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Key terms: low-back pain; return-to-work; RTWSE-19; self-efficacy questionnaire; self-report measure

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3rd place, PREMUS [1] best paper competition: development of the return-to-work self-efficacy (RTWSE-19) questionnaire – psychometric properties and predictive validity

by William S Shaw, PhD,[2, 3] Silje Endresen Reme, PhD,[4] Steven J Linton, PhD,[5] Yueng-Hsiang Huang, PhD,[2] Glenn Pransky, MD [2, 3]

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Objective The 19-item return-to-work self-efficacy (RTWSE-19) scale is a new self-report measure intended to assess workers' beliefs of their current ability to resume normal job responsibilities following pain onset. The aim of this study was to evaluate the factor structure, internal consistency, and predictive and concurrent validity of RTWSE-19 among workers with acute low-back pain.

Methods Patients (N=399, 59% male, mean age 37 years) consulting for acute, work-related low-back pain completed an original 28-item version of the new scale along with concurrent measures of pain, functional limitation, activity avoidance, workplace physical demands, and pain catastrophizing. The assessment was repeated at visit 2, and work limitations and duration of sickness absence were assessed by questionnaire at 3-month follow-up. Exploratory factor analysis (principal component analysis with varimax rotation) was used to assess content validity of the scale, and scores were compared to concurrent pain measures and with disability outcomes at 3 months.

Results The full response range (1–10) was utilized on all 28 items, and there were no ceiling or floor effects. Mean item scores ranged from 4.9 ("reducing physical workload") to 8.3 ("describing injury to supervisor"). The exploratory factor analysis supported three underlying factors (eigenvalue >1.0): (i) meeting job demands; (ii) modifying job tasks; and (iii) communicating needs to others. Internal consistency (alpha) for the three scales were 0.98, 0.92, and 0.81, respectively. At visit 2, self-efficacy scores improved for "meeting job demands" and "modifying job tasks", but not for "communicating needs to others". After controlling for pain and functional limitation, both sickness absence and persistent work limitations were predicted by self-efficacy assessed at visit 2 ($P<0.05$), but self-efficacy assessed at visit 1 did not predict sickness absence.

Conclusions The RTWSE-19 is a new measure with adequate reliability and validity to measure the confidence of workers to meet job demands, modify job tasks, and communicate needs to co-workers and supervisors. When assessed 1–2 weeks after pain onset, the scale is predictive of disability outcomes.

Key terms low-back pain, return to work, RTWSE-19, self-report measure.

Personal beliefs about pain, its functional implications, and its perceived impact on the ability to work are important individual factors influencing pain recovery and return to work (RTW) after onset of musculoskeletal conditions (1–8). Poor expectations for recovery have been shown to be a self-fulfilling prophecy among working adults with musculoskeletal pain (8–11), but researchers have concluded that more reliable and valid measures are needed to study the specific psychological mechanisms underlying this phenomenon (12–14). Self-efficacy [ie, the "belief in one's abilities to organize and execute the courses of action required to produce given attainments" (15)] has been shown to be an important cognitive factor in pain control and adaptation, with the ability to predict functional recovery and treatment outcomes after controlling for pain severity and

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objective clinical findings (16). Self-efficacy may be a useful paradigm for understanding the motivational and pain self-management aspects of RTW, and a specific measure of RTW self-efficacy (RTWSE) might prove useful to evaluate interventions and elucidate mediating pathways.

Like many other medical conditions, an episode of low-back pain can create a need for individuals to adjust their habits and lifestyles temporarily while trying to maintain basic physical, social, and vocational activities. If low-back pain persists, then successful adaptation may require a clearer understanding of the pain problem, more attention to self-care strategies, learning to overcome functional problems effectively, and utilizing available supports and resources wisely. These active coping processes can promote a sense of confidence, or "self-efficacy", for dealing with pain that has been associated with improved function and well-being (17, 18). Thus, efforts to self-manage the functional implications of pain may be more fruitful than repeated (and often futile) efforts to "find and fix" the anatomical source of pain (19, 20).

Self-efficacy has been an important theoretical construct underlying research in arthritis and other sources of chronic pain (21, 22), and improved self-efficacy has been the primary goal of self-management interventions for chronic pain that focus on coping skills, medical education, and social support (23, 24). Low self-efficacy, or a feeling that pain is uncontrollable and unmanageable given the physical demands of daily life, may contribute to a downward spiral of pain "catastrophizing" (exaggerating the negative consequences of pain), activity avoidance, and depression characteristic of a chronic-pain syndrome.

One important life domain for working-age adults with musculoskeletal pain is the workplace, and staying at work or returning to work with residual pain may require significant self-management, communication, and coping skills. Indeed, the outcome of RTW has received a great deal of attention in the musculoskeletal pain literature, and researchers have concluded that more development is needed on workplace constructs and measures in order to advance workplace-focused intervention design and testing (25–27). Though there are a number of existing scales of self-efficacy for managing pain (24, 28, 29), there have been few efforts to develop a validated self-efficacy scale specific to workplace challenges associated with pain.

To generate the conceptual domains for a new measure of RTWSE, the authors conducted a qualitative study (focus groups, semi-structured interviews) of back-injured workers that focused on their perceived challenges of returning to work (30). Results of the study suggested that confidence about resuming work after an onset of low-back pain was dependent on the worker's perception of being able to meet job demands, manage pain effectively while at work, and obtain help as needed (30). Meeting job demands was related to the quality, quantity, and speed of work, as well as meeting basic role expectations. Managing pain at work included tolerance of pain, self-care, and prevention. Obtaining help included communication with supervisors and co-workers as well as obtaining needed job accommodations. Based on the descriptors and examples provided by participants in the qualitative study, an initial pool of 28 items was generated by the authors to encompass these three primary self-efficacy domains in a new self-report questionnaire. The goal of the questionnaire was to provide a more specific conceptualization of the interpersonal challenges of returning to work after a workplace injury or illness. In our study, the pilot scale was administered to patients consulting an occupational health clinic for acute, work-related low-back pain to provide an initial assessment of its reliability and validity.

Methods

Participants

Participants recruited to the study comprised 399 volunteer patients (59% male) seeking treatment at one of eight occupational health clinics for work-related, acute back pain. Clinics were located in Massachusetts, Rhode Island, and Texas (USA). Inclusion criteria were: (i) non-specific sacral or lumbar back pain; (ii) acute onset or exacerbation in the past 14 days; (iii) pain presumed to be of occupational origin; (iv) age 18 or older; and (v) fluency in English or Spanish. Of the 399 patients initially recruited to the study, 292 (73.2%) could be reached for the 3-month follow-up assessment; thus, this smaller sample size applied to all analyses involving follow-up measures. Comparisons of responders and non-responders at 3-month follow-up on initial demographics and report of pain and injury showed no differences ($P<0.05$) except that the latter comprised slightly more men and younger individuals ($P<0.05$). The Institutional Review Board for the Liberty Mutual Research Institute for Safety reviewed and approved all study procedures.

Procedure

Data for this study were taken from a larger prospective cohort study investigating early prognostic factors for back disability. Eligible patients were identified by front desk staff or clinicians during an initial medical evaluation for acute back pain. Details of the research study were described, and a consent form was provided to review and sign. The consent form described confidentiality of surveys, assurance that no surveys would be placed in

medical records or shared with employers, and notice of a US$30 retail gift card for completing the initial survey and an additional US$25 cash payment after completing the 3-month follow-up survey. After any questions or concerns were addressed, patients were asked to complete a 10-page questionnaire containing demographic and contact information and the visit 1 study measures. Participants returned the completed forms to the reception desk before leaving the clinic. Participants returning for a second visit to the clinic were asked to complete the study measures a second time (visit 2); this was typically within one week after the initial visit (range 4–10 days).

Three months after the initial medical evaluation, participants were contacted (by letter and/or e-mail) to complete a brief follow-up questionnaire assessing pain, functional limitation, and work status. Questionnaires could be returned in one of three ways: (i) by mail; (ii) via a toll-free, 24-hour, interactive voice-response telephone system; or (iii) by accessing a web-based internet survey. Participants not responding within five days were called by a trained interviewer who collected the data by telephone.

Measure of return-to-work self-efficacy

The original measure of RTWSE was comprised of 28 items developed by the authors from a qualitative study describing the concerns and expectations of injured workers about resuming normal work while recovering from low back pain (30). The format of the scale is similar to other self-efficacy measures (31) in that respondents report their level of confidence on a scale from 0–10 to overcome a number of RTW barriers. Item generation was based on three conceptual domains: (i) managing pain, (ii) obtaining help, and (iii) meeting job demands. The rationale behind this scale was to provide an assessment of individual concerns about returning to work that would be appropriate across a wide range of job and employer types while accurately portraying individual circumstances and perceived problem solving abilities. A total score was computed as an average of all 28 items (possible range 1–10).

Concurrent pain measures

Pain. Participants reported pain intensity on an 11-point numerical rating scale from 0 ("no pain at all") to 10 ("worst pain possible"). The reliability and validity of the pain numerical rating scale has been well documented (32), and the scale has demonstrated sensitivity to pain treatments for low-back pain (33).

Functional limitation. The Quebec back pain disability scale (34) is a 20-item self-report scale that assesses functional limitations associated with back pain. The scale has excellent reliability and internal consistency, and item selection was based on maximizing sensitivity of the scale across the full range of back disability. Items represent six activity categories: ambulation, bed/rest, bending/stooping, handling of large/heavy objects, movement, and sitting/standing. The scale has equal or better reliability and sensitivity to change when compared with competing measures (34, 35). The total score is a sum of all 20 items.

Activity avoidance. The Tampa scale of kinesiophobia (TSK) is a 17-item self-report scale that was developed to measure "kinesiophobia" [ie, the fear of movement or re-injury (36)]. Responses are on a 4-point Likert-type scale ranging from 0 ("strongly disagree") to 3 ("strongly agree"). Two factors are derived from factor analyses: activity avoidance and pathological somatic focus. For individuals with low-back pain, the TSK has been related to performance on lifting and trunk extension-flexion tasks (37). A shorter, 11-item version of the TSK was chosen for the screening inventory because this version has been shown to have similar psychometric properties to the longer version with improved internal consistency (38).

Physical demands of work. The physical workload survey is a 7-item self-report scale that was developed to provide a brief assessment of workplace physical demands based on well-established risk factors for developing work-related back problems (39). This scale has been used in two prior cohort studies of workers' compensation claimants with work-related musculoskeletal problems (40, 41), and both have shown associations with disability duration after controlling for a number of other factors. Responses indicate, on a 6-point scale, the amount of time spent at work in various physical activities and postures, including: lifting heavy objects, pushing or pulling heavy objects, bending, sitting, standing, driving, and working on vibrating surfaces. A total score is the sum of all 7 items.

Pain catastrophizing. The pain catastrophizing scale (42) is a 13-item self-report scale intended to assess pain catastrophizing, defined as "an exaggerated negative orientation toward pain stimuli and pain experience" (43). Pain catastrophizing has been shown to explain variability in disability outcomes over and above the variance accounted for by pain intensity, and the full scale score has high internal consistency and reliability (43).

Outcome measures

Return to work. At the 3-month follow-up, participants reported the number of days absent from work due to low-back pain and the number of days on modified or

alternate duty assignments. Self-reported duration of health-related absence from work has been shown to be an accurate measure of disability days when the recall period is less than one year (44, 45). From this information, two dichotomous outcome measures were analyzed separately: (i) RTW (either full-duty or modified duty) within 7 days after visit 1; and (ii) RTW (full-duty only) 3 months after visit 1. Selection of these two time points allowed for RTW comparisons at the time when lost-time disability insurance benefits would usually take effect (after 7 days of sickness absence) and when pain might be categorized as a more chronic condition (after 3 months).

Work limitations. Participants who had returned to work after 3 months also completed a 16-item version of the work limitations questionnaire (WLQ) (46). The WLQ assesses perceived impacts of low-back pain on job productivity. For each item, respondents provide a response on a 6-point likert scale from 0 ("difficult none of the time") to 4 ("difficult all the time"). The WLQ was designed as a measure of "presenteeism" that might be used to quantify subjective interpretations of lost productivity due to pain and chronic illness among working adults (47). The measure has good reliability and has been associated with objective measures of work productivity (46, 48).

Data analysis

The primary goal of data analysis was to assess the reliability and validity of the new self-efficacy scale. Reliability is the extent to which a construct can be accurately measured and is relatively free of measurement error. For psychological instruments, scale reliability is typically assessed by internal consistency of scale items (eg, Cronbach's alpha) or by comparing repeat administrations (test–retest reliability). Validity is the extent to which a variable appears to assess the actual trait or characteristic that it was designed to measure, and this evidence can be content-related (covering the proper conceptual domains), criterion-related (associated with outcomes), or construct-related (assembling evidence about what a scale score really means).

Reliability of the self-efficacy scale was evaluated from estimates of internal consistency (Cronbach's alpha) and from test–retest correlations between visits 1 and 2. Content validity of the scale was determined by individual item analysis and by a factor analysis (principal components analysis with varimax rotation) to verify conceptual sub-domains. Criterion-related validity was determined by assessing correlations of the RTWSE scale with concurrently administered measures. Very high correlations might suggest a substantial conceptual overlap with related constructs, but low-to-moderate correlations with related constructs would support the validity of the scale. An additional validity criterion was the ability of the scale to predict RTW outcomes, and a logistic regression analysis was used to estimate relative risks. Changes from visit 1 to visit 2 in total and subscale self-efficacy scores (based on factor analysis results) were analyzed using paired samples t-tests.

Results

Demographic characteristics of the 399 participants (table 1) described a mostly white, blue-collar population of working adults with moderate levels of income and education, who were employed by medium-to-large employers. Ages of participants ranged from 18–63 years [mean 36.5, standard deviation (SD) 11.2]. The most frequent occupational categories were healthcare, transportation, retail/restaurant, sanitation and maintenance, and distribution/warehousing. The occupational and demographic characteristics of participants matched that of a national database listing all reported back injuries at work (49) (see table 1). Based on a one-page debriefing questionnaire completed by participating clinicians at the end of the study, the rate of voluntarism among patients was approximately 50–75% of those eligible.

At the initial visit, most participants reported a moderate-to-high level of pain intensity (mean 6.72, SD 2.01). Based on a brief written description by participants of what happened at the time of pain onset, injuries were classified according to event or exposure codes used by the US Bureau of Labor Statistics for tracking workplace injuries (50). The ten most frequent injury types were: overexertion (57.1%), bodily reaction (16.3%), bodily reaction and exertion, unspecified (8.5%), fall on same level (4.9%), highway accident (2.8%), fall to lower level (2.6%), struck by object (2.3%), struck against object (0.8%), fall, unspecified (0.5%), and repetitive motion (0.5%). These percentages were similar to those compiled by the US Occupational Safety and Health Administration (OSHA) based on mandatory employer reporting (62.2% for overexertion, 16.3% for bodily reaction, 7.8% for fall on same level, 3.5% for fall to lower level) (50).

Means and SD for each of the 28-scale items are shown in table 2. The three items with the highest mean scores were: (i) describing pain treatments to a supervisor (mean 8.28, SD 2.37); (ii) discussing factors that contribute to pain with a supervisor (mean 7.50, SD 2.80); and (iii) explaining limitations to co-workers (mean 6.61, SD 3.19). The three items with the lowest mean scores were: (i) reducing physical workload (mean 4.88, SD 3.04); (ii) changing work to reduce discomfort (mean 5.13, SD 3.16), and (iii) work at usual

Table 1. Demographic characteristics of study participants (N=399). [USD= US dollar]

Variable	N	Sample %	US injury statistics [a] %
Gender			
Male	236	59.1	60.8
Female	163	40.9	39.2
Race			
Black	52	13.0	8.9
White	283	70.9	54.2
Asian or Pacific Islander	10	2.5	1.4
American Indian/Alaskan Native	8	2.0	0.4
Not reported	46	11.5	35.1
Ethnicity			
Hispanic	66	16.5	.
Non-Hispanic	289	72.4	.
Not reported	44	11	.
Age (years)			
18–30	145	36.3	.
31–45	151	37.8	.
46–63	99	24.8	.
Not reported	4	1.0	.
Marital status			
Never married	170	42.6	.
Married	158	39.6	.
Divorced	67	16.8	.
Not reported	3	0.8	.
Education			
No high school diploma	66	16.5	.
High school or equivalent	133	33.3	.
Some college	136	34.1	.
University degree	61	15.3	.
Not reported	3	0.8	.
Personal annual income (USD):			
<$10 000	41	10.3	.
$10 000–14 999	46	11.5	.
$15 000–24 999	87	21.8	.
$25 000–39 999	115	28.8	.
$40 000–59 999	75	18.8	.
>$60 000	26	6.5	.
Not reported	9	2.3	.
Occupational categories			
Healthcare	76	19	18.4
Transportation, shipping	85	21.3	19.5
Retail, restaurant, flight attendant	81	20.3	11.9
Sanitation, housekeeping, landscaping	37	9.3	6.4
Electrical/mechanical, plumbing, auto repair	30	7.5	7.8
Manufacturing, assembly, seamstress, materials handling	13	3.3	12.7
Construction trades	23	5.8	7.4
Public service (eg, police, fire, post office)	6	1.5	0.6
Airport worker (eg, ticketing, baggage handler, customer service)	8	2.0	1.4
Machinist, machine operator	15	3.8	1.9
Education, childcare	7	1.8	1.0
Office worker	12	3.0	6.8
(Other)	6	1.5	4.1

[a] Taken from US Department of Labor. Bureau of Labor Statistics (49, 50)

Table 2. Mean item scores and factor loadings from principal components analysis (N=399), listed in order of factor loading. [RTWSE=return-to-work self-efficacy; SD=standard deviation]

			Factor loadings (Varimax rotation) [a]		
RTWSE scale item	Mean	SD	Factor 1	Factor 2	Factor 3
6 Meet job performance expectations?	6.11	3.41	0.90	.	.
16 Meet production requirements?	5.84	3.42	0.88	.	.
20 Do everything trained to do?	6.34	3.45	0.88	.	.
3 Fulfill duties and responsibilities?	6.16	3.52	0.88	.	.
7 Perform most daily work activities?	6.03	3.47	0.87	.	.
10 Keep up with work pace?	5.83	3.44	0.86	.	.
25 Work without slowing others down?	6.26	3.46	0.85	.	.
1 Meet employer standards?	6.31	3.33	0.84	.	.
12 Work at usual pace?	5.35	3.53	0.84	.	.
24 Do job the way it should be done?	6.11	3.51	0.83	.	.
28 Resume usual work schedule?	5.86	3.37	0.83	.	.
19 Respond to an emergency situation?	6.15	3.42	0.74	.	.
27 Continue working despite pain?	5.77	3.10	0.73	.	.
18 Manage pain while at work?	5.58	3.05	0.69	0.50	.
22 Stretch and move around at work?	6.37	3.09	0.67	.	.
15 Stop thinking about pain?	5.43	3.06	0.66	0.50	.
17 Reduce physical workload?	4.88	3.04	.	0.75	.
14 Avoid activities that increase pain?	5.72	3.25	.	0.74	.
4 Change work to reduce discomfort?	5.13	3.16	.	0.73	.
11 Modify the way you work?	5.82	3.11	0.51	0.67	.
26 Request changes in work area?	5.50	3.37	.	0.60	0.42
2 Suggest changes to supervisor?	6.03	3.07	.	0.60	0.47
8 Avoid re-injury?	5.83	3.33	0.48	0.59	.
23 Discuss pain factors with supervisor?	7.50	2.80			0.82
21 Describe treatment plan with supervisor?	8.28	2.37	.	.	0.79
13 Get emotional support from co-workers?	6.14	3.23	.	.	0.66
5 Explain limitations to co-workers?	6.61	3.19	.	.	0.63
9 Get help from co-workers?	6.55	3.22	.	0.42	0.54

[a] Factor 1=meeting job demands; factor 2=modifying job tasks; factor 3= communicating needs to others. Factor loadings <0.40 not shown.

pace (mean 5.35, SD 3.53). The full range of possible responses (from 1–10) was utilized on all 28 items. All items were significantly correlated with the total score (P<0.05), and a visual inspection of item-characteristic curves (showing plots of individual item scores versus total scale scores) showed no anomalies that might suggest some items should be dropped due to poor wording or comprehension.

The total scale mean score (an average of all 28 items) at visit 1 was 6.01 (SD 2.50), and tertiles (3 equally sized groups) were defined by score ranges of 1–5 (low self-efficacy), 5–7.5 (medium self-efficacy), and 7.5–10 (high self-efficacy). At visit 2, the total scale mean score was slightly improved (mean 6.37, SD 2.44, P<0.01). The total scale score had no statistically significant association with age, gender, or income, but there was a negative correlation with education (r = -0.15, P=0.001).

Factor analysis (principal components) of the 28 items (visit 1) extracted 3 factors with eigenvalues >1.0, and this factor solution explained 73.0% of the total variance. The rotated factor loadings using a varimax rotation are shown in table 2. Labels were assigned based on the content of items loading highest on each factor. Thus, factor 1 was labeled "meeting job demands" (16 items), factor 2 was labeled "modifying job tasks" (8 items) and factor 3 was labeled "communicating needs to others" (4 items). Internal consistency (alpha) for the three scales were 0.98, 0.92, and 0.81, respectively. A second factor analysis of scale items at visit 2 (results not shown) indicated an identical breakdown of items within the same three factors.

Due to the very high internal consistency for factor 1 and the large number of items included in this scale, a sensitivity analysis was conducted to determine whether some of the items in factor 1 could be deleted while still maintaining a high level of internal consistency (Cronbach's alpha) and without reducing associations with pain, functional limitation, and RTW by >10%. Results of the sensitivity analysis are shown in table 3. Individual items from factor 1 were deleted one-at-a-time (starting with the item with the lowest factor loading) until the sensitivity criteria were exceeded. The sensitivity analysis showed that the scale could be reduced from 28 to 19 items with little or no reduction in psychometric properties. Therefore, the 19-item version of the scale (see Appendix) was used in all subsequent analyses.

Test–retest correlations from visits 1 to 2 (see table 4) varied from 0.51–0.70. An independent samples t-test showed statistically significant improvements (P<0.05) in self-efficacy for meeting job demands and modifying job tasks, but not in communicating needs to others. The total self-efficacy score improved only slightly (from 5.95 to 6.38), but this was a statistically significant improvement (P=0.002). Correlations with concurrent pain measures at visit 1 were low to moderate (see table 5). The strongest correlation was with functional limitation (r = -0.31, P=0.0005), and self-efficacy showed no statistically significant correlation with physical demands or pain catastrophizing (P>0.05).

Logistic regression analyses were conducted to test the association of total self-efficacy scores with actual RTW. For these analyses, three groups were formed according to total self-efficacy scores: low self-efficacy (<5), medium self-efficacy (scores from 5–7.5), and high self-efficacy (>7.5). Both unadjusted relative risk (RR) values and RR adjusted for age, gender, income, and education are shown in table 6. Those individuals with medium or high self-efficacy at visit 1 were 3–5 times more likely to return to work (either full or modified duty) within 7 days. A full-duty RTW within 3 months was 4 times more likely among participants with high self-efficacy measured at visit 2, but there was no significant association (P>0.05) between self-efficacy measured at visit 1 and 3-month RTW. Overall, adjustments for age, gender, income, and education had a tendency to increase the size

Table 3. Sensitivity of psychometric properties to step-wise deletion of individual scale items (N=399). [RTWSE=return-to-work self-efficacy; RTW=return to work; OR=odds ratio: 95% CI=95% confidence interval]

RTWSE version	Cronbach's alpha		Correlation	Prediction	
	Full scale	Subscale	Quebec disability scale	RTW within 7 days	
				OR [a]	95% CI
28-item version (full original scale)	0.974	0.982	-0.35a	1.25	1.1–1.4
27-item version (delete #15)	0.973	0.982	-0.35a	1.25	1.1–1.4
26-item version (delete #22)	0.972	0.982	-0.34a	1.25	1.1–1.4
25-item version (delete #18)	0.970	0.982	-0.34a	1.25	1.1–1.5
24-item version (delete #27)	0.969	0.982	-0.33a	1.25	1.1–1.4
23-item version (delete #19)	0.967	0.982	-0.33a	1.25	1.1–1.5
22-item version (delete #28)	0.965	0.982	-0.32a	1.26	1.1–1.5
21-item version (delete #24)	0.962	0.981	-0.32a	1.26	1.1–1.5
20-item version (delete #12)	0.958	0.979	-0.32a	1.26	1.1–1.5
19-item version (delete #1)	0.955	0.977	-0.31a	1.26	1.1–1.5

[a] P<0.01

Table 4. Changes in RTWSE (return-to-work self-efficacy) subscale and total scores between first and second medical visits (N=399). [SD=standard deviation.]

Self-efficacy scale	Visit 1		Visit 2		Correlation [a]	t-test [b]	P
	Mean	SD	Mean	SD			
Meeting demands	5.91	3.29	6.47	3.06	0.51	-2.82	0.005
Modifying tasks	5.54	2.63	5.80	2.58	0.64	-3.40	0.001
Communicating needs	7.00	2.26	6.90	2.49	0.70	0.54	0.587
Total self-efficacy score	5.95	2.41	6.38	2.36	0.63	-3.13	0.002

[a] Pearson correlation, all significant at 0.05 level.
[b] Matched samples t-test.

Table 5. Correlations of RTWSE (return-to-work self-efficacy) total score with concurrent pain measures. [SD=standard deviation.]

			Pearson correlations					
Variable	Mean	SD	RTWSE	PAIN	FUNC	AVOID	PHYS	CATAST
RTWSE	6.01	2.50	1.00					
Pain intensity (PAIN)	6.72	2.01	-0.17 [a]	1.00				
Function (FUNC)	4.94	2.13	-0.31 [a]	0.51 [a]	1.00			
Activity avoidance (AVOID)	27.79	5.48	-0.19 [a]	0.33 [a]	0.44 [a]	1.00		
Physical demands (PHYS)	26.03	6.14	-0.09	0.12 [b]	0.11 [b]	0.16 [a]	1.00	
Pain catastrophizing (CATAST)	18.31	13.14	-0.10	0.42 [a]	0.47 [a]	0.59 [a]	0.15 [a]	1.00

[a] P<0.01.
[b] P<0.05.

Table 6. Relative risk (RR) for return to work based on RTWSE-19 (return-to-work self-efficacy) scores. [95% CI=95% confidence interval.]

Work outcome/visit	N	Return rate %	Unadjusted		Adjusted	
			RR	95% CI	RR [a]	95% CI
Return to work within 7 days						
Visit 1 RTWSE						
Low (<5.0)	119	61.3	1.00		1.00	
Medium (5.0–7.5)	104	82.1	2.89 [b]	1.42–5.89	3.40 [b]	1.58–7.33
High (>7.5)	119	87.2	4.31 [b]	2.02–9.19	4.93 [b]	2.23–10.91
Return to work at 3 months						
Visit 1 RTWSE						
Low (<5.0)	119	76.6	1.00		1.00	
Medium (5.0–7.5)	104	73.1	0.83	0.42–1.66	0.91	0.44–1.88
High (>7.5)	119	84.9	1.72	0.80–3.67	1.97	0.90–4.33
Visit 2 RTWSE						
Low (<5.0)	76	66.1	1.00		1.00	
Medium (5.0–7.5)	78	75.0	1.54	0.68–3.46	3.62	0.70–3.75
High (>7.5)	94	85.1	2.94 [c]	1.27–6.78	3.72 [b]	1.51–9.13

[a] RR adjusted for age, gender, income, and education.
[b] P<0.01.
[c] P<0.05.

and precision of RR estimates. When analyses were repeated with the additional adjustment of controlling for concurrent pain intensity and functional limitation (Quebec disability scale), high self-efficacy at visit 1 was still a significant predictor of full or modified duty RTW within 7 days [RR 3.62, 95% confidence interval (95% CI) 1.59–8.24], and high self-efficacy at visit 2 was still a significant predictor of RTW at 3 months (RR 2.69, 95% CI 1.12–6.44). The overall correct classification of RTW within 7 days was 61%, less than the 75% reported by more comprehensive risk prediction instruments covering multiple domains [eg, the back disability risk questionnaire (51) and the Örebro musculoskeletal pain questionnaire (52)].

At 3-month follow-up, 242 participants who had returned to work completed the measure of work limitations, with a mean total score of 8.74 (SD 11.11). As a point of reference, this mean score would correspond, for example, with a respondent indicating difficulty "some of the time" on 4 of the 16 items. This outcome was negatively correlated with total self-efficacy at visit 1 ($r = -0.15$, $P<0.05$) and visit 2 ($r = -0.23$, $P<0.01$).

Discussion

A plethora of self-report measures have been developed to assess psychological constructs germane to musculoskeletal pain and disability (28), but few have been focused specifically on work-related constructs. Questions pertaining to self-efficacy have been included in a number of recent low-back pain cohort studies (41, 53), but this is the first full-length scale focusing on resumption of workplace activities that was developed from qualitative studies to ensure content validity. Many studies have shown that illness, pain, and disability are not synonymous and that non-physiological factors (eg, pain beliefs and coping) explain some of the discordance between pain and disability. Self-efficacy may be one psychological factor that allows patients to willfully distract from negative thoughts, threatening physiological sensations, and emotional distress to solve workplace problems and barriers more rationally and return to normal work sooner. This study provided an opportunity to evaluate the reliability (internal consistency) and validity (factor structure and predictive strength) of a new measure of RTWSE in a cohort of working adults with acute onset of work-related low-back pain.

Scores on the RTWSE-19 measure were negatively correlated with concurrent measures of pain intensity, functional limitation, physical demands of work, activity avoidance, and pain catastrophizing (though the latter failed to reach statistical significance). The strength of correlation was low (range 0.1–0.3), which suggests that while RTWSE was associated with related pain constructs in the hypothesized direction, RTWSE shows little overlap or redundancy with other measures. Thus, the self-reported ability to meet occupational demands is highly distinguishable from the more general concepts of fear-avoidant beliefs (54, 55) or exaggerated worries or ruminations about pain (43) that are thought to mediate associations between pain and disability. General beliefs and expectations about the impact of pain on daily function, then, may be altered when viewed through the lens of workplace activities, responsibilities, and relationships. This may explain the surprisingly weak concordance between outcome measures of functional impairment and RTW in studies of low-back pain (51).

Results of the principal components analysis showed a 3-factor solution, but item loadings suggested a different labeling and configuration from the three original sub-domains (pain control, obtaining help, and meeting job demands) that were originally generated from qualitative analysis of worker interviews and focus groups. Results of the principal components analysis suggested two alterations in the conceptualization of RTWSE. First, many items under the original headings of controlling pain at work and meeting job demands loaded in a single factor; thus, there is little distinction between worker efforts to "control or manage pain" and worker efforts to keep up with job demands; the two ideas are conceptually very similar. Second, factor loadings of individual items suggested that the ability to meet job demands and the ability to modify work to reduce discomfort were conceptually distinct. This finding supports the importance of an employer offer of job modification, as workers form an opinion about the feasibility of job modification that is separate from the perception of being able to keep up with productivity demands. Future work might assess the impact of employer accommodation efforts on the RTWSE beliefs of workers.

The RTWSE-19 scale was associated with RTW outcomes, but relationships were stronger when self-efficacy was assessed at visit 2. Individuals with high RTWSE at visit 2 were 5 times more likely to return to work than those with low RTWSE. Thus, beliefs about the ability to work may have more prognostic value when assessed after the first week of low-back pain. During the first week, patients may formulate more definitive expectations for recovery and RTW from employer interactions, from discussions with family and friends, or from changes (or lack of change) in pain symptoms over the first few days. Assessment of psychosocial factors like self-efficacy, then, may be more informative for clinical decision-making when administered a week or two following pain onset, after patient beliefs and expectations and the trajectory of symptom recovery have begun to take shape. While the mean RTWSE-19 score improved only slightly between visits 1 and 2, the moderate test–retest correlation provides further evidence that self-efficacy beliefs were still evolving in the first week.

In this study, the RTWSE-19 was administered very early after pain onset among mostly blue-collar occupations, and the measure may perform differently among patients with chronic low-back pain and among other working populations. One limitation of the study was the sizable attrition despite substantial efforts to track participants and facilitate data collection at the 3-month follow-up assessment. Subsequent studies should apply the RTWSE-19 scale among sub-acute and chronic low-back pain populations and in other jurisdictions to ensure a similar level of reliability and validity. As with any study involving volunteer patients, selection bias is a concern, although the initial patient sample compared favorably with national injury data, and there were no differences between responders and non-responders at the 3-month follow-up on baseline measures of pain and pain beliefs. Because the focus of the larger study was on predicting transition from acute to sub-acute to chronic back pain, longer-term follow-up (ie, one year)

was not included in the study design. Workers' compensation claims data in the US suggest that for individuals not working 3 months after onset of back pain, 78% will remain out of work for at least six months, and 56% for at least one year (56).

Though self-efficacy is generally conceptualized as an individual-level factor in pain and disability, it's important to recognize that not all workplace circumstances are within the control of individual workers. Thus, self-efficacy, when measured in the context of RTW, may reflect both individual characteristics (ie, the ability to persist with goals and activities despite potential obstacles and barriers) and workplace characteristics (eg, supervisor support or the ability to provide alternate or modified duty). Thus, the RTWSE-19 may be capturing elements of both personal motivation and situational barriers. In this study, RTW self-efficacy showed no statistically significant association with self-reported workplace physical demands, but more research is needed to assess whether RTW self-efficacy is influenced by occupational demands and organizational practices and whether employers can improve the self-efficacy beliefs of workers.

From the study results, we conclude that the RTWSE-19 scale is a reliable and valid measure for assessing the confidence of working adults with low-back pain to meet job demands, modify job tasks, and communicate needs to co-workers and supervisors so they are able to return to work during the recovery period. The RTWSE-19 may be useful to assess the effectiveness of workplace and clinical interventions, explore mediating mechanisms in RTW, and highlight the interpersonal and self-management aspects of returning to work after onset of musculoskeletal pain. When assessed 1–2 weeks after pain onset (ie, visit 2), the scale is predictive of longer range disability outcomes.

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Appendix: The 19-item return-to-work self-efficacy (RTWSE-19) scale (9 of original 28 items have been deleted).

Instructions: We would like to know how confident you are in doing certain activities if you were at work today. For each of the following questions, please circle the number that corresponds to your confidence that you could do the task at the present time:

How confident are you that you could…	Not at all confident									Totally confident
2. Suggest to your supervisor ways to change your work to reduce discomfort?	1	2	3	4	5	6	7	8	9	10
3. Fulfill all of your duties and responsibilities?	1	2	3	4	5	6	7	8	9	10
4. Change the type of work activities you do to reduce discomfort?	1	2	3	4	5	6	7	8	9	10
5. Explain any physical limitations you may have to your co-workers?	1	2	3	4	5	6	7	8	9	10
6. Meet expectations for job performance?	1	2	3	4	5	6	7	8	9	10
7. Perform most of your daily activities at work?	1	2	3	4	5	6	7	8	9	10
8. Avoid re-injury?	1	2	3	4	5	6	7	8	9	10
9. Get co-workers to help you with activities that might cause discomfort?	1	2	3	4	5	6	7	8	9	10
10. Keep up with the pace at work?	1	2	3	4	5	6	7	8	9	10
11. Modify the way you work to reduce discomfort?	1	2	3	4	5	6	7	8	9	10
13. Get emotional support from coworkers (such as listening or talking about your problem)?	1	2	3	4	5	6	7	8	9	10
14. Avoid activities that are likely to increase pain?	1	2	3	4	5	6	7	8	9	10
16. Meet your production requirements?	1	2	3	4	5	6	7	8	9	10
17. Reduce your physical workload?	1	2	3	4	5	6	7	8	9	10
20. Do everything you're trained to do?	1	2	3	4	5	6	7	8	9	10
21. Describe to your supervisor the nature of your injury and your medical treatment?	1	2	3	4	5	6	7	8	9	10
23. Discuss openly with your supervisor things that may contribute to your discomfort?	1	2	3	4	5	6	7	8	9	10
25. Do your work without slowing others down?	1	2	3	4	5	6	7	8	9	10
26. Request changes in your workstation or work area to reduce discomfort?	1	2	3	4	5	6	7	8	9	10