



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Psychological flexibility moderates the relation between PTSD symptoms and daily pain interference



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ARTICLE INFO

Keywords:

Psychological flexibility
Posttraumatic stress disorder
Pain severity
Pain interference
Daily diary

ABSTRACT

Posttraumatic stress disorder (PTSD) symptoms are associated with increased physical health problems, including chronic pain. Although researchers have identified several risk factors that partially account for the co-occurrence of PTSD symptoms and pain, a substantial amount of variance remains unexplained in these models. The present study evaluated psychological flexibility (PF) as a potential moderator of the relation between probable PTSD diagnosis and pain interference in daily life. Probable PTSD participants reported significantly greater daily pain severity and interference, and greater daily pain interference when controlling for pain severity, relative to non-PTSD participants. PF emerged as a significant moderator of the relation of PTSD and pain interference. Participants with probable PTSD reported greater pain interference only in conjunction with low levels of PF. Results suggest psychosocial treatments that target PF as a means of improving functioning may improve outcomes for patients with co-occurring PTSD and chronic pain.

1. Introduction

Posttraumatic stress disorder (PTSD) is commonly associated with negative physical health outcomes (Scott et al., 2013), potentially contributing to higher health care utilization and related costs (e.g., Chan, Cheadle, Reiber, Unützer, & Chaney, 2009; Kartha et al., 2008). In particular, PTSD and chronic pain conditions such as fibromyalgia, arthritis, and back pain co-occur at high rates (Pacella, Hruska, & Delahanty, 2013; Sareen et al., 2007) and this co-occurrence is associated with increased pain and pain-related disability (Beckham et al., 1997; Sherman, Turk, & Okifuji, 2000), emotional distress, general functional impairment (Bryant, Marosszeky, Crooks, Baguley, & Gurka, 1999; Geisser, Roth, Bachman, & Eckert, 1996), and diminished quality of life (Clapp, Beck, Palyo, & Grant, 2008) relative to either condition alone. As such, chronic pain in the context of PTSD represents a significant public health burden.

Conceptual models (Asmundson, Coons, Taylor, & Katz, 2002; Sharp & Harvey, 2001) and longitudinal examinations (Jenewein, Wittmann, Moergeli, Creutzig, & Schnyder, 2009; Liedl et al., 2010) of the relation between PTSD and chronic pain conditions provide support for mutual maintenance, such that the experience of one condition increases the risk for the development and maintenance of the other. Evidence also exists for the role of shared cognitive, affective, and behavioral

vulnerability factors that may contribute to the development and maintenance of both PTSD and chronic pain, specifically, attentional biases towards threat-relevant and pain-related stimuli, anxiety sensitivity (AS), and avoidance of activities that may lead to distressing emotional or physical sensations (Asmundson et al., 2002; Asmundson & Hadjistavropoulos, 2006). Despite this growing body of research examining the underlying mechanisms in the association between PTSD and chronic pain, substantial variance often remains unexplained. Identification of additional individual difference factors that confer risk for pain problems in individuals with PTSD may lead to a more comprehensive understanding of the interaction of these difficulties.

One individual difference factor that may confer vulnerability for chronic pain among those with PTSD symptoms is low psychological flexibility (PF). PF involves an accepting stance towards present-moment private experiences (i.e., thoughts, emotions, and physical sensations) that lends distance and perspective to such experiences, thereby facilitating value-guided behaviors and consequently enhancing individuals' quality of life (Hayes, Levin, Plumb-Villardaga, Villatte, & Pistorello, 2013). In contrast, habitual rigid fear and avoidance of internal experiences, such as seen with emotional and experiential avoidance, often impedes engagement in value-directed activities. Low PF is associated with both elevated PTSD symptoms (e.g., Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011; Meyer, Morissette, Kimbrel,

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Druse, & Gulliver, 2013) and chronic pain-related problems (e.g., Feldner et al., 2006; McCracken & Velleman, 2010).

Moreover, PF may interact with mechanisms proposed to link PTSD and pain. Indeed, low PF seems to set the stage for a robust relationship between other risk factors and PTSD. For instance, anxiety sensitivity is associated with PTSD diagnoses, but only in the context of emotional and experiential avoidance (Bardeen, Tull, Stevens, & Gratz, 2014, 2015). One aspect of inflexible PF is cognitive fusion, the rigid attachment to emotional and substantive content of thoughts, which has been linked to dysfunctional pain-related coping strategies (Zettle et al., 2005) and pain intensity and disability (Solé et al., 2016). Dysfunctional coping strategies associated with low PF, such as suppression, may increase pain (Quartana, Bounds, Yoon, Goodin, & Burns, 2010). Ironic process theory (Wegner, 1994) posits that suppression of unwanted experiences paradoxically increases their accessibility once self-regulatory resources become depleted. The use of suppression in the context of intense distress associated with PTSD and subsequent depleted regulatory resources may increase accessibility of pain experiences (Quartana et al., 2010). Given that low PF is associated with more pain-related problems, it is possible that low PF confers additional risk for these problems in the context of PTSD. Collectively, this evidence suggests inflexible responses to private experiences may moderate the relation of PTSD and pain.

Evidence suggests low PF is a risk factor for co-occurring problems in the context of traumatic exposure and physical pain separately. However, PF has not been evaluated as a moderator of the relation between PTSD symptoms and physical pain. The present study aimed to examine the associations between PF, probable PTSD diagnostic status, and daily pain severity and interference. We hypothesized that a probable PTSD diagnosis would be related to greater average daily pain interference after accounting for pain severity, relative to no probable PTSD diagnosis. We also anticipated that people with a probable PTSD diagnosis who reported low PF would demonstrate stronger PTSD-pain interference relations relative to those who reported flexible response patterns. Identifying individual factors that increase risk for experiencing pain-related impairment in the context of PTSD has the potential to inform the development of targeted psychosocial treatments for individuals who experience co-occurring PTSD and chronic pain.

2. Method

2.1. Participants

Participants were 115 university undergraduate students (female = 80.9%; $M_{age} = 19.99$, $SD_{age} = 2.05$; Range = 16–33) recruited from the local psychology subject pool. Of these, 89 participants provided data on four or more daily diary assessment days ($\geq 79\%$ response rate; see Procedure) and were considered compliant with the study protocol. Females were significantly more compliant than males, $\chi^2(1) = 5.21$, $p = 0.02$.

The final sample of 89 participants (female = 85.39%; $M_{age} = 20.09$, $SD_{age} = 2.15$) self-reported ethnicity as follows: White = 71.91%; Asian = 12.36%; multiracial = 6.74%; Black = 4.49%; Latino/a = 2.25%; Other = 2.25%. Most participants were single (95.51%) full-time students (75.28%) with middle-class backgrounds (i.e., M household income = \$55,786.18, $SD = 36,041.87$). Self-reported incidence of psychological treatment (26.97%) and medication use for a psychiatric disorder (22.47%) was low.

2.2. Measures

The *Life Events Checklist* (LEC; Blake et al., 1990) is a 17-item measure designed to assess exposure to a range of potentially traumatic events (PTEs). On a 5-point nominal scale, respondents report the degree of exposure (1 = *happened to me*, 2 = *witnessed it*, 3 = *learned about it*, 4 = *not sure*, and 5 = *does not apply*) to each of the 17 PTEs.

The LEC demonstrates acceptable convergent validity with well-established measures of PTE exposure (M kappa = 0.55, $r = -0.55$; Gray, Litz, Hsu, & Lombardo, 2004). After completing the LEC, participants identified the most distressing PTE, which was used as the index event for the assessment of PTSD symptoms.

PTSD symptoms were assessed with the *PTSD Checklist* (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993; Weathers, Litz, Huska, & Keane, 1991), a 17-item self-report measure that corresponds to the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* (DSM-IV; American Psychiatric Association, 1994) criteria for PTSD. Participants rate the extent to which they have been bothered by each symptom in the past month on a 5-point Likert-type scale (1 = *not at all* to 5 = *extremely*). The PCL demonstrates good convergent validity with other validated measures of PTSD symptomatology (Grubaugh, Elhai, Cusack, Wells, & Frueh, 2007; Palmieri, Weathers, Difede, & King, 2007; Ruggiero, Del Ben, Scotti, & Rabalais, 2003) and strong test-retest reliability ($r = 0.96$; Weathers et al., 1993). Internal consistency was good in the present study, $\alpha = 0.96$. Participants who reported exposure to a PTE (i.e., “happened to me”) and rated at least 1 B-criterion, 3 C-criterion, and 2 D-criterion symptom items as moderately or above, as well as provided an overall summed PCL score of 30 or greater, were classified as having a probable PTSD diagnosis. The lowest severity score among probable PTSD participants was 41.

The *Acceptance and Action Questionnaire-II* (AAQ-II; Bond et al., 2011) was used to assess psychological inflexibility. Participants respond to 7 items utilizing a 7-point Likert-type scale (1 = *never true* to 7 = *always true*). Total score is calculated as the sum of all items (range = 7–49). Thus, higher scores indicate greater levels of *inflexible* responding (i.e., low PF). The AAQ-II has acceptable reliability ($\alpha = 0.84$; test-retest $\alpha = 0.79$), predictive validity across a range of domains, and appropriate discriminant validity (Bond et al., 2011). Internal consistency was good in the present study, $\alpha = 0.95$.

Two items selected from the Brief Pain Inventory (BPI; Cleeland & Ryan, 1994) assessed daily pain severity and pain interference. The items, selected based upon highest factor loading for each subscale, were modified to refer to the past 24 h (with authors' approval). Participants rated their pain severity on an 11-point scale (0 = *no pain* to 10 = *pain as bad as you can imagine*) by responding to the item “Please rate your pain by indicating the one number that describes your pain on average in the last 24 hours.” Pain interference was also assessed on an 11-point scale (0 = *does not interfere* to 10 = *completely interferes*) by the item “Indicate the one number that describes how, during the past 24 hours, pain has interfered with your general activity.”

2.3. Procedure

The local Institutional Review Board approved all procedures. After providing informed consent, participants completed an initial baseline questionnaire containing the LEC, PCL, AAQ-II, and demographic information. Participants learned proper use of the online daily diary system, were provided a link to access the system, and instructed to complete daily online questionnaires each 24-hour period. Participants received a daily email reminding them to complete the survey for 14 days, which included the pain-related items described above. Participants were compensated with course credit.

3. Results

Initial analyses were completed using SPSS 22.0.0.2 for MAC. All data provided by non-compliant participants was removed prior to analysis (McCabe, Mack, & Fleeson, 2012). Daily pain-related data was provided on 853 of 1246 possible days (68.46%; $M = 9.58$, $SD = 3.22$). Thirty participants (34%) reported psychological and behavioral responses to a traumatic event consistent with a PTSD diagnosis. In addition, participants reported moderate levels of psychological inflexibility ($M = 25.91$, $SD = 11.51$) at the baseline assessment.

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