, as opposed to confident, encouraged, happy, relaxed, and satisfied?

	Low									High
Frustration	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

5. Fatigue level

The following question concerns your evaluation of the level of fatigue you experienced.

1. Evaluate the level of FATIGUE you experienced today after your work day by marking the corresponding level on the rating scale below. The rating scale runs from 0 to 10. It is normal to see no comments beside numbers 6, 8, and 9 of the scale.

- ☐ 0 No fatigue
- ☐ 1 Very low
- ☐ 2 Low
- ☐ 3 Moderate
- ☐ 4 A little high
- ☐ 5 High
- ☐ 6
- ☐ 7 Very high
- ☐ 8
- ☐ 9
- ☐ 10 Very, very high

Please specify, if needed.

6. General information

The next questions concern your diary completion experience.

1. Is there any important information concerning your work or work day that you would like to share with us and that was not covered in the diary?

2. Do you have any comments or suggestions regarding possible improvements to the diary?

7. Information on the respondent

The following questions concern your sociodemographic profile.

1. Please enter today's date.

Date DD / MM / YYYY

2. Please enter the participant number we assigned you.

3. Please enter the password we assigned you.

4. What is your sex?

☐ Female

☐ Male

5. What age group do you belong to?

☐ Age 20 to 29

☐ Age 30 to 39

☐ Age 40 to 49

☐ Age 50 to 59

☐ Age 60 to 69

☐ Age 70 and over

6. What category of job do you have?

☐ Professional

☐ Technician

☐ Support staff

7. In which administrative region do you work?

8. Are you...

☐ A casual employee?

☐ A regular employee?

9. How many years' seniority do you have:

	In your current job?	At the centre?	Within the organization?
Seniority			

10. Approximately how many employees work in your organization?

11. Please indicate the total number of days in the past 12 months that you were absent from work for illness, including planned leaves for family responsibilities:

- ☐ No absences
- ☐ Between 1 and 2 days
- ☐ Between 3 and 5 days
- ☐ Between 6 and 10 days
- ☐ More than 10 days

12. Have you had to be absent from work for a period of more than 10 consecutive days in the past 12 months, due to illness?

- ☐ NO
- ☐ YES