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PTSD and emotional distress symptoms measured after a motor vehicle accident: Relationships with pain coping profiles

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Abstract

This study explored differences among pain patients classified as Dysfunctional, Interpersonally Distressed, and Adaptive Copers on the Multidimensional Pain Inventory with respect to PTSD symptomatology, anxiety, and depression. Eighty-five patients with pain complaints who had experienced a serious motor vehicle accident (MVA) were classified into these three pain coping categories and assessed using clinician and self-report measures. Results indicated that patients classified as Adaptive Copers ($n = 24$) showed less PTSD symptomatology, anxiety, and depressed mood, relative to individuals classified as Dysfunctional ($n = 36$) and as Interpersonally Distressed ($n = 25$), who did not differ on these dimensions. Emotional responses during the accident (fear, helplessness, danger, perceived control, and certainty that one would die) did not differentiate the groups. Pain profiles contributed to the prediction of self-reported PTSD symptoms, controlling for state anxiety. These data suggest that pain patients with both Dysfunctional and Interpersonally Distressed coping profiles are at elevated risk for a range of post-trauma problems following a serious MVA.

Keywords

Pain; Posttraumatic Stress Disorder; motor vehicle accident; comorbidity

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Recent research has highlighted the co-occurrence of pain and Posttraumatic Stress Disorder (PTSD), particularly following traumatic events that involve bodily harm (e.g., Blanchard et al., 1995; Turk, Okifuji, Starz, & Sinclair, 1996). Although the literatures on pain and PTSD have remained somewhat separate, empirical work to date has documented that pain complaints are relatively common among individuals diagnosed with PTSD (e.g., Beckham et al., 1997; McFarlane, Atchison, Rafalowicz, & Papay, 1987). Sharp and Harvey (2001) in reviewing this topic, have proposed that chronic pain and PTSD appear to be mutually maintaining conditions that interact and influence one another. These authors speculate that multiple mechanisms may be involved in the mutual interaction of pain and PTSD, including attentional biases, heightened pain sensitivity and perception, anxiety sensitivity, the potential for pain to become a trauma cue, avoidance, depression, and reduced cognitive capacity owing to the cognitive demands of both pain and PTSD.

To date, only two of these processes (heightened pain perception and attentional biases) have been examined for their role in facilitating the interaction of pain and PTSD. Geisser, Roth, Bachman, and Eckert (1996) studied 241 pain patients in order to ascertain the role of pain perception and emotional disturbance following a motor vehicle accident (MVA). Three groups were formed: 1) patients whose pain was not the result of a MVA (No Accident, $n = 150$), 2) patients whose pain was the result of a MVA and reported few or no PTSD symptoms (Accident/No PTSD, $n = 46$), and 3) patients whose pain was the result of a MVA and reported significant PTSD symptoms (Accident/High PTSD, $n = 45$). The Accident/High PTSD patients reported higher levels of pain and greater emotional disturbance, relative to the other two groups. Similar findings have been reported by Turk, et al. (1996) with fibromyalgia patients and by Aghabeigi, Feinmann, and Harris (1992) with patients reporting chronic idiopathic facial pain. These studies provide initial evidence for the role of pain perception as a factor that may influence the interaction of PTSD and chronic pain. In considering these studies, it is unclear whether heightened pain perception is reflective of global distress or is moderated by another intervening variable, an interpretative problem that is intrinsic in cross-sectional designs.

Another line of investigation has studied the role of attentional biases in MVA survivors with and without PTSD and pain using a modified Stroop procedure (MacLeod, 1991). Beck, Freeman, Shipherd, Hamblen, and Lackner (2001) reported that color-naming delays were demonstrated for both pain and trauma-related words in a sample of patients with co-morbid pain and PTSD. In contrast, participants with pain and no PTSD demonstrated interference only for pain words. Although the co-morbid pain and PTSD patients also showed generalized slowing across all word categories, delays specific to presenting complaints suggest that both pain and PTSD are associated with attentional biases, as hypothesized by Sharp and Harvey (2001).

Although these reports begin to examine potential mechanisms through which pain and PTSD interact with one another, these studies neglect important individual differences in patients' expression and response to pain (e.g., Bradley, Prokop, Margolis, & Gentry, 1978; Keefe, Bradley, & Crisson, 1990). Individual variability in coping with pain has been captured by an empirically-derived classification system developed by Turk and colleagues, based on the Multidimensional Pain Inventory (MPI; Kerns, Turk, & Rudy, 1985). The MPI is composed of three sections, subsuming 13 empirically derived scales. Three pain coping profiles are derived from the MPI. Individuals classified in the Dysfunctional profile are characterized as perceiving their pain as severe, disabling, and emotionally distressing and report low activity levels. Individuals classified in the Interpersonally Distressed profile report that family and friends do not provide sufficient emotional support and experience moderate levels of pain and emotional distress. Lastly, individuals classified in the Adaptive Copier/Minimizer profile appear to cope well with their pain, report high levels of support from significant others, indicate high activity levels, and do not perceive substantial interference from pain (Turk & Rudy, 1988). The original factor structure of the MPI has been replicated by other investigators (Bernstein, Jaremko, & Hinkley, 1995; Riley, Zawacki, Robinson, & Geisser, 1999) and psychometric support is good for the MPI (Kerns, et al., 1985). These pain coping profiles influence the presentation of pain symptoms, as well as response to standard pain treatment (e.g., Strategier, Chwalisz, Altmaier, Russell, & Lehmann, 1997; Turk, Okifuji, Sinclair, & Starz, 1998). It is equally possible that these pain profiles affect the presentation of comorbid conditions, particularly PTSD.

In the only study to date to explore this issue, Asmundson, Bonin, Frombach, and Norton (2000) examined the impact of pain coping profiles on PTSD symptom presentation. In this report, self-reported PTSD symptoms were contrasted in pain patients classified as Dysfunctional, Interpersonally Distressed, and Adaptive Copier with the MPI. Results indicated

that Dysfunctional pain patients reported higher levels of PTSD symptoms, relative to the other two pain coping profiles. Although all patients in this study had experienced some type of work-related injury, it is not clear whether these accident experiences satisfied Criterion A of the diagnostic criteria for PTSD (specifically, the individual was exposed to an event that involved actual or threatened death, injury, or threat to physical integrity and their emotional response was intense fear, helplessness, or horror). As such, interpretation of these results is a bit complicated.

The current study was designed to replicate and extend the findings of Asmundson et al. (2000). Because research on the interplay between pain and PTSD has just begun, replication of these initial findings is important. This study aimed to examine PTSD symptomatology among individuals with Dysfunctional, Interpersonally Distressed, and Adaptive Coper coping profiles. In the current study, participants had each experienced the same traumatic event, a MVA, which was the source of their pain complaints and satisfied Criteria A of the diagnostic criteria for PTSD. Via this inclusion criterion, this report expands the current literature by including a homogeneous group of trauma survivors who meet the entry requirements for PTSD. In addition to PTSD symptomatology, this study examined related variables such as the presence of other anxiety and depressive disorders, participants' emotional responses during the accident, the presence or absence of litigation, and the amount of time that had passed since the accident, to determine if related dimensions of emotional distress also were associated with pain coping profiles following a MVA.

Method

Participants

Eighty-five patients with pain complaints were included, selected from a pool of 132 individuals who participated in an on-going research clinic on the assessment of PTSD after a MVA (64% inclusion rate). Among the 47 individuals excluded from the current report, 30 reported unanalyzable profiles (this reflects individuals without a romantic partner, thus rendering the MPI unanalyzable), 7 reported hybrid profiles, and 10 were diagnosed with current substance abuse or dependence¹. Participants were referred to the clinic by physical therapists, chiropractors, massage therapists, and specialists in rehabilitation and internal medicine. Individuals were included if their pain symptoms were the result of injuries sustained during a MVA and had not responded to standard medical treatment. In each case, pain caused significant lifestyle limitations (e.g., unable to work), impairment (e.g., use of prescription pain medications at least 3 days/week), or significant distress (e.g., continued health care utilization for pain). The majority of patients ($n = 78$, 95%) experienced pain complaints from a muscular-skeletal or soft tissue injury and had experienced pain for 6 months or longer ($n = 65$, 76%). Individuals were included in the current report if they had experienced a MVA involving actual or threatened death or serious injury and their emotional response included intense fear, helplessness, or horror (American Psychiatric Association, 1994). These features were evaluated during initial phone contact with the project and using the MVA Interview (see below). Individuals involved in minor accidents that did not satisfy Criterion A of the diagnostic criteria for PTSD were not evaluated. Within the sample, 36 participants were classified in the Dysfunctional profile, 25 in the Interpersonally Distressed profile, and 24 in the Adaptive Coper profile. As shown in Table 1, the three groups were clearly separated from one another across the three sections of the MPI and showed profiles that matched the original validation sample (Turk & Rudy, 1988).

¹This percentage of individuals with anomalous, unanalyzable, and hybrid profiles resembles that noted in other samples of patients with pain complaints (e.g., Asmundson et al., 2000). No significant differences were found in age, gender, or race between the patients who were included in this report and those who were not.

The final sample included 25 men and 60 women, with an average age of 42.1 (SD 9.99). Sixty eight (80%) were Caucasian, 14 (17%) were African American, 2 (2%) were Hispanic, and 1 (1%) was Asian. Fifty-two participants (61%) were married at the time of evaluation although all individuals were involved with a significant life partner. The groups did not differ with respect to age ($F(2,82) = 1.36$), gender ($X^2(2) = 1.65$), race ($X^2(2) = 2.53$), marital status ($X^2(2) = 0.98$), the length of time elapsed since the MVA ($F(2,82) = 0.20$), and the percentage of each group that had experienced pain for 6 months or longer ($X^2(2) = 0.49$). (see Table 2).

Measures

Group classification measure: The MPI (Kerns et al., 1985) was used for classification of patients into pain coping profiles. Thirteen scales comprise the MPI and assess pain severity, perceptions of interference from pain, dissatisfaction with current functioning, appraisals of support from significant others, perceived life control, affective distress, and activity levels. Determination of pain coping profiles is based on a multivariate discriminant model, using scores on nine of these scales. If the scale scores are significantly different from the three prototypic group profiles, classification stops and the profile is coded as “hybrid” (Rudy, 1989). Scoring the MPI and deriving group classification occurred after administration of the other measures. *PTSD measures:* PTSD symptomatology was assessed with both clinician and self-report measures. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990), a structured interview that assesses the symptoms of PTSD identified in the current Diagnostic and Statistical Manual (DSM-IV; American Psychiatric Association, 1994) was administered. The CAPS includes standardized questions to determine symptom frequency and intensity. Symptoms were assessed in the preceding month, using a 5-point Likert scale (e.g., 0 indicates that the symptom does not occur or does not cause distress and 4 indicates that the symptom occurs nearly every day or causes extreme distress and discomfort). The total severity score for the CAPS is computed by summing the frequency and intensity ratings for each symptom (range 0-136). Additionally, probes were added to the interview to determine whether each PTSD symptom was attributable to pain (e.g., if a patient reported difficulty sleeping, the clinician assessed whether this symptom was due to pain. If so, the symptom was not scored on the CAPS).

The CAPS was administered by 8 trained clinicians who were advanced doctoral students in clinical and counseling psychology. All clinicians received extensive training in use of the CAPS. Interviews from a larger sample ($n = 195$) that included the 85 patients in this report were videotaped and 29% ($n = 56$) were randomly selected and reviewed by an independent clinician to establish diagnostic reliability. Inter-rater agreement in PTSD diagnosis, reflected by the kappa statistic, was strong for PTSD ($k = 0.89$). The CAPS has excellent support for its reliability and validity (e.g., Weathers, Keane, & Davison, 2001) and has been shown to be sensitive to the detection of PTSD in individuals following a MVA (Blanchard & Hickling 1997). In this report, three measures were derived from the CAPS: 1) total severity score for PTSD, 2) severity score for the three symptom clusters (Re-experiencing, Avoidance and numbing, and Physiological hyperarousal), and 3) the percent of patients per pain coping profile meeting diagnostic criteria for PTSD.

Participants completed two self-report scales, the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the PTSD Symptom Scale – Self Report (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993). The IES contains 15 items rated on a Likert scale and distributed across two subscales that assess intrusion (7 items) and avoidance (8 items). Test-retest reliability is good and the scale appears to possess sound psychometric properties (Weiss & Marmar, 1997). The PSS-SR contains 17 items, reflecting the DSM-IV symptoms of PTSD, which are rated on a 3-point Likert scale and summed to yield a total score. This measure has good test-retest reliability over a 1-month interval and high internal consistency (Foa, et al.,

1993). Higher scores on both of these measures indicate the presence of more PTSD symptoms. *Anxiety measures:* Anxiety symptomatology was assessed with both clinician and self-report measures. In order to evaluate the presence of other anxiety disorders, the Anxiety Disorders Interview Schedule (ADIS-IV; DiNardo, Brown & Barlow, 1994) was administered. The ADIS-IV is a semi-structured interview that evaluates each of the anxiety disorders². The same clinicians who administered the CAPS also administered the ADIS-IV. All interviewers received extensive training in use of the ADIS-IV, following procedures outlined by DiNardo, Moras, Barlow, Rapee, and Brown (1993). As with the CAPS, 29% were randomly selected and reviewed by an independent diagnostician. Agreement between diagnosticians was strong for Social Phobia ($k = 0.87$), Generalized Anxiety Disorder ($k = 0.93$), and Specific Phobia ($k = 0.85$) and acceptable for Panic Disorder with Agoraphobia ($k = 0.73$)³. Use of the ADIS-IV is recognized as providing reliable and valid diagnoses (Brown, DiNardo, Lehman, & Campbell, 2001).

The State-Trait Anxiety Inventory (STAI; Spielberger, 1983) was completed by participants. The STAI contains 40 items which are rated on a 1-4 Likert scale, 20 which assess State anxiety (STAI-S) and 20 which assess Trait anxiety (STAI-T). Psychometric properties are well-established (Spielberger, 1983). Higher scores indicate greater levels of state and trait anxiety.

Depression measures: Depression symptomatology was assessed with both clinician and self-report measures. The ADIS-IV was used to evaluate the presence of depressive disorders (Major Depressive Disorder, Dysthymia, and Bipolar Disorder). Diagnostic reliability, established as previously described, was strong for Major Depressive Disorder ($k = 0.84$) and acceptable for Bipolar Disorder ($k = 0.79$)⁴. Additionally, the Beck Depression Inventory (BDI; Beck & Steer, 1993) was administered. The BDI is a 21-item questionnaire that evaluates current depressive symptoms and has well-established reliability and validity (Steer & Beck, 1988). Although it is common within the pain literature to remove somatic items when scoring the BDI, this procedure does not improve accuracy of the scale (e.g., Geisser, Roth, & Robinson, 1997). In order to facilitate comparison of the current data with previously published studies of patients with MVA-related PTSD and pain (e.g., Blanchard et al., 1995), the original scoring method was used. Higher scores on the BDI indicate greater levels of depression.

MVA characteristics: All patients were administered the MVA Interview, which assesses characteristics of their MVA (Blanchard & Hickling, 1997). This interview includes questions about the individual's emotional response to the accident, including feelings of fear, helplessness, danger, being out of control and perceptions that they might die, which were necessary to determine whether the MVA qualified as a traumatic event. Each of these emotional responses to the MVA was rated on a 0-100 Likert-type scale, where 0 = "not at all" and 100 = "extreme". Participants were asked whether litigation had been initiated as a result of the MVA (yes/no).

Procedure

All procedures were reviewed by the Institutional Review Board at The University at Buffalo – SUNY. The procedures were explained to the participant and informed consent was obtained. All participants were interviewed individually and then completed the self-report measures.

²The section of the ADIS-IV that assesses PTSD was omitted.

³Other anxiety disorders did not occur with sufficient frequency in the reliability sample to calculate kappa coefficients.

⁴Dysthymia was not diagnosed within the reliability sample, precluding computation of kappa.

Analytic strategy

Two steps were involved in the analytic strategy. First, a series of between-group analyses were conducted, to compare pain coping subtypes. Continuous measures were submitted to a one-way ANOVA, while the X^2 statistic was used for categorical variables. Bonferroni adjustment was used within each family of measures (PTSD, anxiety, depression, and MVA characteristics) and significant differences were followed with the Tukey procedure. The percent of variance accounted for (effect size) was calculated for each variable, using η^2 for continuous variables and Φ^2 for categorical variables.

Second, in order to examine the specific contribution made by pain coping profiles to the prediction of PTSD symptoms, two regression analyses were conducted. In the first analysis, CAPS total severity scores were predicted based on pain profile, after entry of the STAI- State subscale (as a control for overall anxiety level). The second analysis was identical to the first, except that PSS-SR scores were predicted. In this way, potential differences could be examined in the role that pain coping profiles played in the prediction of PTSD assessed via clinician versus self-report measures.

Results

Between group differences

PTSD Measures: As seen in Table 3, a significant difference was noted between groups with respect to the total CAPS severity score ($F(2,81) = 10.56, p < .0001$) and the percentage diagnosed with PTSD ($X^2(2) = 13.6, p < .001$). Follow-up tests indicated that the Adaptive Copier group scored significantly lower, relative to the Dysfunctional and Interpersonally Distressed groups on CAPS severity and the number diagnosed with PTSD. This same pattern of group differences was echoed in significant group differences on CAPS severity scores for the Reexperiencing ($F(2,81) = 10.58, p < .0001$), Avoidance and numbing ($F(2,81) = 5.45, p < .006$) and Physiological hyperarousal ($F(2,81) = 7.66, p < .001$) symptom clusters. Examination of the IES indicated significant group differences on the Avoidance ($F(2,81) = 13.62, p < .0001$) and Intrusion ($F(2,81) = 11.18, p < .0001$) subscales, which again indicated that the Adaptive Copier group scored significantly lower, relative to the Dysfunctional and Interpersonally Distressed groups. A similar pattern was noted on the PSS-SR ($F(2,81) = 15.93, p < .0001$). Overall, this pattern of results suggests that the Adaptive Copier group experienced fewer PTSD-related symptoms following their MVA, relative to the Dysfunctional and Interpersonally Distressed pain coping groups on both clinician and self-report measures.

Anxiety measures: The three pain groups differed on the State ($F(2,81) = 13.92, p < .0001$) and Trait ($F(2,81) = 11.19, p < .0001$) subscales of the STAI, although they did not differ with respect to the number of additional anxiety disorders that were present ($F(2,82) = 2.81$; see Table 3). Follow-up testing indicated that the Adaptive Copier group scored significantly lower on both subscales of the STAI, relative to the Dysfunctional and Interpersonally Distressed groups.

Depression measures: Consideration of depression measures indicated that the groups showed a significant difference on the BDI ($F(2,80) = 13.06, p < .0001$) as well as the number of depressive disorders diagnosed by interview ($F(2,82) = 4.23, p < .01$). As can be seen in Table 3, the Adaptive Copier group scored significantly lower on the BDI, relative to the Dysfunctional and Interpersonally Distressed groups. The Dysfunctional group was diagnosed with significantly more depressive disorders, relative to the Adaptive Copier group.

MVA characteristics: Examination of participants' emotional responses during their MVA indicated no significant group differences with respect to feelings of fear ($F(2,82) = 1.32$), helplessness ($F(2,84) = 0.95$), danger ($F(2,83) = 1.64$), perceived control ($F(2,84) = 0.89$), and certainty that one would die during the MVA ($F(2,84) = 0.48$) (see Table 4). The majority of

participants (80%, $n = 68$) had been involved in MVA-related litigation; no between group differences were noted on this variable ($X^2(2) = 0.30$).

How do pain profiles contribute to the prediction of PTSD symptoms?

Clinician assessment of PTSD: Stepwise multiple regression, using the STAI-State subscale and MPI pain coping profile, indicated a significant model ($F[2,80] = 12.75, p < .0001, R^2 = .24$). Only STAI-State contributed significantly in the prediction of CAPS severity scores ($B = 0.37, p < .001$), although MPI profile score approached significance ($B = 0.19, p = .09$) in this model.

Self-report assessment of PTSD: Stepwise multiple regression, using the STAI-State subscale and MPI pain profile, indicated a significant model ($F[2,81] = 33.10, p < .0001, R^2 = .45$). Both STAI-State ($B = 0.50, p < .0001$) and MPI pain coping profile ($B = .27, p < .005$) contributed significantly in the prediction of PSS-SR scores in this model.

Discussion

The current study demonstrated that there are significant differences between patients with different pain coping styles with respect to post-trauma functioning after a MVA. These differences were found in multiple domains, including PTSD, anxiety, and depression. In particular, those patients classified as Adaptive Copers reported less PTSD symptomatology, less anxious mood, and less depressed mood, compared to individuals classified as Dysfunctional and Interpersonally Distressed. Interestingly, emotional responses during the accident did not differentiate the groups, suggesting that these dimensions do not account for the observed differences in emotional distress between the groups. Examination of whether pain coping profiles carried unique variance in the prediction of PTSD symptoms indicated that this was only the case when PTSD was assessed using self-report, a finding that may be attributable to shared method variance.

Pain patients classified as Adaptive Copers reported significantly lower levels of anxiety, depression, and post-trauma symptoms, relative to those classified as Interpersonally Distressed and Dysfunctional. These findings suggest that positive coping with pain also is associated with lower levels of emotional distress overall. However, patients within the Interpersonally Distressed and Dysfunctional groups did not differ significantly from one another on these dimensions, a finding that is somewhat unexpected in light of previously documented differences between these groups (e.g. Kerns et al., 1985; Turk & Rudy, 1988). Previous consideration of emotional functioning using the MPI classification system has focused on emotional distress related to pain symptoms. In contrast, the current report focused on a broader range of emotional responses in the wake of a serious car accident and was not limited to pain complaints. In this context, it is important to note that both Interpersonally Distressed and Dysfunctional patients are more likely to report PTSD symptoms and related emotional distress.

Contrary to Asmundson et al. (2000), no significant differences were observed between participants in the Dysfunctional and Interpersonally Distressed subsamples with respect to PTSD symptoms. It is possible that the discrepancies between the present results and those of Asmundson and colleagues are due to sampling differences. The present study was limited to a homogeneous sample of trauma survivors who had each experienced a serious MVA and responded to this experience with pronounced feelings of fear, helplessness, and horror (Criterion A of the PTSD diagnosis). In contrast, Asmundson and colleagues (2000) evaluated a mixed sample of individuals who had experienced work-related accidents, without discussion of participants' emotional responses to the target event. With these methodological additions,

it appears that patients with both Dysfunctional and Interpersonally Distressed pain coping profiles are at elevated risk for post-trauma problems.

The present report has several limitations. First, the sample involved in this study was restricted to individuals who had experienced a specific trauma, i.e., a motor vehicle accident. It is possible that other features would be noted in individuals whose pain complaints were the result of injuries received during different types of traumatic events, such as combat, work-related accidents, or physical assault. In extending this type of study, it will be important to ensure that the diagnostic definition of a trauma is met, prior to exploring differences in the presence and symptomatology of PTSD. As well, in the present report, MVA characteristics were measured via retrospective ratings, which could be distorted by recall biases. Future studies in this arena would benefit from additional measures of trauma characteristics. Third, the sample size of this report is limited. Within the MPI system, one needs to be involved with a significant life partner in order to receive a pain coping classification. As reported, 30 patients were excluded from the present sample because they were not involved with a romantic partner. Ideally, further development of the MPI classification system can include consideration of individuals without a significant life partner, in order to include the full scope of individuals with pain complaints. Fourth, the sample in the present report contained more women than men, a gender distribution that is unusual among pain clinics. Because participants were recruited into a research clinic that focused on psychological recovery after a MVA, this sample characteristic may restrict the generalizability of these data.

In sum, this report documents that significant differences in symptoms of PTSD, anxiety, and depression are observed among patients with different pain coping profiles who have experienced a serious motor vehicle accident. Individuals classified as Adaptive Copers were less likely to report emotional symptomatology, relative to individuals classified within the Dysfunctional and Interpersonally Distressed profiles. Thus, these data suggest that PTSD and physical pain complaints may go hand-in-hand for individuals who have been injured in a serious motor vehicle accident. In particular, individuals who show a poor response to coping with their pain are more likely to report PTSD symptoms, anxious mood, and depression. In keeping with the suggestions of Sharp and Harvey (2001), these findings could be attributed to the use of an avoidant coping style, could be mediated by increased pain severity, or could reflect heightened anxiety sensitivity. Clearly, additional research that explores factors which mediate and moderate the interplay between pain and PTSD would be useful. The current data suggest that greater attention to PTSD symptoms among pain patients would be informative, particularly among those individuals who are reporting negative styles of coping with pain complaints.

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References

- Aghabeigi B, Feinmann C, Harris M. Prevalence of post-traumatic stress disorder in patients with chronic idiopathic facial pain. *British Journal of Oral and Maxillofacial Surgery* 1992;30:360–364.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th. Washington, DC: 1994.
- Asmundson GJG, Bonin MF, Frombach IK, Norton GR. Evidence of a disposition toward fearfulness and vulnerability to posttraumatic stress in dysfunctional pain patients. *Behaviour Research and Therapy* 2000;38:801–812. [PubMed: 10937428]
- Beck, AT.; Steer, RA. *BDI Manual*. The Psychological Corporation; San Antonio, TX: 1993.

- Beck JG, Freeman JB, Shipperd JC, Hamblen JL, Lackner JM. Specificity of Stroop interference in patients with pain and PTSD. *Journal of Abnormal Psychology* 2001;110:536–543. [PubMed: 11727943]
- Beckham J, Crawford A, Feldman M, Kirby A, Hertzberg M, Davidson J, Moore D. Chronic posttraumatic stress disorder and chronic pain in Vietnam combat veterans. *Journal of Psychosomatic Research* 1997;43:379–389. [PubMed: 9330237]
- Bernstein IH, Jaremko ME, Hinkley BS. The utility of the West Haven-Yale Multidimensional Pain Inventory. *Spine* 1995;20:256–263.
- Blake, D.; Weathers, F.; Nagy, L.; Kaloupek, D.; Klauminzer, G.; Charney, D.; Keane, T. Clinician-administered PTSD scale (CAPS). National Center for Posttraumatic Stress Disorder, Behavioral Science Division; Boston, MA: 1990.
- Blanchard, EB.; Hickling, EJ. After the Crash: Assessment and Treatment of Motor Vehicle Accident Survivors. American Psychological Association; Washington, DC: 1997.
- Blanchard EB, Hickling EJ, Mitnick N, Taylor AE, Loos WR, Buckley TC. The impact of severity of physical injury and the perception of life threat in the development of post-traumatic stress disorder in motor vehicle accident victims. *Behaviour Research and Therapy* 1995;33:529–534. [PubMed: 7598673]
- Bradley LA, Prokop C, Margolis R, Gentry W. Multivariate analyses of the MMPI profiles of low back pain patients. *Journal of Behavioral Medicine* 1978;1:253–272. [PubMed: 158659]
- Brown T, DiNardo P, Lehman C, Campbell L. Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology* 2001;110:49–58. [PubMed: 11261399]
- DiNardo, P.; Brown, T.; Barlow, D. Anxiety Disorders Interview Schedule for DSM-IV. Greywind; Albany, NY: 1994.
- DiNardo P, Moras K, Barlow D, Rapee R, Brown T. Reliability of DSM-III-R anxiety disorder category. *Archives of General Psychiatry* 1993;50:251–256. [PubMed: 8466385]
- Foa EB, Riggs DS, Dancu CV, Rothbaum BO. Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of Traumatic Stress* 1993;6:459–473.
- Geisser M, Roth R, Bachman J, Eckert T. The relationship between symptoms of post-traumatic stress disorder and pain, affective disturbance, and disability among patients with accident and non-accident related pain. *Pain* 1996;66:207–214. [PubMed: 8880842]
- Geisser M, Roth R, Robinson M. Assessing depression among persons with chronic pain using the Center for Epidemiological Studies Scale and the Beck Depression Inventory: A comparative analysis. *Clinical Journal of Pain* 1997;13:163–170. [PubMed: 9186024]
- Horowitz M, Wilner N, Alvarez W. Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine* 1979;41:209–218. [PubMed: 472086]
- Keefe FJ, Bradley L, Crisson J. Behavioral assessment of low back pain: Identification of pain behavior subgroups. *Pain* 1990;40:153–160. [PubMed: 2137905]
- Kerns RD, Turk DC, Rudy TE. The West Haven Yale Multidimensional Pain Inventory (WHYMPI). *Pain* 1985;23:345–356. [PubMed: 4088697]
- MacLeod CM. Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin* 1991;109:163–203. [PubMed: 2034749]
- McFarlane A, Atchison M, Rafalowicz E, Papay P. Physical symptoms in post-traumatic stress disorder. *Journal of Psychosomatic Research* 1987;38:715–726. [PubMed: 7877126]
- Riley JL, Zawacki TM, Robinson ME, Geisser M. Empirical test of the factor structure of the West Haven-Yale Multidimensional Pain Inventory. *Clinical Journal of Pain* 1999;15:24–30. [PubMed: 10206564]
- Rudy, TE. Multiaxial assessment of pain: Multidimensional Pain Inventory Users Manual. University of Pittsburgh School of Medicine; Pittsburgh, PA: 1989.
- Sharp T, Harvey A. Chronic pain and posttraumatic stress disorder: Mutual maintenance? *Clinical Psychology Review* 2001;21:857–877. [PubMed: 11497210]
- Spielberger, CD. State-Trait Anxiety Inventory for adults: Manual. Consulting Psychologists Press, Inc.; Palo Alto, CA: 1983.

- Steer, R.; Beck, AT. Beck Depression Inventory. In: Hersen, M.; Bellack, AS., editors. Dictionary of Behavioral Assessment Techniques. Pergamon Press; Oxford: 1988. p. 44-46.
- Strategier LD, Chwalisz K, Altmaier EM, Russell DW, Lehmann TR. Multidimensional assessment of chronic low back pain: Predicting treatment outcome. *Journal of Clinical Psychology in Medical Settings* 1997;4:91–110.
- Turk DA, Okifuji A, Sinclair JD, Starz TW. Differential responses by psychosocial subgroups of fibromyalgia syndrome patients to an interdisciplinary treatment. *Arthritis Care & Research* 1998;11:397–404. [PubMed: 9830884]
- Turk DC, Rudy TE. Toward an empirically derived taxonomy of chronic pain patients: Integration of psychological assessment data. *Journal of Consulting and Clinical Psychology* 1988;56:233–238. [PubMed: 3372831]
- Turk DC, Okifuji A, Starz TW, Sinclair JD. Effects of type of symptom onset on psychological distress and disability in fibromyalgia syndrome patients. *Pain* 1996;68:423–430. [PubMed: 9121832]
- Weathers F, Keane TW, Davison JRT. Clinician-administered PTSD scale: A review of the first ten years of research. *Depression and Anxiety* 2001;13:132–156. [PubMed: 11387733]
- Weiss, DS.; Marmar, CR. The Impact of Event Scale –Revised. In: Wilson, J.; Keane, TM., editors. *Assessing Psychological Trauma and PTSD*. Guilford Press; New York: 1997. p. 399-411.

Table 1

T scores for each subscale of the MPI, by pain coping profile (means with standard deviations in parentheses).

	Dysfunctional (<i>n</i> = 36)	Interpersonally Distressed (<i>n</i> = 25)	Adaptive Copier (<i>n</i> = 24)	<i>p</i>
Section I: Psychosocial dimensions of pain				
Pain severity	53.91 ^a (8.75)	46.12 ^b (9.34)	39.55 ^b (10.96)	.0001
Interference	55.87 ^a (5.19)	50.30 ^b (9.26)	42.66 ^c (8.66)	.0001
Life Control	44.15 ^a (6.03)	49.11 ^b (7.20)	54.50 ^c (4.97)	.0001
Affective Distress	54.01 ^a (7.55)	51.74 ^a (8.15)	38.75 ^b (7.02)	.0001
Support	54.38 ^a (4.99)	38.95 ^b (9.88)	47.78 ^c (5.78)	.0001
Section II: Responses from romantic partner				
Punishing Responses	48.15 ^a (7.61)	57.73 ^b (10.47)	46.66 ^a (6.37)	.0001
Solicitous Responses	55.83 ^a (6.66)	38.81 ^b (6.79)	51.75 ^a (8.19)	.0001
Distracting Responses	53.03 ^a (8.26)	42.51 ^b (7.39)	52.25 ^a (6.86)	.0001
Section III: Activities				
Household chores	47.52 ^a (8.67)	54.39 ^b (10.41)	52.85 ^{a,b} (8.73)	.01
Outdoor work	44.89 ^a (5.77)	51.04 ^b (9.14)	49.89 ^{a,b} (10.29)	.01
Activities away from home	45.63 ^a (7.49)	50.71 ^{a,b} (8.45)	54.96 ^b (8.87)	.0001
Social activities	45.65 ^a (7.70)	49.88 ^{a,b} (9.14)	54.37 ^b (10.60)	.002
General activity level	44.69 ^a (6.66)	52.34 ^b (9.64)	54.01 ^b (9.12)	.0001

Note: Means within a row which share common superscripts do not differ ($p < .05$).

Table 2

Description of Dysfunctional, Interpersonally Distressed, and Adaptive Coper pain coping profiles.

	Dysfunctional ($\underline{n} = 36$)	Interpersonally Distressed ($\underline{n} = 25$)	Adaptive Coper ($\underline{n} = 24$)	p
Age	42.14 (SD 10.1)	44.40 (SD 8.3)	39.71 (SD 11.2)	n.s.
Gender (% female)	64% ($\underline{n} = 23$)	72% ($\underline{n} = 18$)	79% ($\underline{n} = 19$)	n.s.
Race (% Caucasian)	72% ($\underline{n} = 26$)	88% ($\underline{n} = 22$)	83% ($\underline{n} = 20$)	n.s.
Marital status (% married)	61% ($\underline{n} = 22$)	68% ($\underline{n} = 17$)	54% ($\underline{n} = 13$)	n.s.
Length of time since MVA (mos)	23.08 (SD 25.8)	24.56 (SD 30.1)	27.96 (SD 32.8)	n.s.
Chronic Pain (% with pain ≥ 6 mos)	81% ($\underline{n} = 29$)	68% ($\underline{n} = 17$)	79% ($\underline{n} = 19$)	n.s.

Table 3
Comparison of three pain coping profile groups on PTSD, anxiety, and depression measures.

	Dysfunctional (<i>n</i> = 36)	Interpersonally Distressed (<i>n</i> = 25)	Adaptive Coper (<i>n</i> = 24)	Effect size	<i>p</i>
PTSD measures					
No. meeting criteria for PTSD	30 (83%) ^a	23 (92%) ^a	12 (50%) ^b	.16	*
Total CAPS severity score	58.6 (23.17) ^a	59.2 (21.26) ^a	33.6 (22.65) ^b	.21	*
Total Re-experiencing symptom score (CAPS)	19.4 (9.09) ^a	21.1 (7.33) ^a	10.8 (8.32) ^b	.21	*
Total Avoidance and Numbing symptom score (CAPS)	20.4 (10.09) ^a	19.4 (11.58) ^a	11.7 (9.96) ^b	.12	*
Total Physiological hyperarousal symptom score (CAPS)	18.9 (9.52) ^a	18.2 (6.15) ^a	11.1 (6.42) ^b	.16	*
IES-Avoidance subscale	21.9 (8.93) ^a	19.4 (10.60) ^a	9.0 (8.96) ^b	.25	*
IES- Intrusion subscale	21.0 (11.59) ^a	20.2 (9.76) ^a	8.9 (8.24) ^b	.22	*
PSS-SR	29.9 (12.86) ^a	25.7 (10.75) ^a	12.9 (9.52) ^b	.28	*
Anxiety measures					
# additional anxiety disorders present	1.3 (1.23)	0.9 (1.08)	0.6 (0.78)	.06	n.s.
STAI-State	52.8 (15.70) ^a	48.9 (15.79) ^a	33.2 (9.01) ^b	.26	*
STAI- Trait	53.1 (11.70) ^a	50.6 (12.17) ^a	39.1 (9.91) ^b	.22	*
Depression measures					
# depressive disorders present	0.5 (0.51) ^a	0.4 (0.50) ^{a,b}	0.1 (0.34) ^b	.09	*
BDI	23.5 (9.40) ^a	21.5 (11.23) ^a	10.7 (7.94) ^b	.25	*

Note: CAPS = Clinician Administered PTSD Scale, IES = Impact of Event Scale; PSS-SR = PTSD Symptom Scale - Self Report; STAI = State Trait Anxiety Inventory; BDI = Beck Depression Inventory. Means within a row which share common superscripts do not differ ($p < .05$); * indicates a statistically significant difference after Bonferroni correction (within the family of measures).

Table 4
 Comparison of three pain coping profile groups on MVA characteristics.

	Dysfunctional (n = 36)	Interpersonally Distressed (n = 25)	Adaptive Coper (n = 24)	Effect size	p
Fear (0-100)	79.7 (34.65)	82.8 (26.84)	68.3 (35.31)	.03	n.s.
Helplessness (0-100)	90.4 (20.51)	82.3 (26.05)	85.4 (23.72)	.02	n.s.
Danger (0-100)	77.2 (35.81)	81.6 (28.83)	64.2 (39.19)	.04	n.s.
Perceived control during MVA (0-100)	10.0 (23.62)	18.6 (36.86)	19.6 (33.68)	.02	n.s.
Certainty would die (0-100)	44.2 (46.25)	44.5 (44.57)	34.0 (39.70)	.01	n.s.
Litigation (% yes)	28 (78%)	18 (72%)	22 (92%)	.07	n.s.