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# Somatic focus/awareness: Relationship to negative affect and pain in chronic pain patients

**Erin M. O'Brien, M.S.**[1], **James W. Atchison, D.O.**[2], **Henry A. Gremillion, DDS**[3], **Lori B. Waxenberg, Ph.D.**[4], and **Michael E. Robinson, Ph.D.**[5]

[1] University of Florida, Department of Clinical and Health Psychology

[2] Professor, UF College of Medicine -- Orthopaedics

[3] UF College of Dentistry -- Hospital Dental Service

[4] Associate Professor, University of Florida, Department of Clinical and Health Psychology

[5] Professor, University of Florida, Department of Clinical and Health Psychology

## Abstract

Somatic focus refers to the tendency to notice and report physical symptoms, and has been investigated in relation to chronically painful conditions. This study investigated the relationship between somatic focus, as measured by the Pennebaker Inventory of Limbic Languidness (PILL), negative affect and pain. A secondary purpose of the present study was to examine sex differences in these relationships. Participants included 280 chronic pain patients (69.6% females, 88.9% Caucasian), who completed a battery of self-report measures on somatic focus, pain, negative affect, coping, and dysfunction. Results for the overall sample revealed that the PILL shares considerable variance with measures of negative affect, particularly with the physiological components of anxiety and depression. When the results were analyzed separately for male and female patients, it was found that several components of negative affect and cognitive factors play a stronger role in predicting somatic focus among men compared to women. Additional analyses then examined whether somatic focus was predictive of male and female patients' pain reports. Results indicated that somatic focus explained a small, but unique amount of variance in female patients' pain reports, which differed from the relationship observed among male patients.

### Keywords

somatic focus; chronic pain; sex differences; negative affect; Pennebaker Inventory of Limbic Languidness (PILL)

## Introduction

Somatic focus is the tendency to attend to and report somatic symptoms which are not correlated with objective measures of health status (Watson and Pennebaker 1989). Somatically focused chronic pain patients often report elevated levels of nonspecific physical symptoms,

Corresponding author: Michael E. Robinson, Ph.D., University of Florida, Department of Clinical and Health Psychology, Box 100165, Gainesville, FL 32610-0165, Phone: (352) 273-6153, Fax: (352) 273-6156, E-mail: merobin@ufl.edu.

corresponding to reported increases in pain severity and negative emotions (Von Korff et al. 1988; McCracken et al. 1998), disability (e.g., (Millard et al. 1991; Carosella et al. 1994; Ciccone et al. 1996; McCracken et al. 1998), and health care use (Barsky et al. 1986; Ciccone et al. 1996). The increased symptomatology of somatically focused individuals may influence decisions regarding diagnosis and treatment, as well as providers' assumptions about their symptoms, making high levels of somatic focus an important target for intervention. Furthermore, although there may be some overlap with constructs such as pain-related anxiety and catastrophizing, somatic focus provides unique information regarding patients' tendencies to focus on physical sensations, which can aid in providers' communication, as well as guide and refine intervention efforts.

While a relationship between somatic focus and clinical pain report has been demonstrated (Geisser et al. 1993; Riley et al. 1998a; Campbell et al. 2000; Heuts et al. 2004), the relationship between somatic focus and response to experimental pain has been less consistent (Dunphy et al. 2003; Geisser et al. 2003). It is possible that another factor, such as negative mood, may influence the relationship between somatic focus and pain in clinical settings but has less of an impact in experimental pain paradigms. Research has also demonstrated relationships between somatic focus, negative mood, and other psychological variables (Geisser et al. 1993; McCracken et al. 1998; Riley et al. 1998a; Geers et al. 2006). Additionally, studies examining the influence of sex differences on somatization, where "somatization" was defined as attention to physical symptoms and/or distress related to the awareness of these symptoms, have yielded conflicting results (Hyyppa et al. 1985; Wilson et al. 1994; Wool and Barsky 1994; Chang and Heitkemper 2002). While, these studies used the term "somatization" rather than "somatic focus," the construct under study is consistent with somatic focus, suggesting the importance of considering the relevance of these findings to the present study. Therefore, the present investigation will examine sex differences in the relationships among somatic focus, negative affect, and pain to attempt to clarify these findings.

Understanding somatic focus may be important for understanding mechanisms underlying chronic pain conditions, and facilitating successful treatment planning. Research on somatically focused chronic pain patients is needed to determine whether there are shared pathophysiological mechanisms or emotional factors involved in this relationship. The present study first examined the construct of somatic focus, particularly whether it is predicted by physiological measures of negative affect. Further examination focused on whether patients' somatic focus scores were predictive of measures of pain, after accounting for measures of negative affect. A secondary purpose of the present study was to examine the impact of sex differences on these relationships.

## Materials and Methods

### Participants and Procedures

Participants in this study included 280 chronic pain patients from one of several tertiary care clinics at a major Academic Health Science Center (the University of Florida). Fifty-seven (20.4%) patients were in the chronic analgesic management program (CAMP) located in the Spine Care Center; 96 (34.3%) patients were seen in the Facial Pain Center; 89 (31.7%) patients were general pain patients, which included patients who were seen in the Psychology Clinic (self-referred or referred from a primary care physician), as well as patients seen in the Fibromyalgia Clinic and the Anesthesia Pain Management program. The pain treatment site was not specified for 38 (13.6%) patients.

There were 82 males (29.3%) and 195 females (69.6%) in the sample, with the sex of 3 patients not indicated. The sample consisted of 249 (88.9%) Caucasian patients, 19 (6.8%) African-American patients, 1 (0.4%) Asian patient, 3 (1.1%) Hispanic patients, and the ethnicity of 8

patients was not indicated. One hundred sixty-two (57.9%) of the participants were married, 60 (21.4%) were single, 41 (14.6%) were divorced, 8 participants (2.9%) reported being widowed, 6 (2.1%) participants reported being separated, and 3 (1.1%) participants did not indicate their marital status. Regarding patients' employment status, 67 (23.9%) participants were employed full-time, 19 (6.8%) were employed half-time, 153 (54.6%) were not employed, and 41 (14.6%) did not indicate their employment status. Participants' mean years of education was 13.67 years (range = 6 to 20 years) in this sample. The mean duration of participants' pain condition was 96.93 months (median = 36 months) in this sample.

All participants completed a psychological assessment, as well as a number of self-report measures regarding their pain, somatic focus, mood, coping, and level of functioning, during the course of their routine clinical evaluation. Previous studies have found relationships between somatization and pain (e.g., (Wilson et al. 1994; Dunphy et al. 2003); depression (e.g., (Geisser et al. 1993); and functioning and disability (e.g., (Riley et al. 1998a). In addition, Alaranta and colleagues (1983) and Hyyppa and colleagues (1985) concluded that differences in coping styles are also likely to play a role in the sex differences found in somatization (Alaranta et al. 1983; Hyyppa et al. 1985). Thus, these variables were considered to be important ones to include in the present investigation of somatic focus. Participants were evaluated at one of several sites at the University of Florida, including the Psychology Clinic (located within a large tertiary care hospital), the Facial Pain Clinic, the Spine Care Center, and the Fibromyalgia Clinic. The self-report measures used in this study are all reliable and well-validated instruments that are commonly used with chronic pain populations and are described in more detail below.

## Measures

**Pain—**Participants completed the McGill Pain Questionnaire (MPQ; (Melzack 1975), which is a self-report questionnaire that provides an overall total pain score, as well as assessing the sensory, affective, and evaluative dimensions of the pain experience. It is valid and reliable (e.g., (Turk et al. 1985; Love et al. 1989; Pearce and Morley 1989; Lowe et al. 1991), and has a long history of use in pain research (Melzack and Katz 1992). Participants also completed a numerical rating scale (NRS) for average pain intensity as a measure of their level of pain. On the pain intensity numerical rating scale (NRS), the anchor points were 0 (i.e., no pain sensation) and 10 (i.e., most intense pain sensation imaginable). Numerical Rating Scales (NRS) of pain have been demonstrated to be valid measures of pain intensity, that are able to be used with a great variety of patients, and are sensitive to treatment effects (e.g., (Kremer et al. 1981; Jensen et al. 1986; Jensen et al. 1989; Paice and Cohen 1997).

**Somatic Focus—**The Pennebaker Inventory of Limbic Languidness (PILL; (Pennebaker 1982) measured somatic focus in this study. This measure allows individuals to rate how frequently they have experienced each of 54 common symptoms (such as racing heart, upset stomach, coughing, stiff joints, and nausea) over an unspecified time period in the past using a five-point Likert scale, ranging from "have never or almost never experienced" to "more than once a week". The PILL contains a range of physical symptoms, including some items that are pain-related (e.g., headache, back pains, sore muscles). As a measure of somatic focus, the PILL assesses a general tendency to experience and report symptoms instead of a person's specific symptom experience (Gijsbers van Wijk et al. 1996). Therefore, the PILL is conceptualized as a trait-like symptom scale that evaluates a general propensity to report physical symptoms (Pennebaker 1982). Research has demonstrated that the PILL has high internal consistency (Gijsbers van Wijk et al. 1996), sufficient test-retest reliability ($r = 0.83$) and was shown to correlate moderately with similar symptom scales (Pennebaker 1982).

**Mood and Coping—**Participants also completed several measures of negative affect in this study, including the Beck Depression Inventory (BDI; (Beck et al. 1961), the Pain Anxiety Symptom Scale (PASS; (McCracken et al. 1992), and the State-Trait Anger Expression Inventory (STAXI; (Spielberger 1988). In addition, participants completed the Coping Strategies Questionnaire (CSQ-R; (Riley and Robinson 1997), which a self-report instrument measuring pain coping strategies, and the catastrophizing subscale from this measure was used in this study.

The BDI is a self-report measure of depression that assesses the degree to which individuals currently exhibit or experience each of 21 cognitive, affective, or neurovegetative symptoms of depression. This measure has been shown to have acceptable internal consistency when used with both psychiatric and nonpsychiatric populations (Beck et al. 1988), and it is a well-validated instrument (Beck and Bearnesderfer 1974) that is frequently used in experimental pain research (e.g., (Myers et al. 2003).

The Pain Anxiety Symptoms Scale (PASS; (McCracken et al. 1992) is a self-report questionnaire, consisting of 40 items that assess four dimensions of pain-related anxiety including cognitive anxiety, escape/avoidance, fearful appraisal, and physiological anxiety (McCracken et al. 1992). Previous studies (e.g., (McCracken and Dhingra 2002; Roelofs et al. 2004) have demonstrated that the PASS is psychometrically sound with Cronbach's alpha coefficients of 0.94 in samples of chronic pain patients (fibromyalgia, low back pain).

The State-Trait Anger Expression Inventory (STAXI; (Spielberger 1988) is used to assess both state anger symptoms and more general trait-like or constitutional anger symptoms. The factor structure of the STAXI has been supported in various populations (Forgays et al. 1997; Forgays et al. 1998), and this instrument has been shown to have acceptable reliability and validity (Kramer and Conoley 1992).

The Coping Strategies Questionnaire – Revised (CSQ-R; (Riley and Robinson 1997) is a reformulation of the original CSQ (Rosenstiel and Keefe 1983), a rationally constructed instrument designed to assess cognitive and behavioral pain coping strategies. The sound psychometric properties of this measure have been demonstrated in previous studies (Riley and Robinson 1997; Robinson et al. 1997; Hastie et al. 2004). The catastrophizing subscale of the CSQ-R was used in the present investigation, as this has been shown to be related to both pain and negative outcomes in numerous investigations (Wilkie and Keefe 1991; Geisser et al. 1994; Lester et al. 1996; Martin et al. 1996; Robinson et al. 1997; Sullivan et al. 2001; Turner et al. 2002).

## Statistical analyses

The primary aim of this study was to examine the relationship of somatic focus to measures of negative affect and pain, as a means of gaining a better understanding of the construct of somatic focus. Somatic focus is conceptualized as a heightened attention to a variety of non-specific physical symptoms. This variable has also been found to correlate with measures of negative affect (e.g., depression and anxiety), which often include a somatic or physiological component. A hierarchical regression analysis was conducted to examine the predictive ability of several variables on patients' total scores on the Pennebaker Inventory of Limbic Languidness (PILL). A two-step regression model was employed, entering patients' scores on the somatic scale of the BDI and the physiological anxiety subscale of the PASS in the first step. Since the PILL is conceptualized to be a measure of somatic focus, there was an a priori hypothesis that the somatic subscale of the BDI, which measures somatic symptoms of depression (e.g., loss of energy), and the physiological subscale of the PASS, which measures physiological symptoms of anxiety (e.g., racing heart), would each have a strong relationship with PILL total scores. In the second step of the equation, patients' scores on the cognitive

scale of the BDI, the escape/avoidance, fearful appraisal, and cognitive anxiety subscales of the PASS, the state and trait subscales of the STAXI, the catastrophizing subscale of the CSQ-R, and the total score of the MPQ were entered to determine whether additional measures of negative emotions or pain contributed any additional information to the prediction of somatic focus scores.

As relationships have been found between pain reports and both somatic focus and negative mood, another hierarchical regression analysis was conducted to examine whether total scores on the Pennebaker Inventory of Limbic Languidness (PILL) were predictive of patients' pain scores, after accounting for measures of negative affect. A two-step regression model was employed, entering patients' scores on the negative affect measures (somatic scale and cognitive scale of the BDI; physiological anxiety, escape/avoidance, fearful appraisal, and cognitive anxiety subscales of the PASS; the state and trait subscales of the STAXI; and the catastrophizing subscale of the CSQ-R) in the first step. In the second step of the equation, patients' total score on the PILL were entered to determine whether this measure explained any additional variance in pain scores. One analysis was conducted with patients' MPQ total scores as the dependent variable, and a separate analysis was conducted with patients' average pain ratings as the dependent variable.

Once the relationships between somatic focus, pain, and negative affect had been explored, the secondary aim of this study was to examine whether sex differences exerted any impact on these relationships. The role of sex differences on somatic focus is unclear, due to the conflicting findings of previous studies. Therefore, the present study aims to further address this question by examining the hypothesized relationships between somatic focus, negative mood, and pain in a diverse sample of male and female chronic pain patients.

## Results

Descriptive statistics were conducted to examine potential differences across patients from the different pain sites [CAMP program (CAMP), Facial Pain (FP), General Pain (GP), and unspecified (US)]. One-way ANOVAs, with post-hoc Tukey tests examined differences across groups on the continuous measures (both demographic variables and variables involved in the regression analyses), and chi-square analyses examined differences across groups on categorical variables. Few significant results differentiating one group from the rest of the sample emerged overall. The one-way ANOVAs revealed significant differences across groups for the following variables: Age (CAMP>GP,US); Years of Education (FP>GP,US,CAMP), MPQ total scores (GP>FP), BDI somatic subscale scores (GP>FP,US), and BDI cognitive subscale scores (GP>FP). The chi-square analyses revealed significant differences across groups for: sex ($\chi^2(3) = 42.73$, $p<.001$), race ($\chi^2(9) = 18.98$, $p<.05$), and marital status ($\chi^2(12) = 37.59$, $p<.001$). Table 1 provides the results of these descriptive analyses.

For the hierarchical regression analysis predicting PILL scores, the first step of the equation (consisting of the physiological anxiety subscale scores from the PASS and the somatic subscale scores from the BDI) explained 40.0% of the variance in PILL total scores ($R^2=0.40$, $F(2,277)= 92.20$, $p<.001$). Subsequent addition of the other variables mentioned above, increased the predictive power of the regression equation to 45.6% of patients' PILL total score ($R^2=0.46$, $F(8,269)=3.47$, $p<.01$). Further analysis revealed that the significant predictors of PILL total scores in this equation were: physiological anxiety subscale scores from the PASS, somatic subscale scores from the BDI, and fearful appraisal subscale scores from the PASS. These results are provided in Table 2.

In addition, a follow-up analysis examined the correlations between PILL total scores and patients' pain ratings. Results revealed significant positive correlations between patients' PILL

total score and their MPQ total score ($r = 0.32$, $p<.001$) in the overall sample, as well as between patients' average and current pain ratings ($r = 0.23$, $p<.001$), and between current pain ratings and MPQ total scores ($r = 0.16$, $p<.01$). Additionally, when analyzed separately, MPQ total scores continued to demonstrate a significant correlation with PILL total scores for both men and women in this sample ($r = 0.28$, $p<.05$ for men; $r = 0.36$, $p<.001$ for women), average and current pain ratings were significantly correlated for men only ($r = 0.68$, $p<.001$), and current pain ratings and MPQ total scores were correlated for women only ($r = 0.15$, $p<.05$).

For the hierarchical regression analysis predicting MPQ total scores, the first step of the equation (consisting of the negative affect measures) explained 24.7% of the variance in MPQ total scores ($R^2$=0.25, $F$(9,270)=9.85, $p<.001$). Subsequent addition of PILL total scores to the equation increased the predictive power of the regression equation to 25.4% of patients' MPQ total score, although this was not a significant increase ($R^2$=0.25, $F$(1,269)=2.58, $p$=*ns*). Further analysis revealed that the significant predictors of MPQ total scores in this equation were: somatic subscale scores from the BDI, and state anger subscale scores from the STAXI. Cognitive anxiety subscale scores from the PASS were also marginally significant in this analysis. Table 3 provides information regarding the overall regression equations, as well as the predictors of MPQ total scores in this equation.

For the hierarchical regression analysis predicting ratings of average pain, the first step of the equation (consisting of the negative affect measures) explained 5.0% of the variance in average pain ratings ($R^2$=0.05, $F$(9,272)=1.60, $p$=*ns*). Subsequent addition of PILL total scores to the equation increased the predictive power of the regression equation to 5.1% of patients' MPQ total score ($R^2$=0.05, $F$(1,271)=0.16, $p$=*ns*). Further analysis revealed that the significant predictors of average pain ratings in this equation were: somatic subscale scores from the BDI, and cognitive subscale scores from the BDI. Fearful appraisal subscale scores from the PASS were also marginally significant in this analysis. Table 3 provides information regarding the overall regression equations, as well as the predictors of average pain ratings in this equation.
Results by Sex

The 2-step hierarchical regression analyses described above were subsequently conducted separately for males and females to examine the predictive ability of the variables discussed above on patients' total PILL scores. For women, the first step of the equation (consisting of the physiological anxiety subscale scores from the PASS and the somatic subscale scores from the BDI) explained 44.1% of the variance in PILL total scores ($R^2$=0.44, $F$(2,192)=75.71, $p<.001$). Subsequent addition of the other variables mentioned above, increased the predictive power of the regression equation to 50.2% of patients' PILL total score ($R^2$=0.50, $F$(8,184) =2.84, $p<.01$). Further analysis revealed that the significant predictors of PILL total scores in this equation were: physiological anxiety subscale scores from the PASS, somatic subscale scores from the BDI, and MPQ total score.

For men, the first step of the equation (consisting of the physiological anxiety subscale scores from the PASS and the somatic subscale scores from the BDI) explained 39.0% of the variance in PILL total scores ($R^2$=0.39, $F$(2,79)=25.30, $p<.001$). Subsequent addition of the other variables mentioned above, increased the predictive power of the regression equation to 57.9% of patients' PILL total score ($R^2$=0.58, $F$(8,71)=3.97, $p<.01$). The results of the regression equations for both male and female participants are provided in Table 4. Further analysis revealed that the significant predictors of PILL total scores in this equation were: physiological anxiety and fearful appraisal subscale scores from the PASS, cognitive subscale scores from the BDI, and the catastrophizing subscale scores from the CSQ-R. Table 4 provides information regarding the predictors of PILL scores in this equation.

Subsequent analyses were conducted to examine whether there were any significant differences between men and women in the semi-partial correlations (which removes the variance accounted for by the other predictor variables) between PILL total scores and each of the variables mentioned above. Results revealed that the relationship between somatic focus and catastrophizing was stronger for men than women ($z = -2.02$, $p<.05$). Additionally, sex differences in the semi-partial correlations between PILL total scores and BDI cognitive subscale scores ($z = -1.75$, $p<.10$) were also marginally significant (stronger for men), although they did not reach the level of statistical significance ($p<.05$) set in this study.

The 2-step hierarchical regression analyses described above were subsequently conducted separately for males and females to examine the predictive ability of the variables discussed above on patients' total MPQ scores. For women, the first step of the equation (consisting of the negative affect measures) explained 25.9% of the variance in MPQ total scores ($R^2=0.26$, $F(9,185)=7.20$, $p<.001$). Subsequent addition of the PILL to the negative affect measures increased the predictive power of the regression equation to 28.4% of patients' MPQ total score ($R^2=0.28$, $F(1,184)=6.42$, $p<.05$). Further analysis revealed that the significant predictors of MPQ total scores in this equation were: escape/avoidance subscale scores from the PASS, and PILL total scores. In addition, the state anger subscale scores from the STAXI were marginally significant.

For men, the first step of the equation (consisting of the negative affect measures) explained 26.9% of the variance in MPQ total scores ($R^2=0.27$, $F(9,72)=2.95$, $p<.01$). Subsequent addition of the PILL to the negative affect measures did not significantly increase the predictive power of the regression equation ($R^2=0.27$, $F(1,71)=0.05$, $p=ns$). The results of the regression equations predicting MPQ total scores for both male and female participants are provided in Table 5, along with information regarding the predictors of MPQ scores for males and females in this equation.

As described above, the 2-step hierarchical regression analysis for average pain ratings was not significant. Therefore, the results of individual analyses for males and females will not be presented. However, results of these analyses can also be found in Tables 5.

## Discussion

The results of these analyses suggest that the PILL shares considerable variance with measures of negative affect. Somatic focus scores were most strongly predicted by measures of the physiological components of depression and anxiety; however, the predictive ability of the regression model was significantly improved by the addition of other measures of negative affect. Of note, no significant differences in somatic focus were found across groups drawn fromthe different pain clinic sites, suggesting that the results are likely applicable to the broader chronic pain population. Consistent with the findings of McCracken and colleagues (1998), the physiological component of pain-related anxiety was the most robust predictor of somatic focus in this study. The strong prediction of somatic focus by the physiological components of negative affect measures suggests that somatic focus may reflect a hypervigilant response style. Significant predictors of somatic focus differed for male and female pain patients, suggests the existence of sex differences in the relationship between somatic focus and negative affect.

For female participants, the physiological measures of pain-related anxiety and depression, and the total score on the MPQ were significant predictors of somatic focus. This seems to suggest that somatic focus in women is most related to physiological symptoms of negative affect, and the subjective pain experience. Contrary to the finding among women, the physiological measure of depression was not a significant predictor of somatic focus for male

participants in the final equation. For male participants, the physiological anxiety subscale scores from the PASS, the fearful appraisal subscale scores from the PASS, the cognitive subscale scores from the BDI, and the catastrophizing subscale scores from the CSQ-R were significant predictors of the PILL total score.

These results suggest that, similar to the results found in women, somatic focus in men appears to be partially explained by the physiological components of negative affect, specifically anxiety. Examination of the semi-partial correlations between PILL total scores and the aforementioned variables in this study revealed that catastrophizing has a significantly stronger relationship to somatic focus for men, as compared to women. Additionally, the semi-partial correlations for the cognitive component of depression showed a marginally stronger relationship with somatic focus for men as well. Taken together, this suggests that, distinct from the findings in female pain patients, somatic focus in men appears to be more strongly related to the cognitive components of negative affect and a maladaptive coping style.

These results may reflect factors related to social desirability and/or normative behavior. Specifically, it is often considered more socially acceptable for females to express negative affect, such as depression or anxiety, than it is for males to do so (e.g., (Josephs 1994; Zeman and Garber 1996; Vingerhoets and Scheirs 2000). Thus, somatic focus in women is mostly reflective of the physiological components of these negative affective states. Somatic focus in men may serve as a more gender-appropriate means of expressing a range of negative affective states, and thus is more multiply determined by various components of negative affect, including cognitive factors.

The differences found in the prediction of somatic focus for men compared to women are consistent with research examining sex differences in pain, as well as the results of recent work in our lab. Sex differences in pain reporting, as well as threshold and tolerance levels to experimental pain, have been reported in the literature (Fillingim and Maixner 1995; Unruh 1996; Riley et al. 1998b). Conversely, studies of sex differences in clinical pain samples have found little or no differences between men and women (e.g., (Bush et al. 1993; Robinson et al. 1998), leading Robinson and colleagues (2000) to differentiate between "sex" and "gender" and to suggest that gender role expectations may be an important variable to consider when examining sex differences in pain for review see (O'Brien and Robinson 2004). Males may endeavor to remain consistent with masculine stereotypes by attempting to appear more tolerant to pain. Several studies have supported the idea that there are gender stereotypes regarding pain sensitivity, willingness to report pain, and pain endurance for both oneself and in the observation of others (Robinson et al. 2001; Wise et al. 2002; Robinson and Wise 2003).

The relationship between pain and negative affect has been well studied, and differences have also been demonstrated in the relationship between pain and negative mood in men compared to women. For instance, Robinson and colleagues (2004) reported that anxiety and gender role stereotypes predicted temporal summation of pain, and the inclusion of these variables in the regression model resulted in sex no longer being a significant predictor. Additionally, Riley and colleagues (2001) reported that female pain patients reported higher levels of pain intensity and unpleasantness compared to male pain patients, with frustration having the strongest relationship to pain intensity for women, while for men, anxiety and depression were the affective variables most highly related to pain intensity (Riley et al. 2001). Also, a stronger relationship between pain-related emotions and pain (specifically pain unpleasantness) was found for men, rather than women.

Further analyses examined the relationship between patients' somatic focus scores and measures of patients' pain in the present study. Significant positive correlations were found between patients' somatic focus scores and MPQ total scores; however, the moderate size of

these correlations indicate that the pain experience alone does not fully explain the extent of somatic focus reported by an individual. Regression analyses examining whether somatic focus contributed any predictive ability for MPQ total scores, after accounting for measures of negative affect, revealed that the PILL explained additional variance in pain reports for female participants only. This is broadly consistent with an interpretation of a differential role for somatic focus in the pain experience of men and women. However, it should be noted that somatic focus only explained an additional 2.5% of the variance in pain scores after accounting for negative affect measures, and thus should be interpreted with caution. This relationship did not emerge for men. One possible reason for this could be that somatic focus may serve as a proxy for negative affect in male chronic pain patients, and as such does not contribute unique information above that provided by other measures of negative affect.

While associations between somatic focus and negative affect have been demonstrated, it is important to also highlight the unique contribution of somatic focus to the chronic pain experience. Patients with high levels of somatic focus are also more likely to experience negative affective states via physical symptoms, but it may be premature to consider somatic focus as being nothing more than negative affect. Patients' ability to "tune-in" to their bodies and focus on their physical symptoms may be useful in certain treatments, such as biofeedback techniques. Furthermore, knowledge about patients' levels of somatic focus may also aid in providers' interpretations of symptom reports, and assist providers in conceptualizing and treating what is a complex population. Along these lines, more effective implementation of treatment efforts can be aided by assessment of patients' somatic focus. For example, educating patients about the mind-body connection may prepare patients to better manage both negative mood and pain, and may also facilitate patient participation in non-pharmacological treatments for their pain conditions.

### Limitations

The sample in this study was comprised of different types of pain patients, reporting a wide range of duration for their pain conditions and also represented a variety of diagnoses. There were also a larger number of female patients in this study than male patients, and only a small proportion of the patients identified themselves as belonging to a minority ethnic group. Furthermore, the data provided in this study relied on self-reports by clinical pain patients. As with all self-report measures, inaccuracies within the data are possible, especially to the extent that social desirability, response biases, or other social and emotional factors influence patients' responses.

## Conclusions

The results of this study demonstrated significant relationships among somatic focus, negative affect, and the pain experience of chronic pain patients. Additionally, it appears that sex differences play a role in these relationships. Future research should attempt to delineate whether these sex differences in the relationships among somatic focus, pain, and negative affect have implications for the treatment of male and female chronic pain patients. The construct of somatic focus could also be examined across different chronic pain conditions, with an interesting question being whether patients with an identifiable physical pathology, such as a degenerative spinal condition or osteoarthritis, differ in their level of somatic focus compared to patients without an objective physical pathology, such as fibromyalgia. Additionally, in the case of those patients who are suffering from depression or an anxiety condition, examination of whether level of somatic focus changes after successful treatment of the mood condition would also be an area worthy of further investigation. As demonstrated by the current study, somatic focus is a valuable component of a multidimensional pain

assessment, however increased understanding of this construct is needed in light of its strong relationship to negative affective states in chronic pain patients.

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**Table 1**

One-Way Analyses of Variance (ANOVA) and Chi-Square Analyses Across Pain Clinic Sites for the Descriptive Characteristics of the Sample

| | df Between | df Within | SS Between | SS Within | MS Between | MS Within | F |
|---|---|---|---|---|---|---|---|
| *One-way ANOVAs* | | | | | | | |
| Regression Variables | | | | | | | |
| PASS cognitive | 3 | 276 | 61.89 | 36671.97 | 20.63 | 132.87 | .16 |
| PASS escape/avoidance | 3 | 276 | 657.99 | 24475.78 | 219.33 | 88.68 | 2.47 |
| PASS fearful appraisal | 3 | 276 | 94.429 | 26589.97 | 31.48 | 96.34 | .33 |
| PASS physiological | 3 | 276 | 680.43 | 34629.21 | 226.81 | 125.47 | 1.81 |
| MPQ total | 3 | 276 | 2450.51 | 63811.46 | 816.84 | 231.20 | 3.53[a] |
| STAXI state | 3 | 276 | 220.67 | 9907.73 | 73.56 | 35.90 | 2.05 |
| STAXI trait | 3 | 276 | 71.81 | 7727.39 | 23.94 | 28.00 | .86 |
| CSQ-R catastrophizing | 3 | 276 | 248.03 | 15067.44 | 82.68 | 54.59 | 1.51 |
| BDI somatic | 3 | 276 | 383.63 | 5789.17 | 127.88 | 20.98 | 6.10[c] |
| BDI cognitive | 3 | 276 | 437.02 | 12080.80 | 145.67 | 43.77 | 3.33[a] |
| PILL total score | 3 | 276 | 145.67 | 43.77 | 2780.51 | 1171.49 | 2.37 |
| Demographic Variables | | | | | | | |
| Age | 3 | 273 | 2737.80 | 54652.34 | 912.60 | 200.19 | 4.559[b] |
| Years of Education | 3 | 237 | 115.51 | 1439.93 | 38.50 | 6.08 | 6.337[c] |
| Pain Duration | 3 | 256 | 120731.12 | 3961075.63 | 40243.71 | 15472.95 | 2.601 |
| Average pain rating | 3 | 264 | 2898.53 | 164476.06 | 966.18 | 623.02 | 1.551 |
| | | | *df* | *N* | | $\chi^2$ | |
| Demographic Variables (Chi-square tests) | | | | | | | |
| Sex | | | 3 | 277 | | 42.73[c] | |
| Race | | | 9 | 272 | | 18.98[a] | |
| Marital Status | | | 12 | 277 | | 37.59[c] | |
| Employment Status | | | 6 | 239 | | 7.82 | |

[a] $p<.05$

[b] $p<.01$

[c] $p<.001$

**Table 2**

Hierarchical Regression Analysis for the Prediction of PILL Scores

| | R | $R^2$ | SE | $R^2$ change | F change | p |
|---|---|---|---|---|---|---|
| Step 1 | 0.63 | 0.40 | 26.81 | 0.40 | 92.20 | .000 |
| Step 2 | 0.68 | 0.46 | 25.90 | 0.06 | 3.47 | .001 |
| | | | *B* | *SE* | *β* | *Tolerance* |
| Step 1 | | | | | | |
| PASS physiological | | | 1.41 | 0.18 | 0.46[c] | 0.66 |
| BDI somatic | | | 1.79 | 0.42 | 0.24[c] | 0.66 |
| Step 2 | | | | | | |
| PASS physiological | | | 1.86 | 0.21 | 0.61[c] | 0.42 |
| BDI somatic | | | 1.76 | 0.55 | 0.24[b] | 0.36 |
| PASS fearful appraisal | | | −0.86 | 0.29 | −0.24[b] | 0.29 |
| BDI cognitive | | | 0.65 | 0.43 | 0.13 | 0.30 |
| STAXI state | | | −0.54 | 0.34 | −0.09 | 0.57 |
| STAXI trait | | | 0.53 | 0.36 | 0.08 | 0.67 |
| MPQ total | | | 0.19 | 0.12 | 0.08 | 0.75 |
| PASS cognitive | | | −0.24 | 0.27 | −0.08 | 0.25 |
| PASS escape/avoidance | | | −0.25 | 0.21 | −0.07 | 0.61 |
| CSQ-R catastrophizing | | | 0.17 | 0.37 | 0.04 | 0.32 |

*Note 1.* A Tolerance < .20 indicates potential multicollinearity; Since multiple subscales from the same measure were entered as predictors in the regression analyses, high intercorrelation among subscales from the same measure would be expected.

*Note 2.* When the regression analysis was performed using the sensory and affective subscales from the MPQ, in place of the MPQ total score, the same constellation of significant predictors resulted in the final equation.

[b] $p<.01$

[c] $p<.001$

**Table 3**

Predictors of Participants' Pain in the Overall Regression Equation

| | MPQ Total | | | | | | NRS usual pain | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** | | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** |
| Step 1 | 0.50 | 0.25 | 13.59 | 0.25 | 9.85 | .000 | Step 1 | 0.22 | 0.05 | 24.22 | 0.05 | 1.60 | .114 |
| Step 2 | 0.50 | 0.25 | 13.55 | 0.01 | 2.58 | .109 | Step 2 | 0.23 | 0.05 | 24.25 | 0.00 | 0.16 | .689 |
| *Variables* | | *B* | *SE* | *β* | *Tolerance* | | *Variables* | | **B** | *SE* | *β* | *Tolerance* | |
| Step 1 | | | | | | | Step 1 | | | | | | |
| BDI somatic | | 0.76 | 0.29 | 0.23[b] | 0.37 | | BDI somatic | | 1.15 | 0.51 | 0.22[a] | 0.37 | |
| PASS cognitive | | −0.28 | 0.14 | −0.21[d] | 0.25 | | BDI cognitive | | −0.79 | 0.40 | −0.21[d] | 0.31 | |
| STAXI state | | 0.36 | 0.18 | 0.14[a] | 0.58 | | PASS fearful appraisal | | −0.48 | 0.27 | −0.19[d] | 0.29 | |
| PASS physiological | | 0.16 | 0.11 | 0.12 | 0.42 | | STAXI state | | 0.43 | 0.33 | 0.10 | 0.60 | |
| BDI cognitive | | 0.24 | 0.22 | 0.11 | 0.30 | | PASS physiological | | 0.18 | 0.20 | 0.08 | 0.43 | |
| PASS fearful appraisal | | 0.16 | 0.15 | 0.10 | 0.29 | | PASS escape/avoidance | | 0.16 | 0.20 | 0.06 | 0.59 | |
| PASS escape/avoidance | | 0.15 | 0.11 | 0.10 | 0.62 | | STAXI trait | | 0.24 | 0.35 | 0.05 | 0.73 | |
| STAXI trait | | 0.21 | 0.19 | 0.07 | 0.68 | | PASS cognitive | | 0.10 | 0.25 | 0.05 | 0.26 | |
| CSQ-R catastrophizing | | −0.06 | 0.19 | −0.03 | 0.32 | | CSQ-R catastrophizing | | −0.03 | 0.35 | −0.01 | 0.32 | |
| Step 2 | | | | | | | Step 2 | | | | | | |
| BDI somatic | | 0.67 | 0.29 | 0.20[a] | 0.35 | | BDI somatic | | 1.11 | 0.52 | 0.21[a] | 0.36 | |
| PASS cognitive | | −0.26 | 0.14 | −0.20[d] | 0.25 | | BDI cognitive | | −0.81 | 0.41 | −0.21[a] | 0.31 | |
| STAXI state | | 0.38 | 0.18 | 0.15[a] | 0.57 | | PASS fearful appraisal | | −0.47 | 0.28 | −0.19[d] | 0.28 | |
| PASS physiological | | 0.06 | 0.13 | 0.05 | 0.33 | | STAXI state | | 0.45 | 0.33 | 0.11 | 0.59 | |
| BDI cognitive | | 0.21 | 0.22 | 0.09 | 0.29 | | PASS physiological | | 0.14 | 0.23 | 0.06 | 0.33 | |
| PASS fearful appraisal | | 0.20 | 0.16 | 0.13 | 0.28 | | PASS escape/avoidance | | 0.16 | 0.20 | 0.06 | 0.58 | |
| PASS escape/avoidance | | 0.17 | 0.11 | 0.10 | 0.62 | | STAXI trait | | 0.23 | 0.35 | 0.05 | 0.72 | |
| STAXI trait | | 0.18 | 0.19 | 0.06 | 0.67 | | PASS cognitive | | 0.10 | 0.25 | 0.05 | 0.26 | |
| CSQ-R catastrophizing | | −0.07 | 0.19 | −0.03 | 0.32 | | CSQ-R catastrophizing | | −0.03 | 0.35 | −0.01 | 0.32 | |
| PILL total | | 0.05 | 0.03 | 0.11 | 0.55 | | PILL total | | 0.02 | 0.06 | 0.03 | 0.58 | |

[a] $p<.05$

[b] $p<.01$

[d] $p<.10$

**Table 4**

Predictors of Participants' PILL scores in the Regression Equation Based on Sex (Females: N = 195; Males: N = 82)

| | Females | | | | | | Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** | | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** |
| Step 1 | 0.66 | 0.44 | 26.16 | 0.44 | 75.71 | .000 | Step 1 | 0.63 | 0.39 | 26.29 | 0.39 | 25.30 | .000 |
| Step 2 | 0.71 | 0.50 | 25.21 | 0.06 | 2.84 | .005 | Step 2 | 0.76 | 0.58 | 23.05 | 0.19 | 3.97 | .001 |
| *Variables* | | *B* | *SE* | *β* | *Tolerance* | | *Variables* | | *B* | *SE* | *β* | *Tolerance* | *z* |
| Step 1 | | | | | | | Step 1 | | | | | | |
| PASS physiological | | 1.60 | 0.21 | 0.52[c] | 0.62 | | PASS physiological | | 1.00 | 0.29 | 0.34[b] | 0.77 | 0.96 |
| BDI somatic | | 1.46 | 0.50 | 0.20[b] | 0.62 | | BDI somatic | | 2.86 | 0.74 | 0.39[c] | 0.77 | −1.45 |
| Step 2 | | | | | | | Step 2 | | | | | | |
| PASS physiological | | 2.05 | 0.25 | 0.67[c] | 0.40 | | PASS physiological | | 1.78 | 0.34 | 0.60[c] | 0.45 | 0.14 |
| BDI somatic | | 2.40 | 0.68 | 0.33[b] | 0.31 | | BDI somatic | | 1.70 | 0.87 | 0.23 | 0.43 | 0.25 |
| MPQ total | | 0.34 | 0.14 | 0.15[a] | 0.74 | | MPQ total | | −0.05 | 0.20 | 0.02 | 0.73 | 1.13 |
| PASS escape/avoidance | | −0.47 | 0.24 | 0.13 | 0.61 | | PASS escape/avoidance | | −0.16 | 0.39 | 0.04 | 0.55 | −0.53 |
| PASS fearful appraisal | | 0.44 | 0.34 | 0.12 | 0.29 | | PASS fearful appraisal | | −1.74 | 0.50 | 0.52[b] | 0.27 | 1.56 |
| STAXI state | | −0.44 | 0.39 | 0.08 | 0.54 | | STAXI state | | −1.24 | 0.66 | 0.19 | 0.59 | 0.64 |
| STAXI trait | | 0.39 | 0.41 | 0.06 | 0.65 | | STAXI trait | | 0.88 | 0.61 | 0.13 | 0.70 | −0.48 |
| CSQ-R catastrophizing | | −0.40 | 0.44 | 0.09 | 0.29 | | CSQ-R catastrophizing | | 1.77 | 0.62 | 0.37[b] | 0.35 | −2.02[a] |
| PASS cognitive | | 0.19 | 0.31 | −0.06 | 0.27 | | PASS cognitive | | −0.64 | 0.51 | 0.22 | 0.19 | 0.49 |
| BDI cognitive | | −0.17 | 0.52 | 0.03 | 0.27 | | BDI cognitive | | 1.91 | 0.69 | 0.38[b] | 0.33 | −1.75[d] |

*Note*. When the regression analysis was performed using the sensory and affective subscales from the MPQ, in place of the MPQ total score, the same constellation of significant predictors resulted in the final equation for both males and females.

[a] $p<.05$

[b] $p<.01$

[c] $p<.001$

[d] $p<.10$

**Table 5**

Predictors of Participants' Pain Scores in the Regression Equation Based on Sex (Females: N = 195; Males: N = 82)

| | Females | | | | | | Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** |
| Step 1 | 0.51 | 0.26 | 13.64 | 0.26 | 7.20 | .000 | 0.52 | 0.27 | 13.82 | 0.27 | 2.95 | .005 |
| Step 2 | 0.53 | 0.28 | 13.45 | 0.03 | 6.42 | .012 | 0.52 | 0.27 | 13.91 | 0.00 | 0.05 | .818 |

| *Variables* | *B* | *SE* | *β* | *Tolerance* | *Variables* | *B* | *SE* | *β* | *Tolerance* | *z* |
|---|---|---|---|---|---|---|---|---|---|---|
| *Dependent Variable:* | | | | | *Dependent Variable:* | | | | | |
| **MPQ Total** | | | | | **MPQ Total** | | | | | |
| Step 1 | | | | | Step 1 | | | | | |
| PASS escape/avoidance | 0.25 | 0.13 | 0.16[a] | 0.63 | PASS escape/avoidance | −0.08 | 0.23 | −0.05 | 0.55 | −1.21 |
| BDI cognitive | 0.35 | 0.28 | 0.15 | 0.27 | BDI cognitive | 0.32 | 0.41 | 0.14 | 0.33 | −0.02 |
| PASS cognitive | −0.20 | 0.17 | −0.15 | 0.27 | PASS cognitive | −0.44 | 0.30 | −0.34 | 0.20 | −0.55 |
| BDI somatic | 0.47 | 0.37 | 0.14 | 0.31 | BDI somatic | 0.91 | 0.51 | 0.27[d] | 0.45 | 0.75 |
| STAXI state | 0.31 | 0.21 | 0.13 | 0.54 | STAXI state | 0.68 | 0.39 | 0.22[d] | 0.61 | 0.60 |
| PASS fearful appraisal | 0.18 | 0.19 | 0.12 | 0.30 | PASS fearful appraisal | 0.01 | 0.30 | 0.01 | 0.27 | −0.44 |
| STAXI trait | 0.21 | 0.22 | 0.07 | 0.65 | STAXI trait | 0.25 | 0.36 | 0.08 | 0.71 | 0.07 |
| PASS physiological | 0.09 | 0.14 | 0.06 | 0.40 | PASS physiological | 0.29 | 0.20 | 0.22 | 0.46 | 0.82 |
| CSQ-R catastrophizing | −0.06 | 0.24 | −0.03 | 0.29 | CSQ-R catastrophizing | 0.04 | 0.37 | 0.02 | 0.35 | 0.20 |
| Step 2 | | | | | Step 2 | | | | | |
| PASS escape/avoidance | 0.29 | 0.13 | 0.18[a] | 0.62 | PASS escape/avoidance | −0.08 | 0.23 | −0.05 | 0.55 | −1.35 |
| BDI cognitive | 0.36 | 0.27 | 0.16 | 0.27 | BDI cognitive | 0.35 | 0.43 | 0.15 | 0.30 | 0.00 |
| PASS cognitive | −0.17 | 0.16 | −0.13 | 0.27 | PASS cognitive | −0.45 | 0.31 | −0.34 | 0.19 | −0.63 |
| BDI somatic | 0.22 | 0.38 | 0.07 | 0.29 | BDI somatic | 0.94 | 0.53 | 0.28[d] | 0.43 | 1.09 |
| STAXI state | 0.35 | 0.21 | 0.14[d] | 0.54 | STAXI state | 0.66 | 0.40 | 0.22 | 0.58 | 0.45 |
| PASS fearful appraisal | 0.22 | 0.18 | 0.14 | 0.29 | PASS fearful appraisal | −0.02 | 0.33 | −0.01 | 0.23 | −0.61 |
| STAXI trait | 0.17 | 0.22 | 0.06 | 0.65 | STAXI trait | 0.26 | 0.37 | 0.09 | 0.69 | 0.19 |
| PASS physiological | −0.12 | 0.16 | −0.09 | 0.29 | PASS physiological | 0.32 | 0.24 | 0.24 | 0.33 | 1.39 |

| | Females | | | | | | Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** | **R** | **$R^2$** | **SE** | **$R^2$ change** | **F change** | **p** |
| CSQ-R catastrophizing | −0.02 | 0.24 | −0.01 | | 0.29 | CSQ-R catastrophizing | 0.07 | 0.40 | 0.03 | 0.31 | 0.17 | |
| PILL total | 0.10 | 0.04 | 0.22[a] | | 0.52 | PILL total | −0.02 | 0.07 | −0.04 | 0.42 | −1.36 | |

| | Females | | | | | | Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | $R^2$ | SE | $R^2$ change | F change | p | R | $R^2$ | SE | $R^2$ change | F change | p |
| Step 1 | 0.24 | 0.06 | 26.23 | 0.06 | 1.23 | .282 | 0.30 | 0.09 | 19.81 | 0.09 | 0.84 | .584 |
| Step 2 | 0.25 | 0.06 | 26.24 | 0.00 | 0.88 | .351 | 0.31 | 0.10 | 19.89 | 0.01 | 0.38 | .539 |

| *Variables* | *B* | *SE* | *β* | *Tolerance* | *Variables* | *B* | *SE* | *β* | *Tolerance* | *z* |
|---|---|---|---|---|---|---|---|---|---|---|
| *Dependent Variable:* | | | | | *Dependent Variable:* | | | | | |
| **NRS usual pain** | | | | | **NRS usual pain** | | | | | |
| Step 1 | | | | | Step 1 | | | | | |
| PASS fearful appraisal | −0.73 | 0.36 | −0.27[a] | 0.29 | PASS fearful appraisal | −0.08 | 0.41 | −0.04 | 0.27 | 0.94 |
| BDI cognitive | −0.96 | 0.55 | −0.23[d] | 0.29 | BDI cognitive | −0.55 | 0.57 | −0.18 | 0.34 | 0.15 |
| BDI somatic | 0.92 | 0.72 | 0.16 | 0.32 | BDI somatic | 1.45 | 0.71 | 0.34[a] | 0.43 | 1.04 |
| STAXI state | 0.69 | 0.41 | 0.16[d] | 0.57 | STAXI state | −0.04 | 0.56 | −0.01 | 0.60 | −0.96 |
| PASS physiological | 0.23 | 0.27 | 0.10 | 0.40 | PASS physiological | 0.16 | 0.28 | 0.09 | 0.45 | 0.02 |
| PASS escape/avoidance | 0.17 | 0.25 | 0.06 | 0.60 | PASS escape/avoidance | 0.10 | 0.32 | 0.05 | 0.52 | −0.11 |
| STAXI trait | 0.30 | 0.46 | 0.06 | 0.72 | STAXI trait | 0.10 | 0.51 | 0.03 | 0.73 | −0.20 |
| PASS cognitive | 0.11 | 0.31 | 0.05 | 0.28 | PASS cognitive | 0.06 | 0.43 | 0.03 | 0.19 | −0.08 |
| CSQ-R catastrophizing | 0.11 | 0.46 | 0.03 | 0.30 | CSQ-R catastrophizing | −0.08 | 0.53 | −0.03 | 0.33 | −0.25 |
| Step 2 | | | | | Step 2 | | | | | |
| PASS fearful appraisal | −0.70 | 0.36 | −0.26[d] | 0.29 | PASS fearful appraisal | −0.15 | 0.43 | −0.08 | 0.26 | 0.76 |
| BDI cognitive | −0.98 | 0.55 | −0.24[d] | 0.29 | BDI cognitive | −0.46 | 0.59 | −0.15 | 0.32 | 0.32 |
| BDI somatic | 0.77 | 0.74 | 0.13 | 0.31 | BDI somatic | 1.55 | 0.73 | 0.36[a] | 0.41 | 1.25 |
| STAXI state | 0.71 | 0.41 | −0.16[d] | 0.57 | STAXI state | −0.12 | 0.58 | −0.03 | 0.56 | −1.11 |



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| Females | | | | | | Males | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R | $R^2$ | SE | $R^2$ change | F change | p | R | $R^2$ | SE | $R^2$ change | F change | p |
| PASS physiological | 0.08 | 0.31 | 0.03 | 0.29 | | PASS physiological | 0.25 | 0.32 | 0.14 | 0.36 | 0.53 |
| PASS escape/avoidance | 0.19 | 0.25 | 0.07 | 0.59 | | PASS escape/avoidance | 0.08 | 0.33 | 0.04 | 0.51 | −0.21 |
| STAXI trait | 0.29 | 0.46 | 0.05 | 0.72 | | STAXI trait | 0.16 | 0.52 | 0.04 | 0.70 | −0.08 |
| PASS cognitive | 0.13 | 0.31 | 0.05 | 0.28 | | PASS cognitive | 0.02 | 0.43 | 0.01 | 0.18 | −0.17 |
| CSQ-R catastrophizing | 0.15 | 0.46 | 0.04 | 0.30 | | CSQ-R catastrophizing | 0.02 | 0.56 | 0.01 | 0.31 | −0.14 |
| PILL total | 0.07 | 0.07 | 0.09 | 0.54 | | PILL total | −0.06 | 0.09 | −0.10 | 0.50 | −1.03 |

*Note*. When separate analyses were conducted with the MPQ sensory subscale scores and the MPQ affective subscale scores as the dependent variables, PILL total scores were found to be a significant predictor for only the MPQ sensory subscales scores in females. No differences from the analyses using MPQ total scores were noted among males.

[a] $p<.05$

[d] $p<.10$