

**SPECIAL ISSUE**

# Treatment-related reductions in catastrophizing predict return to work in individuals with post-traumatic stress disorder

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**Abstract**

Post-traumatic stress disorder (PTSD) has been associated with high rates of work-disability. In other domains of research, it has been shown that catastrophic thinking also contributes to work-disability. The present study examined the relation between catastrophic thinking and work-disability in individuals with PTSD. The study sample consisted of 73 work-disabled individuals with PTSD who were referred to an occupational rehabilitation service. Participants completed measures of post-traumatic stress symptoms, depression, pain, catastrophic thinking, and occupational disability at admission and termination of the rehabilitation intervention. Return-to-work was assessed 1 month following the termination of the rehabilitation intervention. Cross-sectional analyses revealed that catastrophic thinking contributed significant unique variance to the prediction of occupational disability, even when controlling for the severity of symptoms of PTSD. Prospective analyses revealed that treatment-related reductions in catastrophic thinking predicted successful return to work, beyond the variance accounted for by reductions in the severity of symptoms of PTSD. The findings suggest that catastrophic thinking is a determinant of occupational disability in individuals with PTSD. The findings further suggest that interventions designed to reduce catastrophic thinking might promote more successful occupational re-integration in individuals recovering from post-traumatic stress symptoms.

## 1 | INTRODUCTION

Post-traumatic stress disorder (PTSD) is a debilitating mental health condition that can arise following exposure to traumatic events. Common causes of PTSD include being involved in a serious motor vehicle accident, witnessing or being the victim of a violent crime, sexual abuse, military combat and experiencing a natural disaster (Kozaric-Kovacic, 2009). PTSD is characterized by a symptom cluster that includes re-experiencing symptoms, avoidance symptoms and symptoms of hyperarousal (APA, 2013). The risk of chronicity is significant with 11%–44% of individuals experiencing ongoing symptoms of PTSD 2 years after initial diagnosis (Fishbain, Pulikal, Lewis, & Gao, 2016; Galea, Nandi, & Vlahov, 2005; Mak et al., 2010; Mayou, Ehlers, & Bryant, 2002).

The symptoms of PTSD can compromise an individual's ability to participate fully in several activities of daily living. Individuals with PTSD report decreased involvement in family, social, and recreational activities (Geisser, Roth, Bachman, & Eckert, 1996; Martin, Halket, Asmundson, Flora, & Katz, 2010). Several studies have also documented a relation between PTSD and work-disability (Matthews, 2005; Smith, Schnurr, & Rosenheck, 2005). Symptom severity only partially accounts for the relation between PTSD and disability (Chossegros et al., 2011). The severity of symptoms of PTSD has been shown to account for approximately 10%–15% of the variance in disability (Smith et al., 2005; Sullivan et al., 2009). Furthermore, treatment-related reductions in symptom severity do not necessarily yield comparable reductions in disability (Smith et al., 2005; Solomon, 1989).

In other areas of research, catastrophizing has been identified as a psychosocial risk factor for prolonged occupational disability (Sullivan et al., 2001). Research on a wide range of debilitating pain conditions has shown that high scores on measures of catastrophizing are associated with more pronounced and prolonged disability (Hirsh, Bockow, & Jensen, 2011; Kovacs, Seco, Royuela, Pena, & Muriel, 2011; Severeijns, Vlaeyen, van den Hout, & Weber, 2001). Several studies have also shown that treatment-related reductions in catastrophizing prospectively predict successful return to work, independent of changes in symptom severity (Sullivan & Adams, 2010; Sullivan, Adams, Rhodenizer, & Stanish, 2006).

Research conducted on individuals with debilitating pain conditions has also revealed significant associations between measures of pain catastrophizing and PTSD (Andersen, Karstoft, Brink, & Elklit, 2016; Sullivan et al., 2009). In individuals with pain conditions, pain catastrophizing has been shown to predict pain-related interference, independent of the variance accounted for by symptoms of PTSD (Roth, St Cyr, Harle, & Katz, 2013; Vranceanu et al., 2014). The emerging pattern of findings suggests that catastrophizing might also contribute to occupational disability in individuals with PTSD who do not have a co-morbid pain condition.

Until recently, research on the role of catastrophizing as a determinant of disability in PTSD was impeded by the lack of a validated measure of catastrophic thinking suitable for use with individuals with mental health conditions. The bulk of research addressing the relation between catastrophizing and disability has been conducted using measures developed for use with individuals suffering from pain conditions (Rosenstiel & Keefe, 1983; Sullivan, Bishop, & Pivik, 1995). The Symptom Catastrophizing Scale (SCS) was recently developed to assess catastrophic thinking in individuals with mental health conditions. The item content of the SCS was derived from the Pain Catastrophizing Scale (PCS) but modified for use with individuals with mental health conditions. Research has supported the reliability and validity of the SCS as a measure of catastrophic thinking in individuals with mental health conditions (Moore, Adams, Ellis, Thibault, & Sullivan, 2016; Sullivan & Simon, 2012).

The present study examined the relation between catastrophizing and occupational disability in individuals with PTSD. Work-disabled participants with PTSD who were enrolled in an occupational rehabilitation intervention completed measures of PTSD, depression and catastrophic thinking pre- and post-treatment. Return-to-work was assessed 1 month following the termination of the rehabilitation intervention. Cross-sectional analyses addressed whether catastrophizing contributed significant variance to the prediction of self-reported occupational disability, beyond the variance accounted for severity of symptoms of PTSD. Prospective analyses were used to address whether treatment-related reductions in catastrophic thinking were associated with a higher probability of occupational re-engagement.

## 2 | METHOD

### 2.1 | Participants

The data used in analyses were drawn from the clinical files of consecutive referrals to an occupational rehabilitation service in Ontario, Canada. The study sample consisted of 73 work-disabled individuals with PTSD. All participants were receiving disability benefits when they were referred to the occupational rehabilitation service. All participants had been employed full time prior to the current period of sick leave. This was an archival study where information about participants' diagnoses and assessment results was taken from the participants' disability insurance files. Records were only retained for inclusion in the study sample if file review clearly indicated that a diagnosis of PTSD had been confirmed by a medical practitioner or mental health specialist. The majority of the participants (65%) were married or living common law, and had completed at least 12 years of schooling (98%). Work accidents were the most common trauma event (65%), followed by crime victim (15%), disaster (12%) and crime witness (8%). The mean duration of work-disability was 14.4 months (range = 2–47 months).

### 2.2 | Measures

#### 2.2.1 | Post-traumatic stress symptoms

The Post-Traumatic Stress Checklist (PCL) was used to assess the severity of post-traumatic stress symptoms. The PCL is a 17-item measure where respondents are asked to indicate degree to which they have been bothered by different symptoms of PTSD (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Ratings are made on a 5-point Likert scale with the end points (1) *not at all* and (5) *extremely*. Scores can range from 17 to 85. A cut-score of 30 has been recommended to identify individuals with clinically significant post-traumatic stress symptoms (Blanchard et al., 1996; Freedy et al., 2010). The reliability and validity of the PCL has been supported by several studies (Blanchard et al., 1996; Freedy et al., 2010). In the present sample, Cronbach's alpha for the PCL was .92.

#### 2.2.2 | Depressive symptoms

The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptom severity (Kroenke, Spitzer, & Williams, 2001). On this measure, participants indicate how frequently they experience each of nine symptoms of depression. Ratings are made on a 4-point frequency scale with the endpoints (0) *not at all* and (3) *everyday*. PHQ-9 scores can range from 0 to 27, with higher scores indicating more severe depressive symptoms. The reliability and validity of this measure have been established in several studies (Gilbody, Richards, Brealey, & Hewitt, 2007; Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006). In the present sample, Cronbach's alpha for the PHQ-9 was .87.

#### 2.2.3 | Catastrophizing

The SCS was used to assess catastrophic thinking related to the experience of PTSD symptoms (Moore et al., 2016). The seven items of the SCS were drawn from the PCS (Sullivan et al., 1995) (items 1, 4, 5, 6, 9, 12, 13). The instructional set of the original PCS was modified such that individuals responded to the items with reference to their "health or mental health condition" instead of their "pain". The instructional set of the SCS is as follows:

*Chronic health and mental health conditions can have profound effects on our lives. This scale was designed to assess how your health or mental health condition has affected your life.*

*Listed below are seven statements describing different thoughts and feelings that you may experience when you think about your health or mental health condition. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you think about your health or mental health condition.*

**TABLE 1** SCS items

SCS1. I become afraid that my condition will get worse
SCS2. I feel I can't stand it anymore
SCS3. I can't seem to keep (my condition/symptoms) out of my mind
SCS4. There is nothing I can do to reduce the intensity of my symptoms
SCS5. I wonder whether something serious may happen
SCS6. My symptoms are awful and I feel that they overwhelm me
SCS7. I worry all the time about whether my symptoms will end

Ratings are made on a 3-point frequency scale with the anchors (0) *never*, (1) *sometimes* and (2) *often*. SCS scores can range from 0 and 14. The SCS has been shown to be internally reliable and correlated with measures of symptom severity and disability (Moore et al., 2016; Sullivan & Simon, 2012). In the present sample, Cronbach's alpha for the SCS was .86. The items of the SCS are listed in Table 1.

### 2.2.4 | Self-reported disability

Self-reported occupational disability was assessed with the question, "Please choose a number between '0' and '10' to indicate how disabled you are for your occupational activities as a result of your health or mental health condition". The item was adapted from Item 5 of the Pain Disability Index (Tait, Chibnall, & Krause, 1990). The referent for the cause of disability was changed from "pain" (as in the original PDI) to "your health or mental health condition". Participants rated the severity of their occupational disability on an 11-point Likert scale with the endpoints (0) *not at all disabled* and (10) *totally disabled*.

### 2.2.5 | Return to work

Participants were contacted by telephone 1-month post-treatment and interviewed about their occupational status. On the basis of the interview responses, participants' occupational status was classified as (1) returned to work full time, (2) returned to work part-time, (3) enrolled in a graduated return to work program, and (4) did not return to work.

## 2.3 | Procedure

This study was approved by Research Ethics Board of McGill University. The study sample was drawn from the clinical files of individuals who were enrolled in a 10-week risk-targeted activity-reintegration intervention. The aim of the intervention was to promote return-to-work by targeting psychosocial risk factors for delayed recovery. Catastrophizing was one of the psychosocial risk factors targeted by the intervention. Techniques used to reduce catastrophizing included empathic reflection, guided disclosure, thought monitoring, problem solving, and goal setting (Wideman & Sullivan, 2011). These techniques were combined with structured activity scheduling and graduated resumption of discontinued activities in order to re-engage the individual in pre-diagnosis family, social, community, and occupational activities.

The risk-targeted activity-reintegration intervention in which participants were enrolled has been described in more detail elsewhere (Sullivan, Adams, & Ellis, 2013). The intervention is referred to as the Progressive Goal Attainment Program (PGAP) and was designed to target psychosocial risk factors for prolonged occupational disability. Risk-targeted techniques were used within the framework of an activity re-integration program aimed at fostering resumption of important life role activities. Participants were made aware at the beginning of the intervention that return-to-work was the primary objective of treatment. The intervention does not include techniques aimed at reducing the severity of symptoms of PTSD. The PGAP differs from many rehabilitation interventions with its focus on return to function as opposed to symptom reduction. The PGAP has been shown to reduce disability-related

psychosocial risk factors associated with a wide range of debilitating health and mental health conditions (Adams, Thibault, Ellis, Moore, & Sullivan, 2016; Sullivan, Adams, & Ellis, 2012; Sullivan et al., 2006).

Occupational therapists met with participants once per week for a total of 10 weeks. The PCL, PHQ-9, the SCS, and the self-reported disability measure were completed pre-, mid- and post-treatment. Only pre- and post-treatment evaluations were considered in data analyses reported in this paper.

## 2.4 | Data analytic approach

Preliminary analyses addressed whether trauma type was associated with dependent or independent variables central to the study objectives. Oneway analyses of variance revealed that duration of disability,  $F(3, 69) = .74, p < .55$ , SCS scores,  $F(3, 69) = .30, p < .82$ , PCL scores,  $F(3, 69) = .39, p < .75$ , and PHQ-9 scores,  $F(3, 69) = p < .66$ , did not vary significantly as a function of trauma type. As such, trauma type was not considered further in statistical analyses.

Previous research has pointed to significant sex differences in a number of variables assessed in the present study, including PTSD, catastrophizing and depression (Keefe et al., 2000; Tolin & Foa, 2006). As such,  $t$  tests for independent variables and chi square analyses were used to compare women and men on study variables. Multiple linear regression analysis was used to examine the value of pre-treatment SCS scores in the prediction of self-reported occupational disability. In light of previous research showing significant relations between catastrophizing and depression, and between depression and disability, the decision was made to include the PHQ-9 as a potential confounder in regression analyses predicting disability associated with PTSD. However, due to a collinearity problem with the inclusion of the pre-treatment PCL and PHQ-9, the PHQ-9 had to be omitted from the hierarchical regression predicting pre-treatment self-reported occupational disability.

$t$  Tests for paired variables were used to examine the magnitude of treatment-related changes on the PCL, PHQ-9, SCS and self-reported occupational disability. Logistic regression was used to examine the value of treatment-related changes in catastrophizing in predicting follow-up occupational status. In this analysis, change scores on the PHQ-9 were entered as a potential confounder. Tolerance coefficients for all variables included in the logistic regression analysis were  $>.60$  indicating no problem of multicollinearity. All analyses were conducted with SPSS Version 21.

Seven participants discontinued the intervention prematurely and did not complete the post-treatment assessment. For participants with incomplete post-treatment data, mid-treatment scores were carried forward. Analyses of treatment-related changes and predictors of return to work were conducted on an intent-to-treat basis.

## 3 | RESULTS

### 3.1 | Sample characteristics

Means and standard deviations on all study variables are presented in Table 2. The mean score on the PCL was similar to that reported in previous research on work-disabled individuals with PTSD (Smith et al., 2005). Based on scores on symptom measures, at the time of admission, the study sample would be characterized as experiencing moderate to severe post-traumatic stress symptoms, and moderate to severe depressive symptoms.

As shown in Table 2, women and men did not differ significantly on age,  $t(71) = 1.2, p < .11$ , or duration of the current period of work-disability,  $t(71) = .14, p < .88$ . Women obtained significantly higher scores than men on the PCL,  $t(71) = 2.9, p < .004$ , the PHQ-9,  $t(71) = 2.6, p < .01$ , and the SCS,  $t(71) = 1.97, p < .05$ . Sex differences on self-reported occupational disability approached significance,  $t(71) = 1.8, p < .08$ .

### 3.2 | Correlates of catastrophizing

Consistent with previous research, scores on the measure of post-traumatic stress symptoms were significantly correlated with depressive symptoms and disability (Smith et al., 2005; Sullivan et al., 2009). The SCS was significantly correlated with the PCL, the PHQ-9, and self-reported occupational disability (see Table 3). The magnitude of

**TABLE 2** Sample characteristics at the time of admission

Variables	Women (n = 38)	Men (n = 35)	p
Age	44.8 (8.5)	47.7 (10.6)	.11
Duration (months)	14.3 (7.1)	14.6 (9.5)	.88
Occupation			
Labor	8 (21%)	11 (31%)	
Trade	12 (31%)	10 (28%)	
Clerical/admin	10 (26%)	3 (9%)	
Sales	8 (21%)	3 (9%)	
Driving	1 (1%)	8 (23%)	.56
PCL (/85)	59.3 (12.8)	49.1 (16.5)	.004
PHQ-9 (/27)	18.9 (4.7)	15.4 (6.6)	.01
SCS (/14)	11.0 (2.5)	9.6 (3.4)	.05
DISAB (/10)	7.4 (1.3)	6.5 (1.7)	.01

N = 73. Duration, duration of work-disability; PCL, Post-Traumatic Stress Checklist; PHQ-9, Patient Health Questionnaire; SCS, Symptom Catastrophizing Scale; DISAB, occupational disability rating.

**TABLE 3** Correlates of catastrophizing in individuals with PTSD

	1	2	3
1. SCS	-		
2. PCL	.65**	-	
3. PHQ9	.61**	.73**	-
4. DISAB	.47**	.55**	.38**

SCS, Symptom Catastrophizing Scale; PCL, Post-Traumatic Stress Checklist; PHQ-9, Patient Health Questionnaire; DISAB, self-reported occupational disability; PTSD, post-traumatic stress disorder.

\*\* $p \leq .01$ .

correlations among these measures was similar to that which has been reported in previous research with individuals with persistent pain conditions (Sullivan, Stanish, Waite, Sullivan, & Tripp, 1998; Sullivan et al., 2001, 2009).

### 3.3 | Catastrophizing as a predictor of occupational disability

A cross-sectional hierarchical regression analysis on pre-treatment assessment measures was conducted to evaluate whether catastrophizing contributed to self-reported occupational disability beyond the variance accounted for by PTSD symptom severity. As shown in Table 4, age, gender and duration of work-disability were entered in Step 1 of the analysis but did not contribute significantly to the prediction of occupational disability,  $F_{\text{change}}(3, 69) = 2.0$ ,  $p < .11$ . The PCL was entered in Step 2 of the analysis and made a significant contribution to the prediction of occupational disability,  $F_{\text{change}}(1, 68) = 7.2$ ,  $p < .009$ . Catastrophizing (SCS) was entered in the final step of the analysis and contributed significant variance to the prediction of occupational disability, beyond the variance accounted for by variables already entered in the regression equation,  $F_{\text{change}}(1, 67) = 7.9$ ,  $p < .006$ .

### 3.4 | Treatment-related changes in symptom severity and catastrophizing

t Tests for paired samples were conducted to examine treatment-related changes in scores on the PCL, PHQ-9, and the SCS. As shown in Table 5, analyses revealed significant reductions in scores on the PCL,  $t(72) = 7.0$ ,  $p < .001$ , the

**TABLE 4** Hierarchical regression predicting self-reported occupational disability

	$\beta$	$R^2_{\text{change}}$	$F_{\text{change}}$	$p$
Step 1				
Age	.01			
Gender	-.17			
Duration	.04	.08	2.0 (3, 69)	.11
Step 2				
PCL	.06	.09	7.2 (1, 68)	.009
Step 3				
SCS	.40**	.09	7.9 (1, 67)	.006

$N = 73$ . Duration, duration of work-disability; PCL, Post-Traumatic Stress Checklist; PHQ9, Patient Health Questionnaire 9; SCS, Symptom Catastrophizing Scale.

Standardized beta weights are from the final regression equation.

\*\* $p < .01$ .

**TABLE 5** Treatment-related changes in symptom severity and catastrophizing

	Initial assessment	Post-treatment assessment	%Reduction
PCL	54.4 (15.5)	42.9 (15.7)	21
PHQ9	17.2 (5.9)	10.8 (6.3)	37
SCS	10.3 (3.0)	6.4 (3.1)	38

PCL, Post-Traumatic Stress Checklist; PHQ9, Patient Health Questionnaire 9; SCS, Symptom Catastrophizing Scale. Values in parentheses are standard deviations.

PHQ9,  $t(72) = 9.5$ ,  $p < .001$ , and the SCS,  $t(72) = 11.8$ ,  $p < .001$ . The magnitude of treatment-related reductions in post-traumatic stress symptoms, depressive symptoms and catastrophizing (21%–38%) would be considered clinically meaningful (Dworkin et al., 2009; Lowe, Kroenke, Herzog, & Grafe, 2004; Scott, Wideman, & Sullivan, 2014).

### 3.5 | Predicting occupational re-engagement from reductions in PTSD and catastrophizing

At one-month follow-up, 25 participants (34%) had returned to work full time, 11 participants (15%) had returned to work part-time, and 13 participants (18%) were enrolled in a graduated return-to-work program. Twenty-four participants (32%) remained absent from work.

Univariate tests of mean differences were conducted to examine whether treatment-related reductions in symptom severity and catastrophizing distinguished between participants who were, or were not occupationally re-engaged at follow-up assessment. For these analyses, occupational re-engagement was operationalized as having returned to some form of employment (e.g., working full or part-time, or enrolled in a graduated return-to-work program). Change scores (pre-treatment–post-treatment) on the PCL, PHQ9, and the SCS were computed.  $t$  Tests revealed that participants who were occupationally re-engaged at follow-up assessment showed greater reductions in PCL scores,  $t(71) = 2.4$ ,  $p < .05$ , PHQ9 scores,  $t(71) = 2.2$ ,  $p < .05$ , and SCS scores,  $t(71) = 4.8$ ,  $p < .001$ , than participants who were not occupationally re-engaged.

Table 6 shows the results of a hierarchical logistic regression analysis examining the value of changes in symptom severity and changes in catastrophizing as predictors of occupational re-engagement. Age and sex were entered in Step 1 of the analysis but did not contribute significantly to the prediction of occupational re-engagement,  $\chi^2 = 1.6$ ,  $p < .42$ . Duration of work disability was entered in the second step of the analysis and contributed significantly to

**TABLE 6** Logistic regression examining the value of changes in symptom severity and catastrophizing in predicting occupational re-engagement

	Variables	$\beta$	SE	Wald	df	Sig	OR	95% CI
Step 1	Age	.04	0.03	1.6	1	.19	0.95	0.88–1.0
	Gender	.54	0.69	0.61	1	.43	1.7	0.44–6.6
Step 2	Duration	-.11	0.05	4.8	1	.02	0.89	0.81–.98
	$\Delta$ PCL	.001	0.035	0.001	1	.43	0.99	0.93–1.07
Step 2	$\Delta$ PHQ9	.096	0.090	1.1	1	.28	1.10	0.92–1.31
Step 3	$\Delta$ SCS	.633	2.0	11.2	1	.001	1.88	1.30–2.72

Work disability, duration of work disability;  $\Delta$  PCL, change in PCL scores from pre- to post-treatment;  $\Delta$  PHQ9, change in PHQ9 scores from pre- to post-treatment;  $\Delta$  SCS, change in SCS scores from pre- to post-treatment. All values are from the final regression equation. Nagelkerke  $R^2 = .50$ .

prediction of occupational re-engagement,  $\chi^2 = 5.7, p < .01$ . Change scores on the PCL were entered in the third step of the analysis and contributed significantly to the prediction of occupational re-engagement,  $\chi^2 = 5.0, p < .02$ . Change scores on the PHQ9 were entered in the fourth step of the analysis but did not contribute significantly to the prediction of occupational re-engagement,  $\chi^2 = 1.5, p < .21$ . Change scores on the SCS were entered in the final step of the analysis and contributed significant variance to the prediction of occupational re-engagement,  $\chi^2 = 18.6, p < .001$ . In the final regression equation, only duration of work disability, OR = .89 (95% CI = 0.81–0.98),  $p < .02$ , and change scores on the SCS made a significant unique contribution to the prediction of occupational re-engagement, OR = 1.9 (95% CI = 1.3–2.7),  $p < .001$ . Overall classification success was 78%.

## 4 | DISCUSSION

Numerous investigations have shown that high levels of catastrophizing are associated with more prolonged work-disability in individuals who have sustained musculoskeletal injuries (Scott et al., 2014; Sullivan et al., 2013; Wang, Simon, & Kessler, 2003). Several investigations have also shown that reductions in catastrophizing contribute to better return-to-work outcomes (Sullivan, Feuerstein, Gatchel, Linton, & Pransky, 2005). The results of this study extend previous research in showing that catastrophizing also contributes to occupational disability in individuals with PTSD, and that reductions in catastrophizing prospectively predict occupational re-engagement in individuals with PTSD. To our knowledge, this is the first study to show that an intervention designed to reduce catastrophic thinking can improve return-to-work outcomes in individuals with PTSD.

Several investigations have described the deleterious effects of PTSD symptoms on occupational disability (Matthews, 2005; Smith et al., 2005). PTSD symptoms have been associated with more severe and more persistent symptoms of pain, higher levels of pain-related psychosocial risk factors, poorer physical health, and higher prevalence of co-morbid mental health problems (Buitenhuis, de Jong, Jaspers, & Groothoff, 2006; Matthews, 2005; Sullivan et al., 2009). These sequelae or correlates of PTSD likely add to the burden of disability, in turn, compromising individuals' work potential. Symptom severity has been identified as an important predictor of work-disability in individuals with PTSD (Chossegros et al., 2011).

The results of the present study are consistent with previous research showing a relation between symptom severity and occupational disability in individuals with PTSD (Smith et al., 2005). In cross-sectional univariate analyses, the severity of symptoms of PTSD and depression was significantly correlated with self-reported occupational disability. In multiple regression analyses, catastrophizing accounted for 4% of the variance in self-reported occupational disability, after controlling for age, duration of work absence and symptom severity. Reductions in catastrophizing contributed significantly to the prediction of occupational re-engagement, even after controlling for age, duration of



work absence and the severity of symptoms of PTSD. When reductions in catastrophizing were entered in the logistic regression, the contribution of reductions in PTSD symptom severity to occupational re-engagement was no longer significant. The pattern of findings suggests that reductions in catastrophizing might be one of the vehicles through which reductions in PTSD symptom severity influence return-to-work outcomes.

Although the independent contribution of catastrophizing to occupational disability was modest, it is important to note that the analytic approach taken in this study was very conservative. The order of entry of variables in the regression analyses proceeded from the assumption that the severity of symptoms of PTSD and depression had theoretical primacy, and as such, were entered in an earlier step of the analysis. In light of research pointing to the genetic basis of catastrophizing, there could also be grounds for assigning theoretical primacy to catastrophizing (Trost et al., 2015). If no assumptions are made about theoretical primacy, and the contributions of catastrophizing are assessed independently, univariate analyses reveal that catastrophizing accounts for approximately 22% of the variance in self-reported occupational disability, and reduction in catastrophizing is a stronger predictor of return-to-work than reduction in post-traumatic stress symptoms.

The relation between symptom catastrophizing, as measured by the SCS, and disability has been demonstrated in three previous studies. Scores on the SCS have been shown to account for 17%–45% of the variance in self-reported disability in individuals who are work-disabled as a result of a health or mental health condition (Adams et al., 2016; Moore et al., 2016; Sullivan & Simon, 2012). Treatment-related reductions in SCS scores have also been shown to be associated with occupational re-engagement in individuals with debilitating health (i.e., pain) and mental health (i.e., depression) conditions (Adams et al., 2016; Sullivan & Simon, 2012).

In research on pain, catastrophizing has been shown to impact negatively on a number of occupationally relevant factors. Catastrophizing has been associated with longer periods of bed rest and longer periods of work absence following the onset of musculoskeletal pain (Verbunt, Sieben, Vlaeyen, Portegijs, & Andre Knottnerus, 2008; de Vries, Reneman, Groothoff, Geertzen, & Brouwer, 2012). Several studies have shown that catastrophizing is associated with activity intolerance (Elfving, Andersson, & Grooten, 2007; Lariviere, Bilodeau, Forget, Vadeboncoeur, & Mecheri, 2010; Sullivan et al., 2002; Thibault, Loisel, Durand, Catchlove, & Sullivan, 2008) and greater perceived work demands during the performance of a simulated occupational lifting task (Sullivan, Lariviere, & Simmonds, 2010). It is possible that similar processes underlie the relation between catastrophizing and occupational disability in individuals with PTSD.

Of interest is that the mean post-treatment score on the PCL remained above clinical threshold, suggesting that many of the participants were still experiencing clinically significant symptoms of PTSD at the end of treatment. These individuals were nevertheless able to re-engage in occupational activities. The treatment of debilitating mental health conditions continues to be characterized by an overly protective orientation, where employment is viewed as an adverse stressor from which the client must be shielded, and symptom eradication is viewed as necessary before occupational resumption can be considered (Bermejo et al., 2010). Given that the symptoms of many mental health conditions can be expected to persist for extended periods of time, the pursuit of symptom eradication as a precondition of occupational re-engagement might contribute unnecessarily to permanent disability. Lessons learned from the treatment of musculoskeletal pain conditions suggest that successful re-engagement in occupational activities can be achieved in spite of ongoing symptoms (Sullivan & Hyman, 2014). The results of the present study suggest that the same is likely true for individuals with debilitating mental health conditions.

Some degree of caution must be exercised in the interpretation of the study findings. First, data records were drawn from the clinical files of individuals referred to an occupational rehabilitation service. Only a minority of individuals with debilitating health or mental health conditions are referred for occupational rehabilitation services. In addition, all participants were receiving long-term disability benefits. These sample characteristics necessarily have implications for the generalizability of findings. The modest sample size also limited the nature of analytic procedures that could be applied to the data. In particular, it was not possible to examine whether observed relations between catastrophizing and PTSD-related disability were moderated by the type of trauma that had been experienced by participants. It is also necessary to consider that a wide range of symptom-related, treatment-related and work-place

factors that have been shown to impact on occupational outcomes were not assessed in this study. Whether the contribution of catastrophizing to occupational outcomes is independent of other symptom-related, treatment-related or workplace factors remains to be clarified by future research. Finally, occupational re-engagement was operationalized as return to some form of employment. Approximately half the participants classified as being occupationally re-engaged were enrolled in a graduated return-to-work program. Although the majority of individuals who successfully complete a graduated return-to-work program resume their full-time occupational activities, not all do. Greater confidence in the findings of this study awaits replication in a larger sample with a longer period of follow-up.

In spite of these limitations, the results of the present study suggest that the relations among catastrophizing, symptom severity and disability that have been reported in individuals with pain conditions are also evident in individuals with PTSD. The findings suggest that reductions in catastrophizing might be one of the vehicles through which reductions in PTSD symptom severity contribute to occupational re-engagement. Occupational outcomes of work-disabled individuals with PTSD might be enhanced by combining symptom reduction interventions with interventions specifically designed to reduce catastrophizing.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest relevant to the material presented in this paper.

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