

# Development and validation of the French-Canadian Chronic Pain Self-efficacy Scale

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**BACKGROUND:** Perceived self-efficacy is a non-negligible outcome when measuring the impact of self-management interventions for chronic pain patients. However, no validated, chronic pain-specific self-efficacy scales exist for studies conducted with French-speaking populations.

**OBJECTIVES:** To establish the validity of the use of the French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES) among chronic pain patients.

**METHODS:** The Chronic Disease Self-Efficacy Scale is a validated 33-item self-administered questionnaire that measures perceived self-efficacy to perform self-management behaviours, manage chronic disease in general and achieve outcomes (a six-item version is also available). This scale was adapted to the context of chronic pain patients following cross-cultural adaptation guidelines. The FC-CPSES was administered to 109 fibromyalgia and 34 chronic low back pain patients (n=143) who participated in an evidence-based self-management intervention (the PASSAGE program) offered in 10 health care centres across the province of Quebec. Cronbach's alpha coefficients ( $\alpha$ ) were calculated to determine the internal consistency of the 33- and six-item versions of the FC-CPSES. With regard to convergent construct validity, the association between the FC-CPSES baseline scores and related clinical outcomes was examined. With regard to the scale's sensitivity to change, pre- and postintervention FC-CPSES scores were compared.

**RESULTS:** Internal consistency was high for both versions of the FC-CPSES ( $\alpha=0.86$  to  $\alpha=0.96$ ). Higher self-efficacy was significantly associated with higher mental health-related quality of life and lower pain intensity and catastrophizing ( $P<0.05$ ), supporting convergent validity of the scale. There was a statistically significant increase in FC-CPSES scores between pre- and postintervention measures for both versions of the FC-CPSES ( $P<0.003$ ), which supports their sensitivity to clinical change during an intervention.

**CONCLUSIONS:** These data suggest that both versions of the FC-CPSES are reliable and valid for the measurement of pain management self-efficacy among chronic pain patients.

**Key Words:** Chronic pain; French-Canadian; Internal consistency; Reliability; Scale; Self-efficacy; Sensitivity to clinical change; Validity

In large epidemiological studies, chronic pain is defined as pain symptoms that persist for more than three to six months (1-3). This condition affects approximately 11% to 29% of the general Canadian population (1,2,4-6), and includes many pain syndromes such as fibromyalgia, chronic low back pain, arthritis, headaches, abdominal pain, neuropathic pain and postoperative pain. Despite its significant impact on biopsychosocial aspects, the management of chronic pain remains suboptimal (7-12).

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**Développement et validation d'une échelle canadienne-française pour la mesure du sentiment d'auto-efficacité dans la gestion de la douleur chronique**

**PROBLÉMATIQUE :** Le sentiment d'auto-efficacité est un aspect important à considérer quand vient le temps d'évaluer les bénéfices d'une intervention visant l'amélioration de l'autogestion de la douleur chronique. Or, aucun instrument de mesure du sentiment d'auto-efficacité n'est actuellement disponible pour les populations souffrant de douleur chronique francophones.

**OBJECTIFS :** L'objectif de cette étude était d'examiner la validité de l'utilisation de la version canadienne-française d'une échelle d'auto-efficacité spécifique à la douleur chronique (EADC).

**MÉTHODOLOGIE :** Le *Chronic Disease Self-Efficacy Scale* est un questionnaire validé contenant 33 items qui permet de mesurer le sentiment d'auto-efficacité incluant l'adoption de comportements d'autogestion, la gestion de la maladie chronique en général et l'atteinte de résultats (une version à 6 items est aussi disponible). Une adaptation de cet instrument pour évaluer une population en douleur chronique a été effectuée selon les lignes directrices d'adaptation transculturelle d'instruments de mesure. L'EADC a ensuite été administrée à 109 patients souffrant de fibromyalgie et à 34 patients souffrant de lombalgie chronique (n=143) qui participaient à une intervention d'autogestion ayant été démontrée efficace (Programme PASSAGE) et qui a été offerte dans 10 centres de santé de la province du Québec. Afin d'évaluer la cohérence interne des deux versions de l'EADC (33 et 6 items), des coefficients alpha de Cronbach ( $\alpha$ ) ont été calculés. La validité de construit convergente de l'instrument a été évaluée en comparant ses résultats avec ceux d'autres instruments mesurant des concepts similaires. Finalement, la sensibilité au changement de l'EADC a été établie grâce à la comparaison des scores du sentiment d'auto-efficacité ayant été mesurés avant et après la participation au programme PASSAGE. **RÉSULTATS :** La cohérence interne de l'EADC était élevée pour les deux versions de l'échelle ( $\alpha=0.86-0.96$ ). De meilleurs scores d'auto-efficacité étaient associés à une meilleure qualité de vie psychologique, à des symptômes douloureux de moindre intensité et à des tendances à la dramatisation moins importantes ( $P<0.05$ ) ce qui supporte la validité convergente de l'instrument. Une différence statistiquement significative a été trouvée entre les scores de l'EADC ayant été mesurés pré- et post-intervention ( $P<0.003$ ) suggérant que l'échelle démontre une bonne sensibilité au changement procuré par l'intervention.

**CONCLUSIONS :** Nos résultats suggèrent que les deux versions de l'EADC sont fidèles et valides pour la mesure du sentiment d'auto-efficacité dans la prise en charge de la douleur chronique.

Chronic pain management mainly aims to reduce symptoms and improve function or quality of life (13,14). Unfortunately, pharmacological treatments or single nonpharmacological treatments produce, at best, modest effects on patients' conditions. This is why multimodal interventions are recommended for chronic pain management (13-18). These interventions often combine more than one type of therapy (eg, patient education, exercise, psychotherapy, relaxation, etc), promote



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patients' empowerment and active participation, and inculcate self-management strategies to obtain a positive clinical impact (14,16-19). Perception of self-efficacy in the management of chronic pain is, thus, a patient-reported outcome of increasing interest when assessing the benefits associated with multimodal interventions for the treatment of this condition.

Perceived self-efficacy can be defined as individuals' beliefs in their capabilities to achieve certain goals (20) – in our case, management of the physical and emotional symptoms associated with chronic pain. Hence, the measurement of self-efficacy requires carefully developed and validated instruments (21,22). Currently, many pain-related self-efficacy scales are available (23-28), but no validated French-Canadian scales exist. Therefore, the Chronic Disease Self-Efficacy Scale (29) was adapted and translated to create the French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES). We aimed to examine the internal consistency of the FC-CPSES. In addition, we sought to establish the construct validity of its use by measuring the extent to which it is associated with other measures of related outcomes (ie, convergent validity) and, finally, its sensitivity to clinical change.

## METHODS

### Study setting

The validity of the use of the FC-CPSES was established alongside a pragmatic trial that aimed to evaluate the effectiveness of an evidence-based self-management intervention for the treatment of chronic pain (the PASSAGE program), which constituted the validation study population.

The PASSAGE (*Programme d'Apprentissage de Stratégies d'AutoGestion Efficaces*) program is an evidence-based multimodal group intervention for the self-management of fibromyalgia and chronic low back pain that is based on a cognitive behavioural approach (changing behaviour by teaching critical thinking and problem-solving skills) (30-32). Since 2011, the PASSAGE program has been implemented in 10 health care centres across the province of Quebec. To participate in the PASSAGE program, patients must have a medical diagnosis of fibromyalgia or chronic low back pain; be referred to the participating secondary and tertiary health care centres by their treating physician or by another health care practitioner; and be motivated to attend all group sessions and to integrate the proposed self-management strategies into their daily routine. As part of this real-world clinical follow-up, participants in the PASSAGE program were asked to participate in a pragmatic trial (pre-post test design) and complete questionnaires to evaluate the effectiveness of the program. Pre- and postintervention measures were collected using postal self-administered questionnaires that included patient characteristics, chronic pain management self-efficacy and other patient-reported outcomes such as pain intensity, health-related quality of life (HRQOL) and pain coping strategies. Almost 95% of the patients who participated in the PASSAGE program completed the questionnaires and were included in the present study. All study participants provided informed consent, and ethics approval for the study was obtained from the ethics review board of the *Centre hospitalier universitaire de Sherbrooke* (Sherbrooke, Quebec).

### The basis for developing the FC-CPSES

The FC-CPSES resulted from an adaptation of the Chronic Disease Self-Efficacy Scale (29), which is a 33-item self-administered questionnaire that measures self-efficacy to perform self-management behaviours, manage disease in general and achieve outcomes (<http://patienteducation.stanford.edu/research/secd32.html>). Patients are asked how confident they are in performing certain activities at the present time. Each item is measured using a numerical scale ranging from 1 (not at all confident) to 10 (totally confident). The total score of the Chronic Disease Self-Efficacy Scale can be obtained by calculating the mean of the 33 items and ranges from 1 to 10. Higher scores indicate higher self-efficacy. Ten subscale scores can also be calculated using the same method: exercise regularly (items 1 to 3); get information about disease (item 4); obtain help from community, family or friends (items 5 to 8); communicate with physician (items 9 to 11);

manage disease in general (items 12 to 16); do chores (items 17 to 19); social/recreational activities (items 20 and 21); manage symptoms (items 22 to 26); manage shortness of breath (item 27); and control/manage depression (items 28 to 33). The Chronic Disease Self-Efficacy Scale has been validated (29) and extensively used in the literature for the measurement of patient-reported outcomes in studies of multimodal self-management interventions efficacy (33-37). A more convenient six-item version of the Chronic Disease Self-Efficacy Scale is also available that includes items 14 to 16 and 23 to 25 of the original 33-item version (<http://patienteducation.stanford.edu/research/secd6.html>) (35).

As a basis for the FC-CPSES, the Chronic Disease Self-Efficacy Scale was chosen over other self-efficacy scales for the following reasons: the availability of a six-item short version of the scale; the extent to which it covers all concepts relevant to chronic disease self-management (ie, some of the available pain-specific scales did not examine self-efficacy to obtain help from community, family and friends, and to communicate with physician); the evidence supporting its validity; it is widely used in the literature; and it could be adapted quickly and easily to the context of chronic pain.

### Adaptation and translation process

Because the six-item version of the Chronic Disease Self-Efficacy Scale is a subset of items from the original 33-item version of this scale, both long and short versions of the FC-CPSES were developed concurrently. The adaptation of the Chronic Disease Self-Efficacy Scale to create the FC-CPSES was performed by adjusting expressions such as "disease", "illness", or "health condition" to the specific context of chronic pain patients. The French-Canadian version (Appendix 1) was then developed according to recommendations for the cross-cultural adaptation of health status measures (38). First, a double forward-backward translation method was applied by four independent translators. A bilingual member of the research team and a professional translator worked independently on the English to French translation of the scale. Then, the two versions of the scale were back-translated into English by a different member of the research team and a different professional translator. The different translations of the scale were then reviewed by an expert committee (AL, PB and MC, who have different expertise in the fields of chronic pain, instrument development, translation and validation) who reached a consensus on any discrepancies. Equivalence between the original and the target version of the scale was also verified (semantic, idiomatic, experiential and conceptual equivalence [38]). Finally, the FC-CPSES was pre-tested among a sample of adults suffering from chronic pain. Score calculation and interpretation for the FC-CPSES are the same as for the original Chronic Pain Self-Efficacy Scale.

### Convergent validation

Three clinical outcomes that were shown to be related to perceived chronic pain management self-efficacy (24,26,39) and that were also measured in the PASSAGE program pragmatic trial were considered: pain intensity; HRQOL; and pain coping strategies. These outcomes were assessed using well-validated and widely used tools with documented psychometric properties.

Pain intensity was measured with a standardized numerical rating scale (NRS) ranging from 0 (no pain) to 10 (worst possible pain) (40). At each time point of the study, patients was asked to rate the average intensity of their pain as experienced in the past seven days. Pain intensity NRS were consistently proven reliable, valid and responsive among pain patients (40).

HRQOL was measured using the French-Canadian version of the 12-item Short-Form health survey (SF-12) version 2 (41). This shorter version of the SF-36 is one of the most common and rigorously validated HRQOL generic measure and can be used among patients with chronic pain conditions such as fibromyalgia or back pain (42). With the SF-12, two summary measures can be obtained: physical and mental HRQOL scores. Summary measures range from 0 to 100 and are calculated using the scores on the 12 items. Scores on each summary

**TABLE 1**  
Patient characteristics according to pain diagnosis

Characteristics	Pain diagnosis	
	Fibromyalgia (n=109)	Chronic low back pain (n=34)
Age, years, mean $\pm$ SD (range)	49.09 $\pm$ 11.10 (22–71)	52.64 $\pm$ 10.85 (30–72)
Female sex	101 (93.52)	24 (70.59)
Completed education level		
None	0 (0.00)	2 (5.88)
Elementary	4 (3.77)	2 (5.88)
High school	42 (39.62)	14 (41.18)
College (CEGEP)	31 (29.25)	8 (23.53)
University	29 (27.36)	8 (23.53)
Marital status		
Single	25 (23.58)	4 (11.76)
Married or civil union	60 (56.60)	21 (61.76)
Divorced or separated	19 (17.92)	8 (23.53)
Widowed	2 (1.89)	1 (2.94)
Work status		
Full-time job	18 (16.98)	4 (11.76)
Part-time job	11 (10.38)	5 (14.71)
Medical disability	36 (33.96)	7 (20.59)
Other*	41 (38.68)	18 (52.94)
Household income, \$		
<20,000	28 (28.87)	13 (39.39)
20,000–49,999	40 (41.24)	10 (30.30)
50,000–79,999	20 (20.62)	0 (0.00)
$\geq$ 80,000	9 (9.28)	10 (30.30)
Pain duration, years, mean $\pm$ SD (range)	11.09 $\pm$ 7.97 (1–40)	9.63 $\pm$ 10.26 (2–45)
Average pain intensity <sup>†</sup> in the past seven days, mean $\pm$ SD (range)	6.92 $\pm$ 1.71 (2–10)	6.17 $\pm$ 1.77 (3–9)

Data presented as n (%) unless otherwise specified. \*Including retired patients, students, homemakers and voluntary workers; <sup>†</sup>Numerical rating scale, range 0–10. For all variables measured at baseline, number of missing values <5% of the sample. CEGEP Collège d'enseignement général et professionnel

scale were calculated with standard scoring algorithms and normalized using the United States general population values (mean [ $\pm$  SD] 50 $\pm$ 10). Higher scores represent better HRQOL.

Pain coping strategies were evaluated using the French version (43–45) of the Coping Strategy Questionnaire (CSQ) (46). This scale is one of the most widely used measures of coping strategies in pain patients and was demonstrated to be reliable and valid among various types of patients, including those with fibromyalgia or low back pain (43–47). The CSQ includes 21 items rated on a four-point Likert scale ranging from 1 (never) to 4 (always), which measures five coping strategies: ignoring pain sensations; diverting attention; catastrophizing; reinterpreting pain sensations; and praying. A score is calculated for each subscale by adding the ratings on each of its item.

#### Statistical analysis

Descriptive statistics were used to estimate the distribution of participants' characteristics at time of recruitment (preintervention). Internal consistency, defined as the intercorrelations among items of a scale (48), was measured using Cronbach's alpha coefficients ( $\alpha$ ) for the 33-item version of the FC-CPSES, its different subscales and its six-item version (preintervention measures). Cronbach's coefficients can range between 0 (weak reliability) and 1 (perfect reliability). The following cut-offs for the interpretation of  $\alpha$  statistics were used:  $\geq$ 0.7 indicates adequate internal consistency for research purposes; and  $\geq$ 0.9 indicates excellent internal consistency and high reliability (48).

**TABLE 2**  
Internal consistency\* of the French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES)

Scales and subscales	Pain diagnosis	
	Fibromyalgia (n=109)	Chronic low back pain (n=34)
33-item FC-CPSES	0.93	0.96
Exercise regularly	0.81	0.88
Get information about disease <sup>†</sup>	NA	NA
Obtain help from community, family and friends	0.72	0.88
Communicate with physician	0.92	0.92
Manage disease in general	0.82	0.88
Do chores	0.88	0.82
Social/recreational activity	0.91	0.94
Manage symptoms	0.95	0.92
Manage shortness of breath <sup>†</sup>	NA	NA
Control/manage depression	0.93	0.96
Six-item FC-CPSES	0.86	0.86

\*Cronbach's alpha; <sup>†</sup>Calculation of internal consistency is nonapplicable (NA) because this subscale contains only one item

The internal structure of the FC-PCSES was examined using item-total correlations; ie, when a value is <0.3 or is causing a substantial change in the Cronbach's coefficient of the scale, this indicates that the item is not measuring the same thing as the rest of the items (49). For its part, construct validity can be determined by the extent to which a measure is able to predict the results from other measures of related constructs (convergent construct validity) (48). Therefore, univariate linear regression models were built to measure the associations between preintervention FC-CPSES scores and related outcomes such as the pain intensity score, the SF-12 physical and mental HRQOL scores, and the CSQ coping strategies scores. The sensitivity to change of the FC-CPSES, defined as the ability of the scale to detect a change in the clinical state of patients (50), was also evaluated by comparing pre- and postintervention FC-CPSES scores. Paired-samples *t* tests or Wilcoxon signed-ranks tests were used depending on the distribution of these scores. All statistical analyses were stratified according to chronic pain syndromes (fibromyalgia or chronic low back pain), thus providing information to future users who want to use the scale in one population or another. In fact, patients with these two conditions were shown to be different regarding many biopsychosocial characteristics (51), and the psychometric properties of a scale are unique to its use for a given patient population (50). Statistical analyses were performed using SAS version 9.2 (SAS Institute, USA);  $P < 0.05$  was considered to be statistically significant.

## RESULTS

Between 2011 and 2013, a total of 143 chronic pain patients (109 fibromyalgia patients and 34 chronic low back pain patients) participated in the PASSAGE program pragmatic trial and were included in the present validation study (Table 1). The mean ( $\pm$  SD) age was 49.09 $\pm$ 11.10 years and 52.64 $\pm$ 10.85 years for the fibromyalgia (n=109) and chronic low back pain (n=34) patients, respectively. There was a greater proportion of women in both samples and approximately one-half of the participants had a college or university education level. The mean duration of pain was 11.09 $\pm$ 7.97 years and 9.63 $\pm$ 10.26 years for the fibromyalgia and chronic low back pain patients, respectively. Finally, their pain intensity levels on the NRS (average pain in the past seven days) were comparable (6.92 $\pm$ 1.71 versus 6.17 $\pm$ 1.77).

#### Reliability of the FC-CPSES

Reliability of the FC-CPSES was supported via internal consistency, with Cronbach's alphas being larger than the 0.7 cut-off for the 33-item version of the FC-CPSES ( $\alpha = 0.93$  to  $\alpha = 0.96$ ), its different

**TABLE 3**  
**Association between French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES) scores and related outcomes as measured in univariate linear regression models**

FC-CPSES versions (according to diagnosis)	NRS		SF-12 score				CSQ subscale scores									
	Pain intensity		Physical HRQOL		Mental HRQOL		Ignoring pain sensations		Diverting attention		Catastrophizing		Reinterpreting pain sensations		Praying	
	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P	Crude $\beta$	P
33-item																
Fibromyalgia	-0.23	0.0045	-0.02	0.4750	0.06	0.0001	0.05	0.2692	0.07	0.1187	-0.18	<0.0001	0.05	0.2541	-0.10	0.0442
Chronic low back pain	-0.28	0.0883	-0.15	0.1788	0.09	0.1114	0.17	0.0513	0.03	0.6980	-0.25	0.0107	0.11	0.1966	-0.05	0.6293
Six-item																
Fibromyalgia	-0.32	0.0013	0.03	0.2298	0.06	0.0018	0.07	0.1610	0.02	0.6975	-0.21	0.0003	0.06	0.3051	-0.15	0.0072
Chronic low back pain	-0.11	0.4184	-0.06	0.5808	0.04	0.4609	0.21	0.0104	0.05	0.4984	-0.22	0.0184	0.16	0.0368	0.0009	0.9924

CSQ Coping Strategies Questionnaire (higher scores indicate greater use of the strategy/coping efforts for ignoring pain sensations, diverting attention, reinterpreting pain sensations, and praying subscales; higher scores indicate greater catastrophizing as for the catastrophizing subscale); NRS Numerical rating scale; SF-12 Short form 12 (higher scores indicate better health-related quality of life [HRQOL])

**TABLE 4**  
**Comparison of pre- and postintervention French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES) scores**

Scales and samples	Preintervention	Post-intervention	P*
33-item FC-CPSES			
Fibromyalgia patients	5.63±1.33	6.07±1.50	0.0024
Chronic low back pain patients	6.11±1.47	7.00±1.31	0.0018
Six-item FC-CPSES			
Fibromyalgia patients	5.53±1.75	5.99±1.71	0.0022
Chronic low back pain patients	5.90±1.48	6.78±1.49	0.0009

Data presented as mean ± SD unless otherwise indicated. \*Paired-sample t test or Wilcoxon signed-ranks test according to the distribution of the variable

subscales ( $\alpha=0.72$  to  $\alpha=0.96$ ) and its six-item version ( $\alpha=0.86$ ) across both chronic pain syndromes (Table 2). With regard to the 33-item version of the FC-CPSES, all item-total correlations exceeded the accepted cut-off of 0.30 except for items 5, 6, 9 and 10. However, removing these items did not cause a substantial change in the scale Cronbach's coefficient (maximum 0.005 diminution of the coefficient value). Item-total correlations ranged from 0.55 to 0.76 for items of the short version of the scale, and no item caused a substantial change in the Cronbach's coefficient of the scale (maximum 0.041 diminution of the coefficient value).

**Convergent construct validity of the FC-CPSES**

When comparing FC-CPSES scores and potentially related outcomes among fibromyalgia patients, higher perceived self-efficacy was significantly associated with better mental HRQOL, lower pain intensity ratings, lower catastrophizing and lesser use of praying coping strategies (Table 3). These associations were statistically significant for both the 33- and the six-item versions of the FC-CPSES.

Among patients with chronic low back pain, higher self-efficacy (as measured by the 33-items version of the FC-CPSES) was significantly associated with lower pain catastrophizing. When using the six-item version, higher self-efficacy was significantly associated with lower catastrophizing as well as greater use of the coping strategies of ignoring pain sensations and reinterpreting pain sensations ( $P<0.05$ ).

Complete correlation tables between FC-CPSES scores and potentially related outcomes among fibromyalgia and low back pain patients are presented in Appendix 2.

**Sensitivity of the FC-CPSES to clinical change**

As shown in Table 4, there was a statistically significant increase in FC-CPSES scores between pre- and postintervention measures for

both versions of the scale and for both patient groups ( $P<0.003$ ), which supports the sensitivity of the FC-CPSES to clinical change occurring over the course of an intervention aiming to improve the self-management of chronic pain and to alleviate symptoms.

**DISCUSSION**

Currently, many pain-related self-efficacy measures are available (23-28), but validated French-Canadian scales are still needed. The present study established the validity of the FC-CPSES by measuring its internal consistency, convergent construct validity and sensitivity to clinical change. Our results suggest that both the 33- and the six-item versions of the FC-CPSES are reliable and valid measures of perceived self-efficacy to manage chronic pain symptoms.

All estimated coefficients of internal consistency of the FC-CPSES showed adequate ( $\alpha\geq 0.7$ ) to excellent ( $\alpha\geq 0.9$ ) reliability, which supports the use of its total score and subscale scores for research purposes in large populations (48). According to recommendations (48), the 33-item FC-CPSES total score could even be used when making treatment decisions and for tracking changes in pain experienced by individuals over time.

The validity of the use of a scale can be determined by the extent to which it is able to correlate with the results of other measures of related variables or dimensions (48). Perceived chronic pain management self-efficacy has been previously shown to be associated with lower pain intensity levels (24,52), better physical HRQOL (24), better mental HRQOL (24), lower catastrophizing (26) and greater use of various coping strategies (ie, ignoring pain sensations [26], task persistence [24,39], rest [24], exercise/stretch [39], coping statements [26,39] or pacing [39]). Although not all pain-specific self-efficacy scales are able to predict these patient-reported outcomes, these outcomes are often used for the establishment of the construct validity of the use of such scales (21,23,25-27). As expected, the 33- and six-item FC-CPSES total scores were found to be associated with several of these outcomes among fibromyalgia patients.

Among chronic low back pain patients, the associations described above were not all replicated and depended on the version of the scale that was used (higher 33-item FC-CPSES scores were only associated with lower catastrophizing scores; and higher six-item FC-CPSES scores were associated with lower catastrophizing, greater ignoring pain sensations coping strategies, and greater reinterpreting pain sensations coping strategies scores). This absence of replication could be explained by the particularities of the two different chronic pain syndromes. In fact, patients with fibromyalgia or chronic low back pain were shown to be different regarding sex predominance, education level, self-efficacy to manage their pain, pain sensations, distress, medication use and litigation issues (51). The absence of certain associations among chronic low

back pain patients could also be explained by a lack of statistical power (small sample size). In fact, a convenience sample was used and no a priori sample size calculation was conducted. To the best of our knowledge, there are no general rules to determine the required sample size for validation studies. Although rules of thumb (eg, three to 10 participants for each item contained in the scale to be validated) and absolute minimum sample size are sometimes used (50,53-55), these rules are specific to some types of validation methods (eg, confirmatory factor analysis) and are often criticized (50,53,55). The construct validity of the FC-CPSES specifically for chronic low back pain patients would need to be confirmed in a larger study.

The evidence of the FC-CPSES sensitivity to detect a change in the clinical state after the participation in the PASSAGE program (30-32) among both types of patients also provides support for the scale's validity. However, we cannot confirm that the changes in perceived chronic pain management self-efficacy were strictly due to the intervention because a pre-post test design rather than a randomized approach was used. We can nonetheless assume that some changes are due to the intervention given the evidence-based nature of the PASSAGE program (30-32). Keeping in mind that sensitivity to change varies according to the characteristics of a treatment and the inherent sensitivity and measurement error of a scale (50), it is difficult to separate characteristics of the FC-CPSES from characteristics of the PASSAGE program.

### Strengths and limitations

To our knowledge, the present study is the first to attempt to validate the use of a chronic pain-specific French-Canadian self-efficacy scale. In addition to the psychometric qualities established in the present study, many aspects of the FC-CPSES development support the content validation of this scale (ie, the extent to which a measure covers all aspects of the topic it is supposed to measure [56]). First, the FC-CPSES is an adaptation of the validated Chronic Disease Self-Efficacy Scale (29) rather than a newly developed scale. In addition, the FC-CPSES was developed according to the recommendations for the cross-cultural adaptation of health status measures (38), which involves a double forward-backward translation method, review by an expert committee and pretest of the final version. Because the present validation study was conducted alongside a pragmatic trial that aimed to evaluate the effectiveness of an intervention, it was unfortunately not possible to examine the test-retest reliability of the FC-CPSES (stability of scores across time among the same patients under the same conditions [48]). Other limitations of our study are inherent to the multiple statistical tests that were conducted (ie, the possibility of type I error) and the evaluation of the psychometric properties of the six-item version of the FC-CPSES from items embedded in the longer version of the scale, rather than a stand-alone short version of a scale.

With regard to external validity, our study population appears to be representative of the population in which the FC-CPSES is intended to be used (ie, chronic pain populations mainly composed of women experiencing moderate to severe pain symptoms who seek new pain management options). Conditionally to its validation in other chronic pain populations, the FC-CPSES could be used in other contexts because its items are formulated for general chronic pain symptoms rather than for a specific condition. Finally, conducting the present study with two different chronic pain populations and in a multicentric context further enhances the external validity of our results.

### CONCLUSION

Globally, our data suggest that the 33- and six-item versions of the FC-CPSES are reliable and valid measures of pain management self-efficacy in chronic pain patients. The FC-CPSES is, thus, a promising tool for clinical researchers who seek to assess the benefits of multimodal self-management interventions for the treatment of chronic pain among French-Canadian patients. Because of the availability of a short version of the scale, the FC-CPSES could also be suitable for assessments in the clinical setting (eg, benefits of self-management interventions offered in community settings or readaptation centres).

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## APPENDIX 1: ÉCHELLE D'AUTO-EFFICACITÉ SPÉCIFIQUE À LA DOULEUR CHRONIQUE

### Texte d'introduction :

Nous voudrions connaître à quel point vous avez confiance en votre capacité à réaliser certaines activités. Pour chacune des questions suivantes, veuillez s.v.p. entourer le chiffre indiquant à quel point, à l'heure actuelle, vous avez confiance en votre capacité quant à la réalisation de vos tâches habituelles.

### Échelle de mesure présentée pour chacun des items :

Pas du tout confiant(e) 1 2 3 4 5 6 7 8 9 10 Entièrement confiant(e)

### Items :

#### Faire de l'exercice régulièrement

1. À quel point avez-vous confiance en votre capacité à faire des exercices légers de renforcement musculaire et de flexibilité trois à quatre fois par semaine (ex. séries de mouvements, utilisation de poids, etc.)?
2. À quel point avez-vous confiance en votre capacité à faire de l'exercice aérobique comme marcher, nager ou faire du vélo de trois à quatre fois par semaine?
3. À quel point avez-vous confiance en votre capacité à faire de l'exercice sans que votre douleur s'aggrave?

#### Obtenir des renseignements sur la douleur

4. À quel point avez-vous confiance en votre capacité à obtenir des informations sur la douleur au sein de votre communauté (ex. Internet, groupes d'entraide, organismes communautaires, conférences, centres de santé, etc.)?

#### Obtenir de l'aide de la collectivité, de la famille et des amis

5. À quel point avez-vous confiance en votre capacité à obtenir l'aide de la part de votre famille ou de vos amis pour effectuer les choses que vous devez faire (ex. tâches ménagères, magasinage, cuisine, déplacements)?
6. À quel point avez-vous confiance en votre capacité à obtenir du soutien affectif de la part de vos amis ou de votre famille (ex. écoute attentive, parler de vos problèmes)?
7. À quel point avez-vous confiance en votre capacité à obtenir, en cas de besoin, du soutien affectif auprès de ressources autres que vos amis ou votre famille (ex. groupe d'entraide, organisme communautaire, professionnel de la santé, etc.)?
8. À quel point avez-vous confiance en votre capacité d'obtenir, en cas de besoin, de l'aide pour effectuer vos tâches quotidiennes (ex. ménage, entretien extérieur, préparation des repas, hygiène personnelle) auprès de ressources autres que vos amis ou votre famille?

#### Communiquer avec le médecin

9. À quel point avez-vous confiance en votre capacité à questionner votre médecin sur des sujets qui vous préoccupent par rapport à votre douleur?

10. À quel point avez-vous confiance en votre capacité à discuter ouvertement avec votre médecin de vos problèmes personnels pouvant être reliés à votre douleur?
11. À quel point avez-vous confiance en votre capacité à régler les désaccords entre vous et votre médecin lorsqu'ils surviennent?

**Prendre en charge la douleur en général**

12. Avoir de la douleur signifie souvent d'avoir à faire différents efforts et activités pour gérer votre condition. À quel point avez-vous confiance en votre capacité à effectuer de façon régulière tout ce qui est nécessaire pour gérer votre condition?
13. À quel point avez-vous confiance en votre capacité à juger que le moment est venu de consulter votre médecin lorsque des changements surviennent dans votre condition de santé?
14. À quel point avez-vous confiance en votre capacité à effectuer les différents efforts et activités requises pour gérer votre douleur en vue de réduire le besoin de voir un médecin?
15. À quel point avez-vous confiance en votre capacité à réduire la détresse émotionnelle causée par votre douleur, de façon à ce que cette détresse n'affecte pas votre vie quotidienne?
16. À quel point avez-vous confiance en votre capacité à opter pour des solutions autres que la seule prise de médicaments afin de réduire l'impact de votre douleur sur votre vie quotidienne?

**Réaliser des tâches**

17. À quel point avez-vous confiance en votre capacité à accomplir vos tâches ménagères telles que passer l'aspirateur et entretenir le terrain malgré vos problèmes de douleur?
18. À quel point avez-vous confiance en votre capacité à faire vos commissions malgré vos problèmes de douleur (ex. épicerie, pharmacie, bureau de poste, etc.)?
19. À quel point avez-vous confiance en votre capacité à effectuer votre magasinage malgré vos problèmes de douleur (ex. achat de vêtements, de meubles, etc.)?

**Avoir des activités sociales et des loisirs**

20. À quel point avez-vous confiance en votre capacité à continuer à pratiquer vos passe-temps et vos loisirs?
21. À quel point avez-vous confiance en votre capacité à continuer de faire les choses que vous aimez faire avec vos amis et votre famille (ex. visites sociales et loisirs)?

**Prendre en charge les symptômes**

22. À quel point avez-vous confiance en votre capacité à réduire votre inconfort physique ou votre douleur?
23. À quel point avez-vous confiance en votre capacité à empêcher que la fatigue causée par votre douleur nuise aux activités et aux tâches que vous souhaitez faire?
24. À quel point avez-vous confiance en votre capacité à empêcher que l'inconfort physique ou la douleur nuisent aux activités et aux tâches que vous souhaitez faire?
25. À quel point avez-vous confiance en votre capacité à empêcher que d'autres de vos symptômes ou problèmes de santé nuisent aux activités et aux tâches que vous souhaitez faire?
26. À quel point avez-vous confiance en votre capacité à contrôler vos symptômes ou vos problèmes de santé afin que ceux-ci ne nuisent pas aux activités et aux tâches que vous souhaitez faire?

**Gérer le manque de souffle**

27. À quel point avez-vous confiance en votre capacité à éviter que le manque de souffle (essoufflement) nuise à ce que vous souhaitez faire?

**Contrôler et prendre en charge les symptômes dépressifs**

28. À quel point avez-vous confiance en votre capacité d'arriver à ne pas vous décourager lorsque peu importe les efforts que vous faites, cela ne fait pas de différence?
29. À quel point avez-vous confiance en votre capacité à faire quelque chose qui vous fera vous sentir mieux lorsque vous vous sentez découragé(e)?
30. À quel point avez-vous confiance en votre capacité d'arriver à ne pas vous sentir triste ou à ne pas avoir le cafard?
31. À quel point avez-vous confiance en votre capacité à faire quelque chose qui vous fera vous sentir mieux lorsque vous vous sentez triste ou avez le cafard?
32. À quel point avez-vous confiance en votre capacité d'arriver à ne pas vous sentir seul(e)?
33. À quel point avez-vous confiance en votre capacité à faire quelque chose qui vous fera vous sentir mieux lorsque vous vous sentez seul(e)?

**Version courte (6-items) : Inclure seulement les questions 14, 15, 16, 23, 24, 25.**

**Calcul des scores :** Le score total est obtenu en effectuant la moyenne des 33 ou des 6 items.

**APPENDIX 2**

**Correlations between French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES) scores and potentially related outcomes**

	Six-item FC-CPSES score	33-item FC-CPSES score	Pain intensity (NRS)	Physical HRQOL	Mental HRQOL	CSQ subscales				
						Ignoring pain sensations	Diverting attention	Catastrophizing	Reinterpreting pain sensations	Praying
<b>Fibromyalgia patients (n=109)</b>										
Six-item FC-CPSES score	1.00000	0.87962	-0.31165	0.12057	0.30685	0.14124	0.03936	-0.35340	0.10306	-0.26476
P		<0.0001	0.0013	0.2298	0.0018	0.1610	0.6975	0.0003	0.3051	0.0072
33-item FC-CPSES score	0.87962	1.00000	-0.30037	-0.07932	0.40926	0.12121	0.16952	-0.42501	0.12431	-0.21632
P	<0.0001		0.0045	0.4705	0.0001	0.2692	0.1187	<0.0001	0.2541	0.0442
Pain intensity (0-10)	-0.31165	-0.30037	1.00000	-0.34309	-0.29242	-0.16444	-0.12906	0.29780	0.04298	0.11941
P	0.0013	0.0045		0.0004	0.0026	0.0969	0.1938	0.0023	0.6648	0.2250
Physical health-related quality of life	0.12057	-0.07932	-0.34309	1.00000	-0.15031	0.10340	-0.18965	-0.16211	-0.02176	-0.10195
P	0.2298	0.4705	0.0004		0.1277	0.3035	0.0575	0.1053	0.8282	0.3055
Mental health-related quality of life	0.30685	0.40926	-0.29242	-0.15031	1.00000	0.33617	0.14790	-0.35242	0.02204	-0.06011
P	0.0018	0.0001	0.0026	0.1277		0.0006	0.1399	0.0003	0.8260	0.5464

Continued on next page

APPENDIX 2 – CONTINUED

Correlations between French-Canadian Chronic Pain Self-efficacy Scale (FC-CPSES) scores and potentially related outcomes

	Six-item FC-CPSES score	33-item FC-CPSES score	Pain inten- sity (NRS)	Physical HRQOL	Mental HRQOL	CSQ subscales				
						Ignoring pain sensations	Diverting attention	Catastrophizing	Reinterpreting pain sensations	Praying
<b>Fibromyalgia patients (n=109) – CONTINUED</b>										
CSQ's Ignoring pain sensations subscale	0.14124	0.12121	-0.16444	0.10340	0.33617	1.00000	0.10941	-0.24192	0.25620	-0.14009
P	0.1610	0.2692	0.0969	0.3035	0.0006		0.2761	0.0143	0.0093	0.1581
CSQ's Diverting attention subscale	0.03936	0.16952	-0.12906	-0.18965	0.14790	0.10941	1.00000	-0.08481	0.26336	0.13930
P	0.6975	0.1187	0.1938	0.0575	0.1399	0.2761		0.3991	0.0075	0.1605
CSQ's Catastrophizing subscale	-0.35340	-0.42501	0.29780	-0.16211	-0.35242	-0.24192	-0.08481	1.00000	-0.06015	0.41312
P	0.0003	<0.0001	0.0023	0.1053	0.0003	0.0143	0.3991		0.5482	<0.0001
CSQ's Reinterpreting pain sensations subscale	0.10306	0.12431	0.04298	-0.02176	0.02204	0.25620	0.26336	-0.06015	1.00000	0.06940
P	0.3051	0.2541	0.6648	0.8282	0.8260	0.0093	0.0075	0.5482		0.4839
CSQ's Praying subscale	-0.26476	-0.21632	0.11941	-0.10195	-0.06011	-0.14009	0.13930	0.41312	0.06940	1.00000
P	0.0072	0.0442	0.2250	0.3055	0.5464	0.1581	0.1605	<0.0001	0.4839	
<b>Chronic low back pain patients (n=34)</b>										
Six-item FC-CPSES score	1.00000	0.90694	-0.14574	-0.16907	0.22448	0.43987	0.12213	-0.41435	0.37064	0.00173
P		<0.0001	0.4184	0.5808	0.4609	0.0104	0.4984	0.0184	0.0368	0.9924
33-item FC-CPSES score	0.90694	1.00000	-0.32805	-0.41581	0.48338	0.37198	0.07672	-0.47458	0.25156	-0.09356
P	<0.0001		0.0883	0.1788	0.1114	0.0513	0.6980	0.0107	0.1966	0.6293
Pain intensity (0-10)	-0.14574	-0.32805	1.00000	0.60668	-0.55342	-0.03265	0.10369	0.19190	-0.15053	0.31821
P	0.4184	0.0883		0.0279	0.0498	0.8592	0.5723	0.3010	0.4189	0.0759
Physical health- related quality of life	-0.16907	-0.41581	0.60668	1.00000	-0.75970	-0.02631	0.65927	0.54568	0.12421	0.51084
P	0.5808	0.1788	0.0279		0.0026	0.9320	0.0142	0.0537	0.7005	0.0744
Mental health-related quality of life	0.22448	0.48338	-0.55342	-0.75970	1.00000	0.28735	-0.54414	-0.67877	-0.19019	-0.56898
P	0.4609	0.1114	0.0498	0.0026		0.3411	0.0545	0.0107	0.5538	0.0424
CSQ's Ignoring pain sensations subscale	0.43987	0.37198	-0.03265	-0.02631	0.28735	1.00000	0.41572	-0.05377	0.33417	-0.14047
P	0.0104	0.0513	0.8592	0.9320	0.3411		0.0180	0.7701	0.0662	0.4432
CSQ's Diverting attention subscale	0.12213	0.07672	0.10369	0.65927	-0.54414	0.41572	1.00000	0.47221	0.69790	0.22778
P	0.4984	0.6980	0.5723	0.0142	0.0545	0.0180		0.0073	<0.0001	0.2099
CSQ's Catastrophizing subscale	-0.41435	-0.47458	0.19190	0.54568	-0.67877	-0.05377	0.47221	1.00000	0.08296	0.18767
P	0.0184	0.0107	0.3010	0.0537	0.0107	0.7701	0.0073		0.6573	0.3037
CSQ's Reinterpreting pain sensations subscale	0.37064	0.25156	-0.15053	0.12421	-0.19019	0.33417	0.69790	0.08296	1.00000	0.01542
P	0.0368	0.1966	0.4189	0.7005	0.5538	0.0662	<0.0001	0.6573		0.9332
CSQ's Praying subscale	1.00000	0.90694	-0.14574	-0.16907	0.22448	0.43987	0.12213	-0.41435	0.37064	0.00173
P		<0.0001	0.4184	0.5808	0.4609	0.0104	0.4984	0.0184	0.0368	0.9924

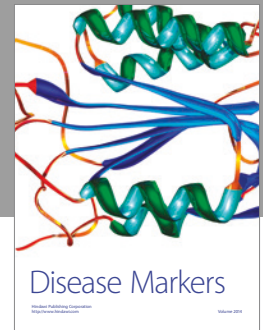
Data are presented as Pearson correlation coefficients and P. CSQ Coping Strategies Questionnaire (higher scores indicate greater use of the strategy/coping efforts for ignoring pain sensations, diverting attention, reinterpreting pain sensations, and praying subscales; higher scores indicate greater catastrophizing as for the catastrophizing subscale); HRQOL Health-related quality of life (higher scores indicate better HRQOL); NRS Numerical rating scale (0–10)

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