J Occup Rehabil (2018) 28:332–345
DOI 10.1007/s10926-017-9721-2

Validation of the Readiness for Return-To-Work Scale in Outpatient Occupational Rehabilitation in Canada

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Published online: 29 July 2017

Abstract *Purpose* To examine construct and concurrent validity of the Readiness for Return-To-Work (RRTW) Scale with injured workers participating in an outpatient occupational rehabilitation program. *Methods* Lost-time claimants (n = 389) with sub-acute or chronic musculoskeletal disorders completed the RRTW Scale on their first day of their occupational rehabilitation program. Statistical analysis included exploratory and confirmatory factor analyses of the readiness items, reliability analyses, and correlation with related scales and questionnaires. *Results* For claimants in the non-job attached/not working group (n = 165), three factors were found (1) Contemplation (2) Prepared for Action-Self-evaluative and (3) Prepared for Action-Behavioural. The precontemplation stage was not identified within this sample of injured workers. For claimants who were job attached/working group in some capacity (n = 224), two factors were identified (1) Uncertain Maintenance and (2) Proactive Maintenance. Expected relationships and statistically significant differences were found among the identified Return-To-Work (RTW) readiness factors and related constructs of pain, physical and mental health and RTW expectations. *Conclusion* Construct and concurrent validity of the RRTW Scale were supported in this study. The results of this study indicate the construct of readiness for RTW can vary by disability duration and occupational category. Physical health appears to be a significant barrier to RRTW for the job attached/working group while mental health significantly compromises RRTW with the non-job attached/not working group.

Keywords Return-To-Work · Measurement · Musculoskeletal · Readiness for change · Work disability · Workers' compensation

Introduction

Return-To-Work (RTW) ultimately depends on the decision-making and behavior change process of the individual experiencing work disability [1]. The process involved in RTW requires the conceptualization of a developmental phenomenon influenced by various temporal aspects associated with physical, psychological, and social factors that affect work disability [2–4]. The Readiness for Return-To-Work (RRTW) model considers behaviours that influence RTW and suggests that individuals progress from one stage of change to another based on one's own decisional balance, self-efficacy, and change process [1, 5]. The five stages of change identified by the RRTW model and discussed in detail elsewhere are: precontemplation, contemplation, preparation-for-action, action, and maintenance [5].

The RRTW model can help work rehabilitation professionals understand how an individual progresses through stages of change [2]. The identification of what stage an

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individual is in during the RTW process can assist in the appropriate selection of a personalized intervention focusing on aspects associated with readiness for RTW unique to that stage [6]. For example, earlier stages of change could focus on initiation of RTW behaviour while later stages concentrate on maintenance of the RTW behaviour. In addition to the benefits of stage specific intervention, identifying what stage of change an individual is in could also help determine RTW outcomes suitable for each stage.

The Readiness for Return-To-Work (RRTW) Scale assesses stages of readiness for RTW and was developed and validated in a Canadian study with lost-time claimants who had experienced a work related musculoskeletal (MSK) disorder of 1-month duration [2]. The two-part scale assesses RRTW for persons not working and readiness for work maintenance for individuals who are working [2, 6]. Franche et al. [2] identified four stages of change for those not working: (1) Precontemplation: the injured worker is not thinking about behaviours that would initiate a RTW. (2) Contemplation: the injured worker uses a decisional balance when considering RTW but is not actively engaging in behaviours involved in RTW. (3) Prepared for Action-Self-evaluative: the injured worker participates in behaviours such as seeking information regarding RTW, testing their abilities to RTW, and making tangible plans. (4) Prepared for Action-Behavioural: the injured worker engages in behaviours that put their RTW plan into action.

Validity of the RRTW Scale has been investigated in a Norwegian study evaluating a 5-day inpatient occupational rehabilitation program [6]. In this study by Braathen et al. only two stages were identified for individuals who were not working: (1) RTW inability which corresponds with Franche et al.'s stage of precontemplation and (2) RTW uncertainty corresponding with Franche et al.'s stage of contemplation [2, 6]. In addition to these differences, a prepared-for-action stage was not identified in the study by Braathen et al. [6]. This was thought to be attributed to the short length of program, which may not have provided enough time for transition to the next stage [6]. For those working, both studies revealed the presence of Uncertain Maintenance and Proactive Maintenance stages. The Uncertain Maintenance stage is characterized by higher levels of functional disability and fear avoidance with challenges staying at work [2, 6]. In the Proactive Maintenance stage, injured workers utilize skills and social supports to manage high-risk situations that can lead to relapse and employ preventative strategies [2, 6]. A Norwegian longitudinal study examined predictive validity of the scale and found that three dimensions (*Prepared for Action-Self-evaluative, Prepared for Action-Behavioural* and *Uncertain Maintenance*) were significantly associated with future RTW in a sample of sick-listed individuals [7]. However, issues were identified with stage allocation and more research is recommended on determining the scale's factor structure.

The somewhat inconsistent results of studies on the RRTW Scale indicate a need for further validation to confirm readiness dimensions. Culture and patient setting can influence the construct of RRTW and further validation in different settings and with various populations is required [6]. Further validation of the RRTW Scale is needed prior to investigating how specific elements of the RRTW model, such as decisional balance, self-efficacy, and change process, influence behaviour change and RTW [5].

Objectives and Study Hypothesis

The aim of this study was to investigate the construct and concurrent validity of the RRTW Scale in a Canadian occupational rehabilitation sample. We built on the studies of Franche et al. [2] and Braathen et al. [6] by comparing constructs related to RRTW previously examined in those studies (pain and health surveys) within a population of injured workers with sub-acute (28–84 days post injury) or chronic (84+ days post injury) MSK disorders. We also examined relationships with a new construct, RTW expectations.

We hypothesized:

1. Earlier stages of change are associated with higher levels of pain severity and pain-related disability as reported on the pain Visual Analogue Scale (VAS) and Pain Disability Index (PDI). Research indicates lower pain levels are associated with RTW [8] and among injured workers with work-related back injuries, persistent pain has been identified as one of the most important obstacles related to RTW [9].
2. Earlier stages of change are associated with more compromised physical and mental health measured through the SF-36 health survey. Research demonstrates sickness absence is associated with increased levels of subjective health complaints [10] and perceptions of better general health and higher SF-36 mental health scores resulted in higher probability of RTW [11].
3. Later stages of change are associated with better RTW expectations. Research has shown recovery expectations are a consistent predictor of activity limitation and are predictive of future work outcome [12]. Also, negative work-related recovery expectations have been associated with longer duration of time-loss benefits and time to claim closure [13].

Methods

Study Design

A cross-sectional study was performed evaluating baseline measures from a clinical trial on claimants attending an outpatient occupational rehabilitation program in Edmonton, Alberta, Canada from November 17, 2014 to June 30, 2015. The cross-sectional approach provided an efficient method to investigate the construct and concurrent validity of the RRTW Scale. Data were obtained through claimant completed surveys/questionnaires and the Workers' Compensation Board (WCB) Alberta/Millard Health administrative and clinical databases, which have previously been used for research. The University of Alberta's Health Research Ethics Board approved this research.

Setting

The aim of the rehabilitation program was to facilitate a RTW outcome through functional restoration and graded activity, and typical program duration is 4–6 weeks. For claimants who commence the RTW program with a job to return to, modified work also becomes a component of the RTW program.

Participants

The study used data from claimants with open workers' compensation claims for MSK disorders (i.e. work related injuries). Who underwent an occupational rehabilitation program at an outpatient facility. At time of admission, claimants were either considered job attached (claimant is employed but experiencing ongoing disability stopping them from completing full work duties) or non-job attached (claimant may be experiencing ongoing disability and does not currently have a job to return to).

Inclusion criteria included all claimants enrolled in an occupational rehabilitation program during the study timeframe who were over the age of 18 years and completed the entire RRTW Scale at program admission. Claimants were excluded from the study if they did not complete all aspects of the scale, required a translator during their program, were diagnosed with a head injury or traumatic psychological injury, completed <5 days of their program, or were removed from their program for either medical or non-compensable reasons. For claimants who attended multiple programs during the study timeframe, demographic and instrument information from their last program were used.

Data Collection

Data were collected through WCB Alberta/Millard Health clinical and administrative databases for claimant characteristics such as age, sex, diagnosis, employment status, marital status, and level of education. On the first day of the program, data were collected through surveys and questionnaires evaluating pain, general health, RTW expectations and RRTW.

Readiness for Return-To-Work Scale

RRTW was measured using the original version of the RRTW Scale [2] (see Fig. 1). The RRTW Scale is a 22-item measure of the RRTW stages and consists of two scales; Scale A contains 13 items for individuals who are not working and Scale B includes nine items for individuals who are working either part or full time. Each item is scored using a 5 point scale (1 = strongly disagree, 5 = strongly agree) representing a specific readiness stage: Precontemplation (items a1, a2, a13); Contemplation (items a9, a11, a12); Prepared for Action-Self-evaluative [a4, a7 (item scale reversed), a8, a10]; and Prepared for Action-Behavioural (a3, a5, a6) for those not back at work and Uncertain Maintenance (b5, b6, b7, b8 (item scale reversed), b9) or Proactive Maintenance (b1, b2, b3, b4) for those who are currently working. The scale provides a final score for each readiness stage by taking the mean of the items that create that factor [2]. Higher scores associated with a readiness stage indicate higher level of beliefs associated with that stage [2].

Pain Disability Index

Perceived disability due to pain was measured using the Pain Disability Index (PDI) [14]. The 7-item self-report inventory measures general and domain-specific disability related to chronic pain. Level of disability is rated on a scale of 0 (no disability) to 10 (total disability) in seven areas of life activities: family/home responsibility, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activity. Higher scores indicate higher levels of perceived disability. To overcome issues associated with missing data, percentage PDI, calculated as the total score divided by the total possible score for only the items completed is recommended and was used in this analysis [15, 16]. Higher scores out of 100 indicate higher levels of perceived disability.

Pain Visual Analogue Scale

The pain Visual Analogue Scale (VAS) was used to measure perceived pain intensity [17]. The scale is anchored at

Fig. 1 Readiness for Return-To-Work Scale

READINESS FOR RETURN-TO-WORK

The following section is about your feelings about getting ready to return to work. Keep in mind that 'back to work' could mean back to part-time or modified work.

1. Are you currently back at work? O No → *complete items 1 to 13 only*
O Yes → *complete items14 to 22 only*

FOR THOSE NOT BACK AT WORK If you are not back at work, skip to the next page, for items 14 to 22.	**Strongly disagree**	**Disagree**	**Neither disagree nor agree**	**Agree**	**Strongly agree**
1) You don't think you will ever be able to go back to work.	**1**	**2**	**3**	**4**	**5**
2) As far as you're concerned, there is no point in thinking about returning to work.	**1**	**2**	**3**	**4**	**5**
3) You are actively doing things now to get back to work.	**1**	**2**	**3**	**4**	**5**
4) Physically, you are starting to feel ready to go back to work.	**1**	**2**	**3**	**4**	**5**
5) You have been increasing your activities at home in order to build up your strength to go back to work.	**1**	**2**	**3**	**4**	**5**
6) You are getting help from others to return to work.	**1**	**2**	**3**	**4**	**5**
7) You are not ready to go back to work.	**1**	**2**	**3**	**4**	**5**
8) You have found strategies to make your work manageable so you can return to work.	**1**	**2**	**3**	**4**	**5**
9) You have been wondering if there is something you could do to return to work.	**1**	**2**	**3**	**4**	**5**
10) You have a date for your first day back at work. **(**	**1**	**2**	**3**	**4**	**5**
11) You wish you had more ideas about how to get back to work.	**1**	**2**	**3**	**4**	**5**
12) You would like to have some advice about how to go back to work.	**1**	**2**	**3**	**4**	**5**
13) As far as you are concerned, you don't need to go back to work ever.	**1**	**2**	**3**	**4**	**5**
FOR THOSE WHO ARE CURRENTLY BACK AT WORK	**Strongly disagree**	**Disagree**	**Neither disagree nor agree**	**Agree**	**Strongly agree**
14) You are doing everything you can to stay at work.	**1**	**2**	**3**	**4**	**5**
15) You have learned different ways to cope with your pain so that you can stay at work.	**1**	**2**	**3**	**4**	**5**
16) You are taking steps to prevent having to go off work again due to your injury.	**1**	**2**	**3**	**4**	**5**
17) You have found strategies to make your work manageable so you can stay at work.	**1**	**2**	**3**	**4**	**5**
18) You are back at work but not sure you can keep up the effort.	**1**	**2**	**3**	**4**	**5**
19) You worry about having to stop working again due to your injury.	**1**	**2**	**3**	**4**	**5**
20) You still find yourself struggling to stay at work due to the effects of your injury.	**1**	**2**	**3**	**4**	**5**
21) You are back at work and it is going well.	**1**	**2**	**3**	**4**	**5**
22) You feel you may need help in order to stay at work.	**1**	**2**	**3**	**4**	**5**

both ends where 0 indicates "no pain" and 10 describes "pain as bad as it could be" or "worst imaginable pain" [15, 17]. Higher scores out of 10 indicate greater levels of pain intensity.

SF-36v2 Health Survey

General health was assessed using the SF-36v2 Health Survey [18]. Eight domains [physical functioning, role participation with physical health problems (role-physical), bodily pain, general health, vitality, social functioning, role participation with emotional health problems (role-emotional), and mental health] considered significant in describing and monitoring individuals suffering from illness or disease are measured in terms of functioning and personal evaluation [18]. Scores range from 0 to 100 with higher scores indicating better health. The 8-scale profile can be reduced to two component summary measures. The physical and mental component summary measures provide a summary of an individual's health from broad physical and mental health perspectives and were used to determine if functional limitations existed in either of these major components of health [18].

Return-To-Work Expectations Questionnaire

Recovery expectations have been found to be associated with the future recovery and RTW of individuals who experience MSK disorders [19]. The RTW Expectations Questionnaire was used to measure claimant RTW expectations [14]. The questionnaire has demonstrated adequate internal consistency ($\alpha = 0.75$) and has been shown to correlate moderately with measures of pain intensity and reported disability in patients with low back pain [15]. It has also demonstrated some predictive validity in claimants with chronic low back pain [20]. A 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) is used to rate agreement with three statements about the likelihood of returning to work. The average of the three ratings was calculated, providing a total score out of 5, with lower scores representing more positive expectations.

Statistical Analyses

Socio-demographic characteristics of claimants were summarized using descriptive statistics. Characteristics of the sample was stratified by job attachment status and compared using Chi Square and independent t tests. Claimants were stratified by job attachment status instead of working and not working groups as identified in the studies by Franche et al. [2] and Braathen et al. [6] since our study was conducted within a rehabilitation context, all claimants were off work or experiencing difficulty completing regular work duties, and because there are significant differences observed on several characteristics between claimants based on job attachment status. Characteristics of claimants between RRTW factors was compared using descriptive statistics and one-way ANOVA.

Internal structure of the RRTW Scale was investigated as a source of construct validity evidence using exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and Cronbach's alpha to evaluate reliability of the subscales. Concurrent validity was investigated with analyses involving comparisons of groups reflecting the stages of change [2] on relevant constructs using ANOVA and MANOVA with post hoc analyses. Our hypotheses were tested on the RTW readiness stages found for the job attached and non-job attached groups.

Construct Validity Analysis

The job attached and non-job attached status groups were randomly divided into two subsamples to allow for cross validation of the factors obtained using EFA. Missing data were managed using listwise deletion. Eight cases were missing from the original data set (n = 389). For the job attached group (n = 114), an EFA was completed using 13 items; for the non-job attached group (n = 109), an EFA was completed with nine items. Prior to conducting an EFA, we investigated the appropriateness of the data for factor analysis. The Kaiser–Meyer–Olkin value was 0.72 for the job attached group and 0.55 for the non-job attached group, which is above the acceptable value of 0.5, and Bartlett's Test of Sphericity was statistically significant for both groups; therefore, we proceeded with the EFA. Evaluation of the scree plot and eigenvalues >1.0 were used to determine the potential number of factors.

EFA was completed using principal components extraction with Varimax rotation. An orthogonal solution was attempted first as it could provide support for the theoretically distinct groups corresponding to the stages of change. In an attempt to further acquire simple structure, an oblique transformation using Direct Oblimin was employed following the orthogonal approach. The final factor solution was determined using the criterion of simple structure—where most variables load onto only one factor and the factors obtained are interpretable. Items that loaded onto more than one factor or demonstrated unpredictable behaviour with factor loadings between analyses were considered to have a nature too complex for interpretation and removed from subsequent analyses [21]. In our analyses, simple structure was obtained using principal components extraction with Varimax rotation (i.e., orthogonal solution) with little advantage gained in using an oblique transformation. Item loadings were retained with factor loading of 0.3 or greater [22].

We intended to cross-validate our findings from the EFA using 2 CFA for both job attached and non-job attached groups; however, due to the small subsample size of the non-job attached group (n = 47), a CFA was not completed as a sample size of 100–200 is recommended when each factor has a loading of at least three items [23]. A CFA was completed with the second subsample of the job attached group (n = 111) using AMOS Software SPSS 23.0 (SPSS Inc., 2015a). Four goodness-of-fit indices were used measure the fit of our model to the data: Comparative Fit Index (CFI), X^2, X^2/degrees of freedom ratio, and Root Mean Standard Error of Approximation (RMSEA). Similar cut-off criteria as Franche et al. [2] were used for these indices to indicate model-data fit with required values between 0.90 and 1 for the CFI [24], X^2/degrees of freedom ratio close to 5 [2] and a value of ≤0.05 for RMSEA [25].

Concurrent Validity Analysis

Concurrent validity of the RRTW Scale was demonstrated using Pearson's correlation with related scales and questionnaires. Groups were created by their stages of change and then compared on relevant outcomes such as pain, health, and RTW expectations. We anticipated claimants in the earlier stages of change would have higher levels of pain severity and pain-related disability while claimants in the later stages of change would have lower perceived pain and disability. We also expected claimants would have more compromised physical and mental health if in the earlier stages of change compared to claimants in the later stages of change. RTW expectations were anticipated to be better among those who were in the later stages of change compared to those in the earlier stages of change.

Results

Of the 389 claimants who completed the entire RRTW Scale such that we were able to identify the readiness stage they belonged to, 224 were job attached/working group and 165 were non-job attached.

Claimant Characteristics

Claimant characteristics are reported in Table 1. Claimants were predominantly male (64.0%), in their mid-40s (mean age 44 years), married (38.3%), achieved a high school education (24.2%), with an annual income of $60,000 CDN. The most common diagnostic category was joint disorders (41.1%) followed by sprain/strain (26.7%), and the body part most frequently injured was the back/trunk/torso (31.4%) followed by upper extremity (28.0%). Claimants had moderate levels of pain and disability (mean pain VAS = 4.8/10 and mean Pain Disability Index = 47/100), physical and mental health (SF-36 PCS = 34.0/100, SF-36 MCS = 41.5/100) and slightly negative RTW expectations (3.4/5). Statistically significant differences were observed between claimants in the job attached and non-job attached groups at program admission on claimant characteristics such as sex ($p < 0.01$), marital status ($p < 0.01$), income ($p < 0.01$), education level ($p = 0.02$), occupational category ($p < 0.01$), and disability duration measured in days from date of accident to admission to program ($p < 0.01$). No statistically significant differences were observed between groups for age ($p = 0.54$), diagnostic category ($p = 0.64$), and part of body injured (0.94).

In comparison to claimants who were job attached, those who were non-job attached were more likely to have lower perceived mental health ($p < 0.01$) and RTW expectations ($p < 0.01$) and higher pain disability measured through the PDI ($p < 0.01$). Statistically significant difference were not observed for pain VAS ($p = 0.91$) and perceived physical health ($p = 0.92$) between the job attached and non-job attached groups.

RRTW Scale A: For Those not Back at Work

The EFA of the RRTW Scale A (n = 109) found three factors. We removed one factor as the items related to this factor loaded onto multiple factors and <1% of our sample rated themselves in this group. Using principal components extraction with Varimax rotation, we were able to identify a three-factors solution where no items loaded onto more than one factor (see Table 2). We found two items (a4, a7) related to Prepared for Action-Self-evaluative; however we decided to drop item a10 from the model because the commonality, or shared variance of this item with other items in the scale, was low (<0.3). The three factors solution explained 65.8% of the variance. The factors identified were Contemplation (contributing 22.8%), Prepared for Action-Self-evaluative (contributing 21.8%) and Prepared for Action-Behavioural (contributing 21.2%). Cronbach's alpha was 0.72 for contemplation, 0.69 for Prepared for Action-Self-evaluative and 0.72 for Prepared for Action-Behavioural.

RRTW Scale B: For Those Who are Currently Back at Work

Using principal components extraction with Varimax rotation, we were able to identify a two-factors solution for the working group (n = 114) where all items loaded onto the appropriate factor (see Table 2). Both factors correspond to the original scale and all original items were contained within the uncertain work maintenance stage (items b5–9) or proactive work maintenance stage (items b1–4).

Table 1 Characteristics of claimants referred for a Return-To-Work (RTW) program

	Entire sample (n = 389)	Job attached/working (n = 224)	Non-job attached (n = 165)
		Mean (SD) or %	
Age (years)	44 (12.3)	45 (11.9)	43 (12.8)
Sex (%)*			
Male	64.0	58.9	70.9
Female	36.0	41.1	29.1
Marital status (%)*			
Married	38.3	41.5	33.9
Single	28.8	26.3	32.1
Common-law	11.6	12.5	10.3
Widowed	1.5	1.3	1.8
Divorced	6.2	6.3	6.1
Separated	3.3	2.2	4.8
Not specified	10.3	9.8	10.9
Gross annual salary (10K CDN)*	60.0 (28.4)	57.8 (24.1)	64.3 (32.9)
Education level (%)**			
Grade 8 or less	2.6	1.3	4.2
Partial high school	13.9	12.5	15.8
High school diploma	24.2	25.4	22.4
Partial technical	12.1	13.8	9.7
Technical diploma	19.3	19.2	19.4
Partial university	4.4	4.9	3.6
University degree	5.9	8.0	3.0
Not specified	17.7	14.7	21.8
Diagnostic category (%)			
Joint disorder	41.4	43.4	34.5
Sprain/strain	26.7	26.2	28.7
Fracture	12.3	11.3	16.1
Contusion	8.7	8.6	9.2
Nerve damage	3.6	4.0	2.3
Dislocation	1.8	1.3	3.4
Laceration	1.8	1.7	2.3
Other	3.6	3.6	3.4
Part of body (%)			
Back/trunk/torso	31.4	30.9	33.3
Upper extremity	28.0	27.2	31.0
Lower extremity	20.1	20.5	18.4
Neck	6.2	6.6	4.6
Other/multiple body parts	14.4	14.9	12.6
Occupational category (%)*			
Trades and transport	49.4	44.4	66.7
Sales and services	15.9	16.9	12.6
Health occupations	11.1	12.9	4.6
Business, finance, admin	7.2	9.3	0.0
Education/law/gov	4.6	5.3	2.3
Manufacturing/utilities	4.4	5.0	2.3
Agriculture	4.1	2.0	11.5
Natural/applied science	1.8	2.3	0.0
Management	1.0	1.3	0.0
Art/culture/rec/sport	0.5	0.7	0.0
Disability duration (days)*	188.0 (393.6)	148.4 (153.8)	241.8 (573.9)

Table 1 (continued)

	Entire sample (n = 389)	Job attached/working (n = 224)	Non-job attached (n = 165)
Pain Disability Index (PDI)*	47 (2.0)	43 (1.9)	52 (1.9)
Visual Analogue Scale (VAS)	4.8 (2.1)	4.6 (2.1)	4.9 (2.0)
SF-36 physical component summary (PCS)	34.0 (7.9)	34.2 (7.7)	33.6 (8.2)
SF-36 mental component summary (MCS)*	41.5 (12.3)	43.6 (11.7)	38.6 (12.7)
Return-To-Work (RTW) expectations*	3.4 (0.8)	3.3 (0.8)	3.6 (0.8)

*Statistically significant difference at $p \leq 0.01$

**Statistically significant difference at $p \leq 0.05$

Table 2 Communality of items loading onto factors

RRTW Scale A items	Readiness for Return-To-Work factors		
	Contemplation	Prepared for Action-Self evaluative	Prepared for Action-Behavioural
RRTW item a9	0.680		
RRTW item a11	0.849		
RRTW item a12	0.817		
RRTW item a4		0.788	
RRTW item a7		0.805	
RRTW item a8		0.744	
RRTW item a3			0.874
RRTW item a5			0.757
RRTW item a6			0.660

RRTW Scale B items	Readiness for Return-To-Work factors	
	Uncertain Maintenance	Proactive Maintenance
RRTW item b1	0.681	
RRTW item b2	0.647	
RRTW item b3	0.686	
RRTW item b4	0.667	
RRTW item b5		0.719
RRTW item b6		0.630
RRTW item b7		0.705
RRTW item b8		0.711
RRTW item b9		0.489

The two-factor solution explained 47.5% of the variance. The factors were uncertain work maintenance (explaining 26.6%) and proactive work maintenance (explaining 20.9%). Cronbach's alpha was 0.76 for Uncertain Maintenance and 0.59 for Proactive Maintenance.

CFA was carried out on the second subsample for only the job attached group (n = 111) using the same items stemming from the exploratory analysis (nine items for the working group) to test the two-factor structure for the job attached group. The variables were correlated to assess the fit of the model to the data ($p > 0.05$). The fit of the model was acceptable with the following global fit indices: CFI = 0.92, $X^2 = 38.82$, df = 27, $X^2/df = 1.44$ and RMSEA = 0.04.

Characteristics of Claimants Between RRTW Factors

Characteristics of claimants between RRTW factors are reported in Table 3. Statistically significant differences were found for age ($p = 0.03$), occupational category ($p < 0.01$), and disability duration ($p < 0.01$) between RRTW factors (see Table 4). No statistically significant differences were

Table 3 Characteristics of claimants between Readiness for Return-To-Work (RRTW) factors

	C (n = 55)	PA-S (n = 48)	PA-B (n = 62)	UM (n = 112)	PM[a] (n = 112)
		Mean (SD) or %			
Age (years)**	47 (11.6)	41 (12.9)	42 (13.0)	45 (12.0)	46 (11.8)
Sex (%)					
Male	72.7	64.6	74.2	61.6	56.3
Female	27.3	35.4	25.8	38.4	43.8
Marital status (%)					
Married	38.2	29.2	33.9	38.4	44.6
Single	27.3	29.2	38.7	29.5	23.2
Common-law	10.9	10.4	9.7	10.7	14.3
Widowed	1.8	4.2	0	1.8	0.9
Divorced	9.1	6.3	3.2	6.3	6.3
Separated	7.3	2.1	4.8	2.7	1.8
Not specified	5.5	18.8	9.7	10.7	8.9
Gross annual salary (10K CDN)	64.0 (30.8)	62.4 (35.3)	64.5 (32.0)	56.6 (23.9)	59.0 (25.4)
Educational level (%)					
Grade 8 or less	9.1	2.1	1.6	1.8	0.9
Partial high school	12.7	18.8	16.1	8	17
High school diploma	25.5	16.7	24.2	28.6	22.3
Partial technical school	7.3	14.6	8.1	13.4	14.3
Technical diploma	16.4	10.4	29	22.3	16.1
Partial university	5.5	0	4.8	4.5	5.4
University degree	1.8	6.3	1.6	6.3	9.8
Not specified	21.8	31.3	14.5	15.2	14.3
Diagnosis (%)					
Fractures	20.0	10.4	14.5	8.9	11.6
Dislocations	3.6	6.3	1.6	0.9	0.0
Sprains/strains	25.5	25.0	22.6	28.6	28.6
Lacerations	1.8	2.1	0.0	1.8	2.7
Contusions	3.6	14.6	12.9	7.1	8.0
Nerve damage	5.5	4.2	3.2	2.7	3.6
Joint disorder	40.0	33.3	38.7	44.6	43.8
Other	0.0	4.2	6.5	5.4	1.8
Part of body (%)					
Upper extremity	29.1	22.9	25.8	23.2	35.7
Lower extremity	16.4	18.8	24.2	21.4	18.8
Back/trunk/torso	32.7	33.4	33.8	30.4	29.5
Neck	7.3	8.3	1.6	8.9	4.5
Other/multiple parts	14.5	16.7	14.5	16.1	11.6
Occupational category (%)*					
Management	0.0	0.0	0.0	0.9	2.7
Business/finance/admin	1.8	4.2	0.0	15.2	7.1
Natural/applied sci	1.8	2.1	0.0	3.6	0.9
Health occupations	10.9	8.3	8.1	11.6	13.4
Education/law/gov	3.6	6.3	9.7	0.9	5.4
Art/culture/rec/sport	0.0	0.0	1.6	0.9	0.0
Sales and services	12.7	12.5	8.1	18.8	20.5
Trades and transport	60.0	54.2	64.5	41.1	42.0
Agriculture	7.3	6.3	4.8	3.6	1.8
Manufacturing/utilities	1.8	6.3	3.2	3.6	6.3

Table 3 (continued)

	C (n = 55)	PA-S (n = 48)	PA-B (n = 62)	UM (n = 112)	PM[a] (n = 112)
Disability duration (days)*	401.0 (951.5)	160.7 (153.3)	163.3 (178.1)	140.9 (177.0)	155.9 (126.7)
Pain Disability Index (PDI)*	56 (1.8)	47 (2.1)	54 (1.8)	47 (1.9)	40 (1.9)
Visual Analogue Scale (VAS)*	5.4 (2.2)	4.1 (2.0)	5.1 (1.8)	5.0 (1.9)	4.3 (2.2)
SF-36 physical component summary (PCS) score*	32.8 (7.5)	35.8 (8.5)	32.5 (8.3)	32.6 (7.4)	35.9 (7.7)
Mental component summary (MCS) score*	36.8 (11.8)	40.0 (13.2)	39.0 (13.1)	42.0 (11.6)	45.2 (11.5)
RTW expectations*	3.8 (0.8)	3.3 (0.8)	3.6 (0.7)	3.7 (0.6)	3.0 (0.8)

C Contemplation, *PA-S* Prepared for Action-Self evaluative, *PA-B* Prepared for Action-Behavioural, *UM* Uncertain Maintenance, *PM* Proactive Maintenance

*Statistically significant difference at $p \leq 0.01$

**Statistically significant difference at $p \leq 0.05$

[a]Letters correspond to readiness stages

Table 4 ANOVA between Readiness for Return-To-Work (RRTW) factors and claimant characteristics

	F	df	p
Age	2.81	4	0.03
Sex	1.97	4	0.98
Marital status	1.21	4	0.30
Salary	1.37	4	0.25
Education level	0.54	4	0.71
Diagnosis	0.91	4	0.46
Part of body	0.36	4	0.84
Occupational category	4.28	4	<0.01
Disability duration	4.93	4	<0.01

$p \leq 0.05$ = statistically significant

observed between RRTW factors on claimant characteristics such as sex, marital status, income, education level, diagnostic category, and part of body injured.

Concurrent Validity

A MANOVA was used to compare pain levels as the pain VAS and PDI were highly correlated ($r = 0.82$) (see Table 5). A statistically significant difference was found among RTW readiness stages and pain levels (Wilks' Lambda = 0.88, $F = 5.09$, $p < 0.01$); however, the effect size was small ($n^2 = 0.06$) [26]. For the PDI, univariate Bonferroni post-hoc analyses found a statistically significant difference between the Contemplation and Uncertain and Proactive Maintenance stages and between the Prepared for Action-Behavioural and Proactive Maintenance stages. For the pain VAS, univariate Bonferroni post-hoc analyses found a statistically significant difference between the Contemplation and Prepared for Action-Behavioural and Proactive Maintenance stages. Pain levels generally decreased as the RTW readiness stages progressed from not working factors to the working factors confirming our hypotheses that earlier stages of change are associated with higher levels of pain rating. However, unexpectedly, the mean pain ratings as measured by the PDI and VAS were higher for those in the Prepared for Action-Behavioural group compared to the Prepared for Action-Self-evaluative group but a statistically significant difference was not found between these factors.

Two one-way ANOVAs were used to compare the mean scores from the SF-36v2 physical and mental component summary measures for each of the groups corresponding to RTW readiness stages (see Table 6). A statistically significant difference ($F = 3.28$, $p < 0.01$) existed between physical component summary measures and RTW readiness stages with a small effect size ($n^2 = 0.04$). Bonferroni post hoc analysis found a statistically significant

Table 5 MANOVA differences in pain measured through the PDI and pain VAS and Readiness for Return-To-Work (RRTW) factors

Variable	Wilks' Lambda	F	df	p	Partial eta squared
RRTW factors	0.88	5.09	10	<0.01	0.06

$p \leq 0.05$ = statistically significant

Table 6 ANOVA between Readiness for Return-To-Work (RRTW) factors and related instruments

	F	df	p	Partial eta squared
SF-36 PCS	3.28	5	<0.01	0.04
SF-36 MCS	7.08	5	<0.01	0.09
RTW expectations	12.67	5	<0.01	0.15

$p \leq 0.05$ = statistically significant

difference between the Uncertain Maintenance and Proactive Maintenance groups. A statistically significant difference ($F=7.08$, $p<0.01$) with a small effect size ($n^2=0.09$) was found between RTW readiness stages and mental component summary measures. Bonferroni post hoc analysis found statistically significant differences between the Contemplation and Proactive Maintenance stages and between the Prepared for Action-Behavioural and Proactive Maintenance stages. Physical and mental component summary measures generally improved as the RTW readiness stages progressed from not working factors to working factors confirming our hypotheses that earlier stages of change are associated with more compromised physical and mental health. However, similar to the pain rating findings and the RTW readiness stages, physical and mental component summary measures were more favorable with the Prepared for Action-Self-evaluative group compared to the Prepared for Action-Behavioural group, but a statistically significant difference was not found between these factors.

A one-way ANOVA was used to compare RTW expectations for each of the groups corresponding to the RTW readiness stages. A statistically significant difference ($F=12.67$, $p<0.01$) existed between RTW expectations and RTW readiness stages with a medium effect size ($n^2=0.15$). Bonferroni post hoc analysis identified a statistically significant difference between the Contemplation and Prepared for Action-Self-evaluative stages; the Contemplation and Proactive Maintenance stages; the Prepared for Action-Behavioural and Proactive Maintenance stages; and the Uncertain Maintenance and Proactive Maintenance stages. Our hypothesis that RTW expectation scores improved as the RTW readiness stages progressed was found with the job attached group but not entirely with the non-job attached group or between the job attached and non-job attached groups. RTW expectation scores were better among the Prepared for Action-Self-evaluative group when compared to the Prepared for Action-Behavioural group and Uncertain Maintenance group, but statistically significant differences were not found between these factors. Statistically significant difference were found between the Contemplation and Prepared for Action-Self-evaluative groups, Contemplation and Proactive Maintenance groups, and between the Proactive Maintenance and Prepared for Action-Behavioural groups and Proactive Maintenance and Uncertain Maintenance groups.

Discussion

Our findings support the construct and concurrent validity of the RRTW Scale developed by Franche et al. [2] within a sample of workers' compensation claimants with sub-acute and chronic MSK disorders attending an outpatient occupational rehabilitation program. We identified three factors for the not working group: Contemplation, Prepared for Action-Self-evaluative and Prepared for Action-Behavioural which are similar to the not working factors identified by Franche et al. [2]. We found that all items related to each factor for contemplation (a9, a11, a12), and Prepared for Action-Behavioural (a3, a5, a6) were the same as the original items used by Franche et al. [2]. We did however, remove one item (a10) from the Prepared for Action-Self-evaluative factor as this item loaded onto multiple factors within our study. Similar to the findings of Franche et al. [2] and Braathen et al. [6], two factors were identified for the job attached group, Uncertain Maintenance and Proactive Maintenance. There was an even distribution of claimants between the job attached factors at the time of admission to the rehabilitation program.

With our sample, we were unable to identify all five original stages of change defined by Prochaska et al. [27] with RTW behaviour. This is consistent with the study completed by Braathen et al. [6] whose findings suggest culture and setting may affect constructs of readiness for RTW. Our sample may have been too narrow and the inclusion of claimants with a diagnosis other than sub-acute and chronic MSK disorders could have assisted with this and with the overall generalizability of the study. Disability duration and higher percentages of certain occupational categories of our sample may have also affected our ability to identify all five original stages of change. From a disability and claims management perspective, future research should follow up with claimants after discharge from a rehabilitation program to determine if there are changes in RRTW. The amount of support received during and after rehabilitation can significantly affect RRTW, and thus contribute to repeat claims.

In contrast to our study, Braathen et al. [6] evaluated a 5-day inpatient occupational rehabilitation setting and identified two factors for the not working group while Franche et al. [2] evaluated claimants with MSK disorders 1-month post injury and found four factors for their sample of not working claimants. We did not identify a precontemplation stage, unlike the other two studies. RRTW items related to the precontemplation stage (a1, a2, a13) loaded onto more than one factor and therefore this factor was removed from our model. The instability of this factor could be related to the low number of claimants ($n=2$) that rated themselves in the precontemplation stage at admission to the rehabilitation program. The previous studies also identified a low proportion of individuals in the precontemplation stage and Franche et al. [2] suggested at even 1-month post injury, assessments could have come too late to identify claimants in this stage. Life threatening or health conditions that are more degenerative than MSK disorders may be more likely to find individuals in the precontemplation stage [2]. The

inclusion of traumatic psychological injuries, head injuries, or other types of illness leading to work disability may have increased the number of claimants in our sample that identified their RRTW in the precontemplation stage.

Compared to the other studies, our sample had a higher proportion of claimants who were job attached. At the time of admission to the RTW program, 57.6% of our claimants were considered job attached. In comparison, 31.6% were considered working in the study by Braathen et al. [6] and 52.7% of claimants were in the working group in Franche et al. study [2]. Future research should investigate if there are any important differences in claimant and work characteristics between the Uncertain Maintenance and Proactive Maintenance groups [2]. Disability duration (average 188 days) of our sample was considerably longer when compared to 5-days in the study by Braathen et al. [6] and 1-month in Franche et al's study [2]. Future research should investigate how disability duration can impact sustainability of RTW. Additionally, further validation of the RRTW Scale is required within different compensation systems nationally and internationally which can affect RRTW.

Concurrent Validity

Evaluation of our hypotheses regarding the relationships between stages of change and theoretically relevant constructs including pain, physical and mental health, and RTW expectations was examined through associations with related scales and questionnaires. The stages of change identified in the original RRTW Scale were generally associated, as expected, with the PDI, pain VAS, SF-36 physical and mental component summary scores and the RTW expectations questionnaire. Claimants in the Proactive Maintenance stage reported less pain, better health and higher RTW expectation ratings compared to the other stages of change while those in the Contemplation stage identified the most impairment with all of the related scales and questionnaires. Statistically significant differences were found between the Proactive Maintenance group and at least one other stage of change for all theoretically relevant constructs examined. The only statistically significant difference for the SF-36 physical component summary scores was between the Proactive Maintenance and Uncertain Maintenance groups. This could suggest that for those already working, physical barriers may be more of a limitation than barriers such as pain and mental health in the successful maintenance of work. In addition, a significant predictor of disability throughout all phases, even after controlling for psychosocial occupational factors and injury severity, is high physical workplace demands [1]. Therefore, future studies need to focus on how the physical demands of the job influence RRTW. Statistically significant differences for pain, SF-36v2 mental component summary scores and RTW expectations were identified between the Prepared for Action-Behavioural and Proactive Maintenance stages. The Proactive Maintenance stage has been associated with high levels of coping [6]. The ability to cope with disability and inefficient coping styles are both identified as factors that should be included in the assessment of work ability as reported by insurance physicians [28]. The ability for claimants in the Proactive Maintenance stage to cope with and manage subjective and mental health complaints may increase RTW expectations and play a substantial role in the distinction between working and not working factors.

The relationships we expected between Prepared for Action-Self-evaluative and Prepared for Action-Behavioural stages and related constructs of pain, physical and mental health and RTW expectations were not observed. Claimants in the Prepared for Action-Behavioural stage rated higher levels of pain, compromised physical and mental component summary scores and RTW expectations compared to claimants in the Prepared for Action-Self-evaluative stage. For our sample of claimants, the prepared for action stages may resemble the original preparation stage identified by Prochaska et al. [26] more than the split prepared for action stages recognized in the RRTW Scale developed by Franche et al. [2]. In our sample of claimants, behaviours that correspond to the Prepared for Action-Self-evaluative stage may be blurred with behaviours related to the Prepared for Action-Behavioural stage due to the nature of the RTW program where RTW plans are often immediately put into action. For claimants with a sub-acute or chronic MSK disorder, the Prepared for Action stages may be better described as a fluid stage instead of two distinct stages.

Strengths and Limitations of the Study

Strengths of our study include a large sample size especially for claimants in the job attached group. We were able to complete EFA with both the job attached and non-job attached groups identifying five factors that correspond RRTW. The CFA completed with the job attached group confirmed the fit of our model was acceptable based on four commonly used goodness-of-fit indices. Concurrent validity was established with related tools, which is consistent with other studies evaluating the RRTW Scale [2, 6].

Limitations of our study include its cross-sectional nature, possible selection effects, and a small sample size of the non-job attached group. Our cross-sectional design was not capable of detecting changes in RRTW Scale dimensions over time or whether workers move between stages. However, the design allowed us to evaluate construct and concurrent validity, thus testing our hypotheses. Since data were collected on workers referred to one

rehabilitation facility operated by a workers' compensation, there are likely some selection effects making our sample different from the general population of injured workers. Results may, therefore, not be broadly generalizable. Lastly, the small sample size of non-job attached workers did not allow us to complete a CFA with the non-job attached group, which limits the strength of the validity evidence with this group. However, the EFA did identify three factors with items from the original RRTW Scale loading onto the appropriate factors.

Conclusion

This study describes the construct and concurrent validity of the RRTW Scale in an outpatient occupational rehabilitation sample of claimants with sub-acute and chronic MSK disorders in Canada. Our study found the construct of RRTW can vary depending on disability duration and occupational category. Among claimants with a sub-acute and chronic MSK disorder who are employed and undergoing rehabilitation, physical health appears to be a significant barrier to RRTW while mental health significantly compromises RRTW with the non-job attached group. Further investigation between working and not working factors will assist in supporting future stage based interventions [2] and RTW outcomes appropriate for each stage.

Funding The Workers' Compensation Board of Alberta and the Canadian Occupational Therapy Foundation provided funding for this research (grant numbers were not provided by either funding agency).

Compliance with Ethical Standards

Conflict of interest Dr. Joanne Park has received research grants from the Workers' Compensation Board of Alberta and is also employed by the Workers' Compensation Board Alberta Millard Health. Dr. Roduta Roberts declares that she has no conflict of interest. Dr. Esmail declares that he has no conflict of interest. Fahreen Rayani works for the Workers' Compensation Board of Alberta. Dr. Norris declares that she has no conflict of interest. Dr. Gross has received research grants from the Workers' Compensation Board of Alberta.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent This study was conducted as part of routine patient care and claimants were not informed about the study and informed consent for the study was not obtained. However, at time of admission to Millard Health (occupational rehabilitation facility where the study took place), claimants are notified that information gathered will be used for individual treatment planning and research in program effectiveness, and that the intent of the use of the information is to improve the programs at Millard Health.

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