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Pain Severity and Emotion Dysregulation Among Latinos in Primary Care: Relations to Mental Health

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Abstract

Although pain severity is often related to poorer mental health and one of the most common presenting complaints in primary care healthcare settings, there is little understanding of the pain experience in relation to anxiety/depressive symptoms and disorders among Latino populations in medical contexts. To address this gap, the current study explored an interactive model of pain severity and emotion dysregulation in relation to anxiety and depressive symptoms and psychopathology among 274 Latinos [86.9% female; M_{age} = 39.3 (*SD* = 11.2); 96.0% indicated Spanish as their first language] who attended a community-based primary healthcare clinic. Results indicated that there was a statistically signifcant interaction between pain severity and emotion dysregulation for suicidal and social anxiety symptoms, number of mood and anxiety disorders, as well as disability, such that more severe pain and greater levels of emotion dysregulation related to more severe mental health. Pain severity and emotion dysregulation were each indvidually significant predictors of depressive symptoms, but only pain severity was a significant predictor of anxious arousal symptoms. These novel findings suggest clinically significant interplay between pain severity and emotion dysregulation among Latinos in primary care. The results are discussed in relation to the need for screening and intervention tactics oriented towards pain severity and emotional dysregulation among Latinos in primary care for mental health problems.

Pain Severity and Emotion Dysregulation Among Latinos in Primary Care: Relations to Mental Health

Latinos are among the largest and most rapidly growing demographic in the United States (Passel & D'Vera Cohn, 2011; Pew Hispanic Center, 2012; U.S. Census Bureau, 2010). There are significant health disparities for mental health among Latinos in the United States (United States Department of Health and Human Services [USDHHS, 2001). For example, when compared with non-Latino Whites, Latinos are less apt to seek and utilize mental health services (Miranda & Green, 1999; Ojeda & McGuire, 2006). Of these mental health problems, anxiety and depressive symptoms and psychopathology are particularly prevalent among Latinos (Alegría et al., 2008; Grant et al., 2004; Vega et al., 1998). Although certain segments of the Latino population appear to be at greater risk for these mental health problems (e.g., United States-born persons of Mexican origin compared to immigrant Latinos), there is global public health need for better understanding anxiety/depressive symptoms and disorders among Latinos (USDHHS, 2001).

Primary care medical settings are the most common healthcare domain for Latinos to seek care. Due partially to such factors as stigma for seeking mental healthcare, primary care settings are an ideal point of contact for early intervention for Latino mental health (Vega & Lopez, 2001). Primary care facilities may also facilitate mental health literacy (e.g., Paulus, Wadsworth, & Hayes-Skelton, 2015) and provide an opportunity for early detection and prevention/treatment of mental disorders (National Research Council and Institute of Medicine [NRC/IOM], 2009). Numerous studies have shown the feasibility and initial efficacy of interventions delivered in primary care for depression (e.g., Ell et al., 2009; Miranda, Azocar, Organista, Dwyer, & Areane, 2003; Muñoz et al., 1995), and to a lesser extent, anxiety (e.g., Chavira et al., 2014) among Latinos. Such clinical investigations are highly promising, but there remains a striking lack of empirical information about risk factors for anxiety/depressive symptoms and psychopathology among Latinos in general and in primary care settings specifically (Chapa, 2004). To the extent that a better understanding of malleable risk candidates for anxiety/depression can be isolated among this population, the greater the ease of screening for high-risk segments of the Latino population in primary care and subsequent implementation of psychological services that can help offset the risk or burden of anxiety/depressive problems among this population (Doty & Ives, 2002).

The experience pain is one factor that is important to consider from a public health perspective in primary care settings, as it frequently occurs and co-occurs with anxiety and depression and medical problems more generally (Smith et al., 2014). Estimates from the general population suggest 'pain complaints' account for more than half of outpatient primary care visits (Kroenke, 2003). Primary care patients with pain are also significantly more apt to suffer from anxiety or depressive disorders (Means-Christensen, Roy-Byrne, Sherbourne, Craske, & Stein, 2008). In fact, pain severity is related to greater depressive (Bair et al., 2004) and anxiety symptom severity (Kroenke et al., 2013). Pain research among Latinos is limited (Green et al., 2003), although a number of studies have reported that increased pain severity and overall distress among Latinos compared to Caucasians (e.g., Gagnon, Matsuura, Smith, & Stanos, 2014). Among Latinos, pain severity is associated with greater anxiety and depressive symptoms (Garcia, 1984; Hernandez & Sachs-Ericsson, 2006) as well as disability (Edwards, Moric, Husfeldt, Buvanendran, & Ivankovich, 2005). Moreover, there is some empirical evidence that Latinos report more somatic symptoms associated with mental health problems relative to other cultural groups (e.g., Simon, VonKorff, Piccinelli, Fullerton, & Ormel, 1999). Yet, we are not aware of research that has explored pain

severity in relation to anxiety and depressive symptoms and psychopathology among Latinos in primary care.

Beyond pain severity, there has been an increasing recognition of the importance of understanding how one reacts to emotional distress in the expression of aversive internal states, including pain as well as anxiety/depressive symptoms and psychopathology (Tull & Aldao, n.d.). Emotion regulation reflects a multidimensional construct with maladaptive emotion regulation (emotion dysregulation) implicated as a transdiagnostic risk factor for anxiety and depressive disorders (Aldao & Nolen-Hoeksema, 2010). Although there are various definitions of emotion dysregulation, most converge on the idea that it reflects a set of abilities wherein one can observe, understand, evaluate, and differentiate one's emotions and subsequently access strategies to regulate them and to control behavioral responses (Tull & Aldao, n.d.). While there is highly limited work examining emotion dysregulation among Latinos, greater levels of emotion dysregulation are associated with anxiety and depressive symptoms among this population (Roberts & Burleson, 2013). There also is some empirical evidence that lesser levels of emotion dysregulation may buffer against effects of discrimination on mental health (Soto et al., 2012) and serve as a protective factor for stress more generally (Troy & Mauss, 2011). Despite these observations, studies have not yet been conducted that evaluate the explanatory role of emotion dysregulation in relation to anxiety and depressive symptoms and psychopathology among Latinos in primary care.

Work among the majority population suggests that emotion dysregulation also may impact the association between pain severity and the experience of negative moods (Dima, Gillanders, & Power, 2013) by amplifying the experience of pain (e.g., Kökönyei, Urbán, Reinhardt, Józan, & Demetrovics, 2014). Indeed, a large corpus of empirical work suggests the emotional impact of pain depends on emotion intensity, which can be mitigated through emotion regulation (Hamilton, Zautra, & Reich, 2007). In line with this perspective, adaptive emotion regulation strategies (e.g., acceptance) have been shown to increase tolerance for pain and reduce perceptions of pain intensity (Kohl, Rief, & Glombiewski, 2012), which in turn, may reduce the emotional consequences of pain, such as anxiety or depression (e.g., Maruta, Vatterott, & McHardy, 1989), as well as alter behavior when one is in contact with painful stimuli (Branstetter-Rost, Cushing, & Douleh, 2009; Vowles et al., 2007). As informed by the initial empirical observations, pain severity and emotion dysregulation may theoretically operate with one another to increase the probability of the greater expression of anxiety and depressive symptoms and psychopathology. From this theoretical framework, greater pain severity may be exacerbated by an individual's lack of emotional regulatory skills. Conversely, an individual's emotion regulatory processes may become more disrupted in the context of elevated pain severity. Therefore, these processes may theoretically function synergistically to confer greater risk for anxiety and depressive symptoms and psychopathology. From this perspective, a formative next research step is to further explore the potential interplay of current pain severity and emotion dysregulation as an integrative explanatory process for vulnerability for the expression of anxiety and depressive symptoms and disorders among Latinos in primary care.

Together, the aim of the current study was to examine the main and interactive effects of current pain severity and emotion dysregulation in relation to anxiety/depressive symptoms and psychopathology in addition to overall disability among Latinos in primary care. It was hypothesized that both pain severity and emotion dysregulation would be positively and uniquely related to the dependent variables. Moreover, it was expected that there would be an interaction between pain severity and emotion dysregulation over and above the main effects, such that greater pain severity

and emotion dysregulation would be associated anxiety/depressive symptoms, psychopathology, and overall disability.

Method

Participants

Individuals (n = 377) for this study were recruited from a primary care health facility located in an urban southwestern area. Potential participants were excluded if there was a history of psychosis (n = 10). Cases with missing or incomplete data on study measures or covariates (n = 88) were not included in the current analyses. Further, five multivariate outliers with high leverage were discovered and excluded from analyses, resulting in a total of 274 adults (M_{age} = 39.3, SD = 11.2; 86.6% female; 99.6% reported Spanish as first language) available for the current study.

In terms of education, 6.9% of participants reported less than 6 years of education, 45.6% 6-11 years, 28.5% 12 years (completion of high school), and 19.0% reported more than 12 years. Approximately half (51.1%) of participants were married, 16.1% were living with partner, 24.5% were single, 6.9% were divorced, and 1.5% were widowed. As for employment, 21.5% were employed full time (40 hours a week), 12.8% were employed part time (20 hours a week), 8.8% were employed less than 20 hours a week, 45.2% were unemployed, and 11.8% were looking for employment. The reasons for attendance to clinic were as follows: family medicine (11.3%), dental (28.8%), psychiatric/psychological (4.4%), and lab test, physical exam, or other reasons (45.5%).

As determined by the Mini International Neuropsychiatric Interview 6.0 (Lecrubier et al., 1997), 38.3% of the sample met criteria for current (past year) Axis I psychopathology. Among participants with current psychopathology, the average number of diagnoses per participant was 0.94 (SD = 1.1). The most common diagnoses were major depressive disorder (23.4%), post-traumatic stress disorder (5.8%), generalized anxiety disorder (5.5%), and agoraphobia (4.4%); see Table 1 for full diagnostic breakdown.

The inclusion criteria included: ability to read, write and communicate in Spanish and being between 18 to 64 years old. Participants were excluded if they exhibited limited mental competency and/or inability to provide informed, voluntary, written consent or if they endorsed current or past psychotic-spectrum symptoms via structured interview screening.

Measures

Validated, Spanish-language versions of all measures were employed in the present study.

Demographics Questionnaire. Demographic information collected included gender, age, race, educational level, marital status, and employment status.

M.I.N.I. International Neuropsychiatric Interview 6.0 (Lecrubier et al., 1997). Diagnostic assessments were performed using the MINI, which provides reliable DSM diagnoses within a short time frame which is applicable to research settings (Lecrubier et al., 1997). The MINI has demonstrated sound inter-rater and test-retest reliability and validity (D. V. Sheehan et al., 1997). The interviews were administered by trained, Spanish-speaking staff and supervised by an independent doctoral-level rater. Approximately 12% of randomly selected interviews were checked for accuracy; no cases of diagnostic coding disagreement were noted.

Graded Chronic Pain Scale (GCPS; Von Korff, Ormel, Keefe, & Dworkin, 1992). The GCPS has acceptable psychometric properties, providing a reliable and valid method of assessing global pain severity (Von Korff, 2001) and has previously been used among Spanish-speaking samples (e.g., Gonzalez, Miranda Rivera, & Espinosa, 2013). Items (e.g., “How would you classify your pain”) assess the severity of respondents’ pain on average during the past three months using separate 0–10

numerical rating scales. Total scores were calculated by summing, yielding a continuous composite score of characteristic pain severity. This measure demonstrated excellent internal consistency in the present sample (Cronbach α = .91).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report measure on which respondents indicate, on a 5-point Likert-style scale (1 = *almost never* to 5 = *almost always*), how often each item applies to them (Gratz & Roemer, 2004). The DERS is multidimensional in that it is comprised of 6 factors in addition to a total score. These factors include: (1) Non-acceptance of Emotional Responses, (2) Difficulties Engaging in Goal-Directed Behavior, (3) Impulse Control Difficulties, (4) Lack of Emotional Awareness, (5) Limited Access to Emotion Regulation Strategies, and (6) Lack of Emotional Clarity. The DERS has demonstrated high levels of internal inconsistency (α = .93; Gratz & Roemer, 2004) and adequate test-retest reliability over a 4-8 week period (ρ = .88; Gratz & Roemer, 2004). In the current investigation, the DERS total score was used to indicate a global composite index of emotion dysregulation (Gratz & Roemer, 2004). The DERS-total score demonstrated good internal consistency in the current sample (Cronbach's α = .89), which is consistent with other work utilizing the DERS among Spanish-speakers (Hervás & Jódar, 2008).

Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007). The IDAS is a 64-item self-report instrument that assesses distinct affect symptom dimensions within the past two weeks. The IDAS includes 10 specific symptom subscales for suicidality, lassitude, ill temper, well-being, insomnia, appetite loss, appetite gain, anxious arousal, social anxiety, and traumatic intrusions, and two broad subscales of general depression and dysphoria. Items are answered on a 5-point Likert scale ranging from "*not at all*" to "*extremely*." The IDAS subscales show strong internal consistency, convergent and discriminant validity with psychiatric diagnoses and self-report measures as well as short-term retest reliability with both community, and psychiatric patient samples (Watson et al., 2007, 2008). The present study used the anxious arousal subscale (8 items; e.g., ''I felt a pain in my chest ''), general depression subscale (20 items; e.g., ''I felt exhausted '' or "I did not have much of an appetite"), social anxiety subscale (5 items; e.g., '' I was worried about embarrassing myself socially"), and the suicidality subscale (6 items; e.g., ''I had thoughts of suicide"). As in past work among Spanish-speakers (Zvolensky, Bogiaizian, Salazar, Farris, & Bakhshaie, 2014) these subscales demonstrated good level of internal consistency among the present sample (Cronbach's α = .91, .94, .90, .79 for anxious arousal, depressive, social anxiety, and suicidal symptom subscales, respectively).

The Sheehan Disability Scale (SDS; D. V. Sheehan, 1983). SDS is a brief self-report measure that assesses overall functioning. The measure has been used in many contexts and extensively validated in past work (K. H. Sheehan & Sheehan, 2008). Participants rated on an 11-point Likert-type scale from 0 "*not at all*" to 10 "*extremely*" how much their emotional symptoms disrupted their lives in the past month with regard to work/school, social life, and family/home life. Consistent with established practice (K. H. Sheehan & Sheehan, 2008), the responses were averaged to form a single composite (overall functioning); as in past work among Spanish-speakers (Luciano et al., 2010), internal consistency of SDS items in the present sample was excellent (Cronbach's α = 0.92).

Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) . The PANAS is a self-report measure asking participants to rate the extent to which they experience each of 20 different feelings and emotions (e.g., interested, nervous) based on a Likert scale that ranges from 1 "*very slightly or not at all*" to 5 "*extremely*". The measure yields two factors (negative and positive affectivity) with strong documented psychometric properties (Watson et al., 1988). The PANAS has been employed

successfully among Spanish-speaking populations (Zvolensky et al., 2015). The negative affectivity subscale (PANAS-NA) was used in the present investigation (Cronbach's α = .89).

Procedure

Participants for the study attended a community-based primary care healthcare clinic. Individuals interested in participating provided informed written consent (in Spanish) and were given a diagnostic interview (see below) and completed self-report questionnaires. Participants were compensated with $20. The study protocol was approved by the Institutional Review Board.

Analytic Strategy

First, bi-variate correlations between study variables were evaluated to examine associations. Then, main and interactive effects of pain severity (GCPS) and emotion dysregulation (DERS) were examined among six outcome variables: depressive, suicidal, social anxiety, and anxious arousal symptoms (IDAS subscales), number of mood and anxiety disorders (via MINI), and overall disability as a result of symptoms (SDS). Hierarchical regression analyses were conducted with predictors centered at their respective means. Covariates of gender, age, number of years in the United States, educational attainment, marital status, and negative affectivity were entered in the first step. Pain severity and emotion dysregulation were entered concurrently in the second step with the interaction term entered in the final step. Post hoc simple slope analyses were conducted for significant interaction terms using values of +/-1 *SD* (high/low) from the mean of the moderator variable, emotion dysregulation. Finally, as recommended by Hayes (2013) the Johnson-Neyman technique (Aiken & West, 1991) was used to identify regions of significance among the moderator variable where the effect of the predictor (pain severity) on the criterion variables is statistically significant.

Results

Descriptive Statistics

List-wise deletion was used resulting in 274 cases for analysis. Zero order correlations are presented in Table 2. Pain severity had a statistically significant and positive association with emotion dysregulation (r = .38; p < .001) and all six dependent variables (*r's* ranged from .30 - .60; all *p's* < .001). Likewise, emotion dysregulation was significantly and positively associated with all dependent variables (*r's* from .35 - .61; all *p's* < .001).

Interactive Analyses

Depressive and suicidal symptoms. In predicting depressive symptoms, covariates entered in the first step accounted for a significant amount of variance (R^2 = .47, F (6, 267) = 38.65, p < .001; Table 3). Negative affectivity (β = .67, t = 14.76, p < .001) was the only significant covariate, demonstrating a positive association with depressive symptoms. There were significant main effects for both pain severity (β = .17, t = 3.73, p < .001) and emotion dysregulation (β = .33, t = 7.00, p < .001). In contrast to prediction, there was no significant interaction between pain severity and emotion dysregulation.

In terms of suicidal symptoms, covariates accounted for a significant amount of variance (R^2 = .21, F (6, 267) = 11.90, p < .001; Table 3); negative affectivity was the only significant variable (β = .44, t = 7.94, p < .001). There was a significant main effect for emotion dysregulation (β = .25, t = 3.92, p < .001), but not pain severity. As expected, there was a significant interaction of pain severity and emotion dysregulation (β = .73, t = 2.68, p = .008). Simple slope analyses revealed that pain severity was related to greater levels of suicidal symptoms among individuals with higher (β = .25, p = .009) versus lower (β = -.20, p = .160) levels of emotion dysregulation (see Figure 1). The Johnson–Neyman technique was employed in order to examine the specific regions (Aiken &

West, 1991) of emotion dysregulation scores where the conditional association of pain severity and suicidal symptoms was significant. Results indicated that pain severity was significantly and positively associated with suicidal symptoms (β = .12-.45, p < .05) for DERS-total scores of 84.67 or higher (22.99% of the sample; see Figure 2).

Social anxiety and anxious arousal symptoms. Regarding social anxiety symptoms, the covariates in the first step were significant as a set (R^2 = .32, F (6, 267) = 20.45, p < .001; Table 3), with negative affectivity (β = .55, t = 10.74, p < .001) as the only significant univariate predictor. There was a main effect of pain severity (β = .15, t = 2.70, p = .007), but not emotion dysregulation. As expected, there was a significant interaction of pain severity and emotion dysregulation (β = .21, t = 3.55, p < .001). Pain severity was related to greater levels of social anxiety among individuals with higher (β = .63, p < .001) versus lower (β = -.26, p = .280) levels of emotion dysregulation (Figure 1, top right). Examination of the Johnson-Neyman results indicated that pain severity was significantly and positively associated with social anxiety symptoms (β = .11-.54, p < .05) for DERS-total scores of 77.06 or higher (37.23% of the sample; Figure 2).

In predicting anxious arousal symptoms, education (β = -.14. t = -2.87, p = .004; Table 4) and negative affectivity (β = .59, t = 12.15, p < .001) were significant predictors. There was a main effect of pain severity (β = .24, t = 4.54, p < .001), but not emotion dysregulation. In contrast to prediction, there also was no significant interaction.

Depressive and anxiety disorders. For number of mood and anxiety disorders, the covariates accounted for significant variance (R^2 = .25, F (6, 267) = 14.83, p < .001; Table 4); negative affectivity was the only significant predictor (β = .49, t = 9.12, p < .001). As expected, there were significant main effects of pain severity (β = .19, t = 3.41, p < .001) and emotion dysregulation (β = .27, t = 4.60, p < .001) and their interaction (β = .16, t = 2.73, p = .007). Simple slope analysis indicated that pain severity was related to more mood and anxiety disorders among individuals with higher (β = .27, p < .001) versus lower (β < .01, p = .990) levels of emotion dysregulation (Figure 1). Pain severity was positively associated with number of mood and anxiety disorders (β = .12-.49, p < .05) for DERS-total scores of 71.24 or greater (48.18% of the sample; Figure 2).

Disability. For disability, the set of covariates at first step was significant (R^2 = .24, F (6, 267) = 14.25, p < .001; Table 4), with education (β = -.13. t = -2.34, p = .020) and negative affectivity (β = .48, t = 8.85, p < .001) as significant predictors. There were main effects for both pain severity (β = .44, t = 8.52, p < .001) and emotion dysregulation (β = .20, t = 2.78, p < .001). Also as hypothesized, there was a statistically significant interaction (β = .16, t = 2.96, p = .003). Pain severity predicted greater levels of disability among individuals with both higher (β = 1.53, p= .003) and lower (β = 3.08, p < .001) levels of emotion dysregulation according to simple slope analysis, but not at very low (DERS-total score of 44; β = 1.18, p = .052; Figure 1). Indeed, pain severity was positively associated with disability (β = .80-4.50, p < .05) for DERS-total scores of 44.69 or greater (97.08% of the sample; Figure 2) according to the Johnson-Neyman results.

Discussion

Generally consistent with prediction, the interaction between pain severity and emotion dysregulation was significantly related to suicidal and social anxiety symptoms as well as number of mood/anxiety disorders and overall disability in this primary care Latino sample. Given that 27-46% of variance was accounted for by covariates and main effects in the first two steps for these tests, the presence of a significant interaction improving the fit in these models' predictive power is clinically noteworthy (Abelson, 1985). Moreover, the form of the interactions followed the same expected pattern. Specifically, pain severity positively predicted suicidal and social anxiety symptoms as well as number of mood/anxiety disorders and overall disability at higher, but not lower, levels of emotion dysregulation (Figure 1). Thus, the overall pattern of findings was

consistent with the posited theoretical model suggesting that there may indeed be some clinically-relevant interplay between pain severity and emotion dysregulation in terms of an array of anxiety/depressive symptoms and disorders among Latinos in primary care. Specifically, lesser ability to adaptively regulate one's emotions may serve to exacerbate the relation between pain severity and certain anxiety/depressive symptoms and disorders.

Yet, contrary to expectation, there was no significant interaction for depressive or anxious arousal symptoms. For depressive symptoms, 60% of variance was accounted for by variables entered in the first two steps. Specifically, while negative affectivity was a significant predictor of each outcome, it accounted for more variance in depressive symptoms than the other criterion variables; a finding in line with past work demonstrating that depression exhibits a stronger relation to negative affectivity than other mood/anxiety disorders (Paulus, Talkovsky, Heggeness, & Norton, n.d.). Despite a statistically non-significant interaction, it is important to note that inspection of Johnson-Neyman results revealed a pattern of findings theoretically consistent with the other tested models, such that the association between pain severity and depressive symptoms was significant for DERS-total scores of 57.19 or greater, which applied to approximately 74% of the sample (see Figure 3). Yet, the lack of significant interaction for anxious arousal symptoms suggests that the interplay between pain severity and emotion dysregulation may not uniformly be applicable to all manifestations of mental health. It is possible that the closer interconnection between anxious arousal and pain severity (both predominately somatic in origin) may be a possible reason for the lack of a significant interaction. To further explore this issue, future work may benefit by examining the present pain severity and emotion dysregulation model with other somatic anxiety processes, such as panic attacks and ataque de nervios symptoms.

As for main effects of pain severity, results were largely in line with expectation, with significant main effects for all dependent variables with the exception of suicidal symptoms. Specifically, greater pain severity was associated with more severe depressive, social anxiety, and anxious arousal symptoms, more mood/anxiety disorders, and increased disability. These findings add to the limited work among Latinos linking pain severity with depressive and anxiety symptoms (Garcia, 1984; Hernandez & Sachs-Ericsson, 2006) and disability (Edwards et al., 2005) and uniquely extend such findings to include psychopathology among a primary care sample. Importantly, the effects of pain severity represent unique relations over and above demographic variables, negative affectivity, and emotion dysregulation. The lack of a main effect of pain severity in predicting suicide symptoms was unexpected, although a growing body of work suggests that individuals with suicidal ideation may have more tolerance for pain (Anestis, Bagge, Tull, & Joiner, 2011).

Findings for emotion dysregulation results generally converged with predictions, as emotion dysregulation demonstrated unique associations with all dependent variables except social anxiety and anxious arousal symptoms. Greater levels of emotion dysregulation were associated with more severe depressive and suicide symptoms, a higher number of mood/anxiety disorders, and greater disability; findings that are consistent with a wide body of work in emotion dysregulation (Aldao & Nolen-Hoeksema, 2010; Tull & Aldao, n.d.), including Latinos (Roberts & Burleson, 2013). A lack of findings for social anxiety and anxious arousal symptoms was surprising, given past work linking these symptoms to emotion dysregulation (Rusch, Westermann, & Lincoln, 2012; Tull & Roemer, 2007). It is possible that, among Latinos, emotion dysregulation has less of a direct impact on anxiety symptoms, or that the effect of pain severity (at the same level) minimized the variance to be accounted for by emotion dysregulation.

Although not the primary focus of the investigation, a number of other observed findings warrant comment. First, there was consistent evidence that negative affectivity was robustly related to each of the dependent measures. These findings are consistent with past work (Watson, 2000), and again, underscore the explanatory role of a tendency to experience negative affect states in models of anxiety/depressive vulnerability (Watson et al., 1995). Second, pain severity and emotion dysregulation were related, but distinct, constructs. Indeed, these two variables shared only approximately 14% of variance with one another. Such an observation lends further empirical support to the construct validity of emotion dysregulation and extends it to a Latino population.

There are a number of limitations that should be noted. First, due to the cross-sectional nature of the present research design, it is not possible to make definitive, causal statements concerning the relations between the studied variables. One important next step in this line of inquiry would be to use prospective research methodologies and evaluate the consistency of the present findings over time. Such investigations may be particularly promising in elucidating the underlying cognitive-affective vulnerability and protective models of anxiety/depression across development by delineating the course of pain severity, emotion dysregulation, and anxiety/depressive-related problems and vulnerability. Another approach would be to experimentally manipulate pain severity emotion dysregulation in the laboratory and test singular and interactive effects with emotion dysregulation in terms of anxious and depressive symptoms to theoretically relevant stressors (e.g., bodily sensations, discrimination, and economic stress). Second, the present Latino sample was largely female and seeking medical services for a wide range of issues. Future work could evaluate the generalizability of the present model to other sectors of the Latino community, including samples with a larger percentage of males and those persons not seeking medical services. Third, Latinos often employ an extreme and acquiescent response style relative to other groups (Davis, Resnicow, & Couper, 2011). Accordingly, there is the possibility that a response bias may have influenced in the present observations, although this issue should be minimized in the current study because the tests conducted were within group (rather between-group) in nature. Fourth, we employed a general measure of pain severity. Therefore, it is not clear whether similar relations would be evident among specific clinical pain populations (e.g., chronic pain). Future work would benefit by exploring the generalizability of the current results to specific Latino pain populations. Fifth, we collapsed across anxiety and depressive disorders to index the number of diagnoses due to the sample size (cf. analyzing data by disorder). Future work may benefit by testing whether the interactive model is particularly applicable to certain types of anxiety/depressive psychopathology. Finally, we focused our investigation on general manifestations of anxiety/depressive phenomenology. However, it is possible the same type of interactive model between pain intensity and emotion dysregulation is applicable to other more culturally-specific forms of distress or stress. Future work may benefit by exploring the interactive model in relation to these processes, such as acculturation anxiety or subjective social status.

Together, the present findings suggest intervention programs for anxiety/depressive symptoms and disorders among Latinos in primary care might benefit from screening for pain severity and emotion dysregulation. For example, targeting Latinos with higher levels of pain severity and emotion dysregulation in primary care settings may help isolate a high-risk segment of the Latino population for anxiety/depressive problems that may benefit from brief, psychosocial interventions that target reducing pain severity and emotion dysregulation through psychoeducation and skills training. In such work, there will likely be a need to further culturally-adapt

psychosocial intervention programs and explore their efficacy among Latinos in primary care.

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Table 1: Psychopathology among sample (*n* = 274)

Diagnosis	Number	Percentage
Major Depressive Disorder	53	23.4
Post-Traumatic Stress Disorder	16	5.8
Generalized Anxiety Disorder	15	5.5
Agoraphobia	12	4.4
Dysthymia	11	4.0
Substance Abuse/Dependence	10	3.6
Alcohol Abuse/Dependence	8	2.9
Social Anxiety Disorder	8	2.9
Obsessive-Compulsive Disorder	8	2.9
Panic Disorder	7	2.6
Bulimia Nervosa	4	1.5
Bipolar I or II Disorders	3	1.1
Anorexia Nervosa	1	0.4

Table 2: Means, standard deviations and bivariate correlations among variables (*n*=274)

Variable	*Mean/n (SD/%)*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Sex (% Female)	238 (86.9)	-												
2. Age	39.3 (11.2)	.04	-											
3. Years in US	18.6 (12.3)	-.02	.44**	-										
4. Education (% with 12 years plus)	130 (47.5)	-.03	-.06	.02	-									
5. Marital Status (% with partner)	184 (67.2)	.03	.02	-.06	-.07	-								
6. PANAS-NA	17.4 (5.6)	.02	-.01	-.04	.03	-.10	-							
7. DERS	72.2 (18.9)	-.02	-.03	-.06	-.10	-.12	.48**	-						
8. GCPS	17.8 (13.6)	.09	.08	.10	-.10	-.01	.39**	.38**	-					
9. IDAS-DEP	34.8 (11.8)	.04	.02	.03	-.06	-.15*	.67**	.61**	.48**	-				
10. IDAS-SUI	6.4 (1.5)	-.04	.02	.08	.05	-.13*	.44**	.41**	.30**	.56**	-			
11. IDAS-SOC	6.8 (2.7)	.05	-.01	.03	-.02	-.12*	.55**	.36**	.37**	.68**	.48**	-		
12. IDAS-ANX	11.2 (5.1)	.05	-.02	.01	-.11	-.15*	.60**	.35**	.45**	.71**	.42**	.62**	-	
13. Number of Dx	0.5 (1.1)	.05	.06	.03	-.01	-.10	.49**	.48**	.41**	.63**	.44**	.50**	.46**	-
14. SDS	3.5 (6.2)	.01	.01	.05	-.11	-.07	.47**	.48**	.60**	.61**	.41**	.47**	.48**	.43**

* p<.05, ** p<.01; *Note: PANAS-NA=Positive and Negative Affect Schedule, Negative Affect Subscale; DERS=Difficulties in Emotion Regulation Scale; GCPS=Graded Chronic Pain Scale; IDAS=Inventory for Depression and Anxiety Symptoms; DEP=Depressive; SUI=Suicidal; SOC=Social Anxiety; ANX=Anxious Arousal; SDS=Sheehan Disability Scale; Number of Dx=Number of Mood/Anxiety Disorders as per the Mini International Neuropsychiatric Inventory. Sex, age, years in the United States, education, marital status and PANAS-NA were covariates. Numbers across header correspond with variables numbered 1-14.*

Table 3: Main and Interactive Effects of Pain and Emotion Dysregulation in Predicting Depressive, Suicidal, and Social Anxiety Symptoms (*n*=274)

Depressive Symptoms (IDAS)				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	.03	0.72	.469	
Age	-.01	-0.03	.978	
Years in United States	.06	1.10	.271	
Education	-.08	-1.84	.067	
Marital Status	-.08	-1.78	.077	
Negative Affectivity (PANAS-NA)	.67***	14.76	<.001	.47***
Step 2				
Emotion Dysregulation (DERS)	.33***	7.00	<.001	
Pain (GCPS)	.17***	3.73	<.001	.13***
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	.04	0.75	.454	<.01
Suicidal Symptoms (IDAS)				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	-.04	-0.75	.452	
Age	-.02	-0.31	.759	
Years in United States	.10	1.69	.093	
Education	.02	0.45	.656	
Marital Status	-.08	-1.38	.169	
Negative Affectivity (PANAS-NA)	.44***	7.94	<.001	.21***
Step 2				
Emotion Dysregulation (DERS)	.25***	3.92	<.001	
Pain (GCPS)	.09	1.57	.117	.06***
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	.19**	3.06	.002	.03**
Social Anxiety Symptoms (IDAS)				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	.04	0.85	.398	
Age	-.05	-0.79	.432	
Years in United States	.07	1.30	.194	
Education	-.04	-0.83	.405	
Marital Status	-.06	-1.20	.230	
Negative Affectivity (PANAS-NA)	.55***	10.74	<.001	.32***
Step 2				
Emotion Dysregulation (DERS)	.08	1.27	.207	
Pain (GCPS)	.15**	2.70	.007	.03**
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	.21***	3.55	<.001	.03***

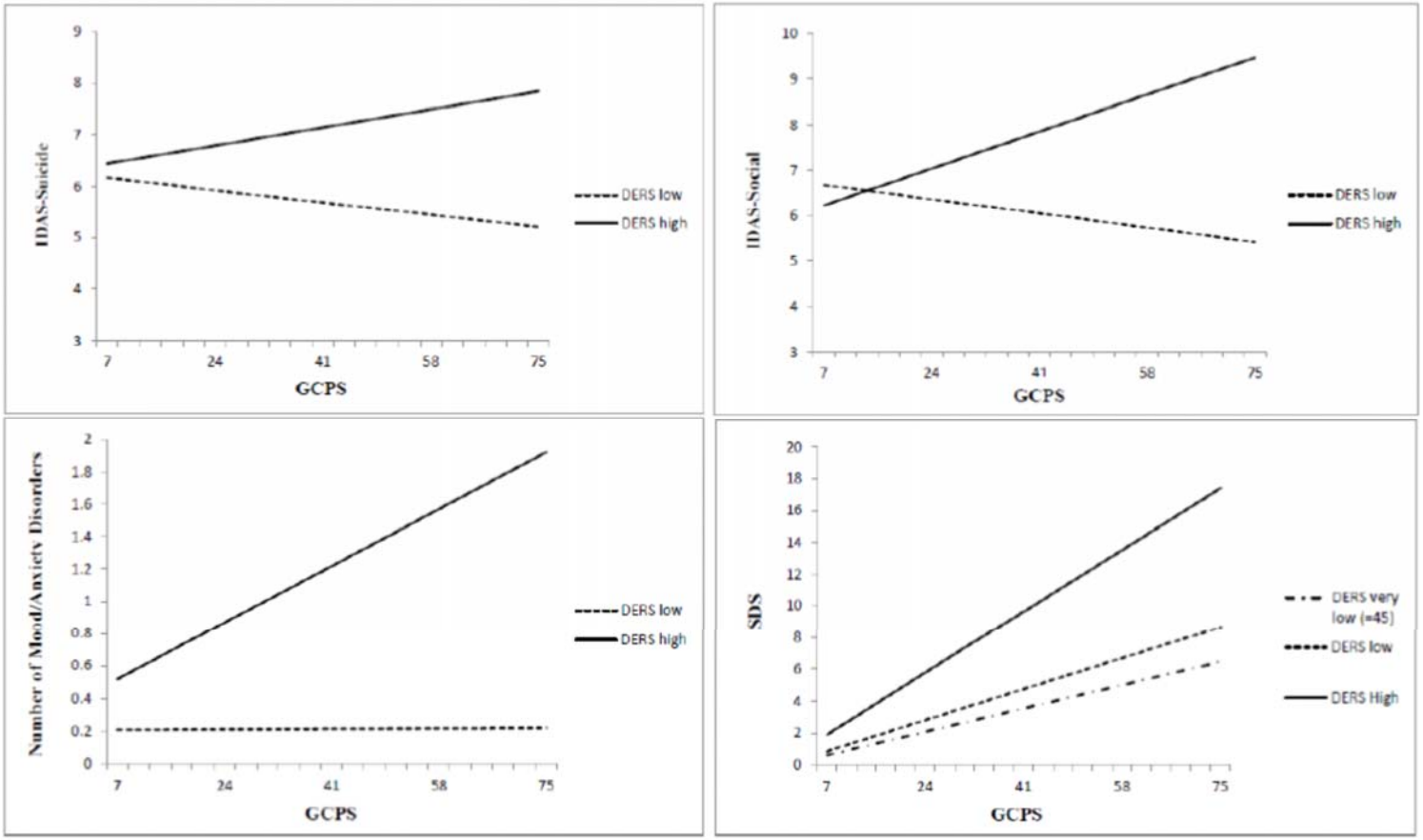
Note: *p<.05, **p<.01***p<.001. PANAS-NA (Positive and Negative Affect Scale, Negative Affect); IDAS (Inventory for Depression and Anxiety Symptoms); DERS (Difficulties in Emotion Regulation Scale); GCPS (Graded Chronic Pain Scale)

Table 4: Main and Interactive Effects of Pain and Emotion Dysregulation in Predicting Anxious Arousal Symptoms, Number of Mood/Anxiety Disorders, and Disability (*n*=274)

Anxious Arousal Symptoms (IDAS)				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	.04	0.92	.359	
Age	-.04	-0.74	.461	
Years in United States	.04	0.83	.410	
Education	-.14**	-2.87	.004	
Marital Status	-.10	-1.95	.052	
Negative Affectivity (PANAS-NA)	.59***	12.15	<.001	.38***
Step 2				
Emotion Dysregulation (DERS)	.01	0.04	.970	
Pain (GCPS)	.24***	4.54	<.001	.05***
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	-.03	-0.57	.570	<.01
Number of Mood/Anxiety Disorders				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	.04	0.78	.435	
Age	.05	0.90	.369	
Years in United States	.02	0.41	.685	
Education	-.02	-0.41	.681	
Marital Status	-.05	-0.93	.351	
Negative Affectivity (PANAS-NA)	.49***	9.12	<.001	.25***
Step 2				
Emotion Dysregulation (DERS)	.27***	4.60	<.001	
Pain (GCPS)	.19***	3.41	<.001	.11***
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	.16**	2.73	.007	.02**
Disability (SDS)				
	β	***t***	***p***	**R^2 Change**
Step 1				
Gender	-.01	-0.01	.994	
Age	-.03	-0.47	.640	
Years in United States	.09	1.47	.142	
Education	-.13*	-2.34	.020	
Marital Status	-.02	-0.44	.659	
Negative Affectivity (PANAS-NA)	.48***	8.85	<.001	.24***
Step 2				
Emotion Dysregulation (DERS)	.20***	3.78	<.001	
Pain (GCPS)	.44***	8.52	<.001	.22***
Step 3				
Pain*Emotion Dysregulation (GCPS*DERS)	.16**	2.96	.003	.02**

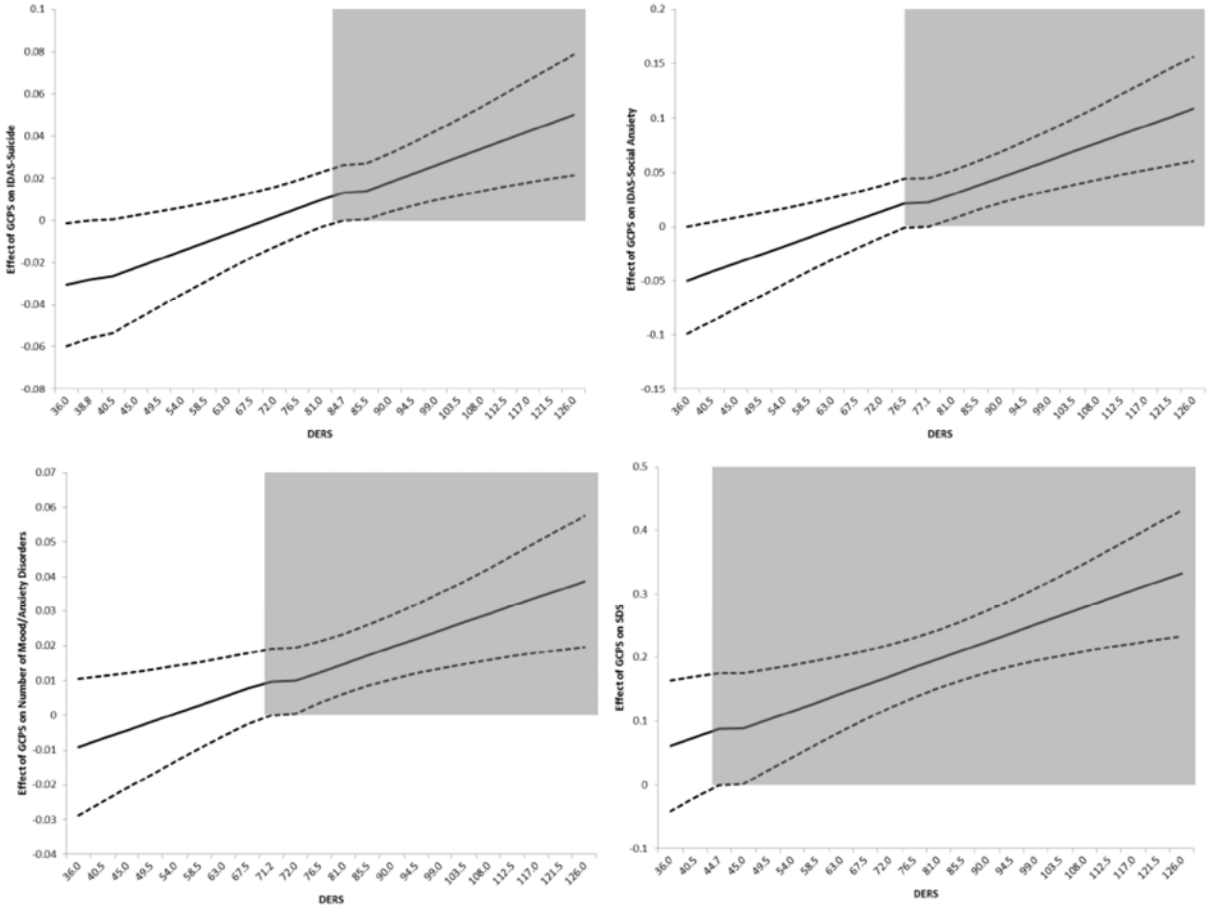
Note: *p<.05, **p<.01***p<.001. PANAS-NA (Positive and Negative Affect Scale, Negative Affect); IDAS (Inventory for Depression and Anxiety Symptoms); SDS (Sheehan Disability Scale); DERS (Difficulties in Emotion Regulation Scale); GCPS (Graded Chronic Pain Scale)

Figure 1: Plotting the Conditional Effect of Pain Severity on Suicidal and Social Anxiety Symptoms, Number of Mood/Anxiety Disorders, and Disability



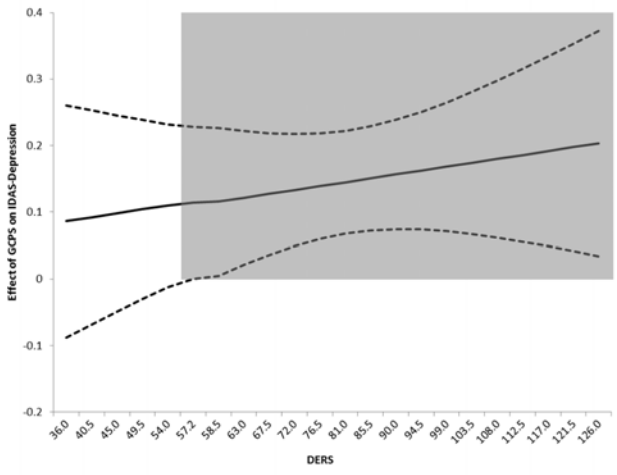
Note: GCPS (Graded Chronic Pain Scale); DERS (Difficulties in Emotion Regulation Scale); IDAS (Inventory for Depression and Anxiety Symptoms); SDS (Sheehan Disability Scale); Number of Mood/Anxiety Disorders based on the MINI (Mini International Neuropsychiatric Interview). Plots represent the association between pain severity and suicidal symptoms (top left) social anxiety symptoms (top right), number of mood/anxiety disorders (bottom left), and disability (bottom right), at high and low values of DERS as well as very low values of DERS for disability.

Figure 2: Location of Change in Significance of the Conditional Effect of Emotion Dysregulation on the Association between Pain Severity and Suicidal and Social Anxiety Symptoms, Number of Mood/Anxiety Disorders, and Disability



Note: The solid black lines illustrate the conditional effect of pain severity on IDAS-suicide (top left), IDAS-social anxiety (top right), number of mood/anxiety disorders (bottom left), and SDS (bottom left) at values of the moderator (DERS). Dotted lines represent the 95% confidence interval for the effect. The grey area represents the regions of DERS scores where the respective associations are significant.

Figure 3: Pattern of Conditional Effect of Emotion Dysregulation on the Association between Pain Severity and Depressive Symptoms



Note: The solid black lines illustrate the conditional effect of pain severity on IDAS-depression at values of the moderator (DERS). Dotted lines represent the 95% confidence interval for the effect. The grey area represents the regions of DERS scores where the respective associations are significant. There was not a statistically significant interaction of pain severity and emotion dysregulation for depressive symptoms.