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PERCEIVED STIGMA AND DEPRESSED MOOD
IN UNDERGRADUATE STUDENTS
WITH CHRONIC PAIN

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Abstract

A considerable body of literature suggests that the stigma associated with a variety of conditions, such as HIV/AIDS and psoriasis, uniquely contributes to adverse health outcomes within these populations. Although efforts to examine the prevalence of and consequences from stigma in chronic pain populations has been extremely limited, the subjective and sometimes invisible nature of chronic pain may predispose this population to stigmatizing interactions. The main goals of the present study were to examine how key psychosocial factors are associated with stigma in a population of undergraduates with chronic pain and to investigate stigma's association with depressed mood over and above pain severity and demographic factors.

As part of a larger research project, participants completed a variety of well-validated questionnaires. A principle component factor analysis was then performed to detect the underlying three-factor structure of the Chronic Pain Perceived Stigma Scale, which was recently developed. The Chronic Pain Perceived Stigma Scale was positively associated with depressed mood, perceived stress, pain interference, pain severity, trait anxiety, and socioeconomic status ($ps < .05$). Perceived stigma accounted for 16.6% of the variance observed in the sample's depressed mood scores, even after controlling for demographics and pain severity ($p < .01$). Further research efforts are thus needed to not only better understand the effect of perceived stigma on additional health outcomes, but to also design and implement prevention efforts that will eliminate stigmatizing interactions from the lives of those individuals with chronic pain.

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Introduction

Chronic pain, which is pain that persists either intermittently or continuously for at least twelve weeks, is devastating in many respects (Gatchel et al., 2007). In addition to the pain, which alone can be conceptualized as a stressor, individuals with chronic-pain conditions may experience a loss in everyday functioning (e.g., self-grooming and maintenance), work, and income; these chronic pain-associated losses in productivity have been estimated to account for 10.7% of the total U.S. labor costs (Collins et al., 2005). Furthermore, chronic pain conditions and their sequelae are often accompanied by both emotional and relationship strains (Lennon, 1989). In addition to these well-documented intra- and interpersonal strains, a lesser-recognized issue exists that may exacerbate pain and its related outcomes for many individuals: social stigmatization due to pain. The majority of research on stigma has been conducted with already well-known stigmatized conditions, such as HIV/AIDS and obesity. This research indicates that perceived stigma is associated with a wide range of negative outcomes, which span from limited employment opportunities to lowered self-esteem levels and adverse health effects (Roeloffs et al., 2003). The goal of the present research is therefore to examine the association between perceived pain-related stigma and psychosocial and health-related factors (i.e., depressed mood) in a sample of undergraduate students with chronic pain.

Stigmatization is comprised of processes by which a person's inherent worth or attributes are respectively devalued and discredited (Smith, Ferrara, & Witte, 2008). Individuals with chronic pain may perceive stigmatization for a variety of reasons. For example, individuals with chronic pain may feel "looked down upon" by others, particularly if they belong to a group that is typically assumed to be healthy (e.g., young

adults). Moreover, chronic pain is also likely to give rise to stigmatization because pain is inherently subjective and potentially invisible in nature. Consequently, chronic-pain sufferers may encounter individuals who doubt the condition's validity or who accuse them of faking a pain condition in order to obtain sympathy and/or pain medication.

Individuals with chronic pain that does not have a visually apparent or obvious cause do not conform to the traditional "sick" role (Jackson, 2005); Jackson (2005) argues that this failure to conform puts chronic pain sufferers in an ambiguous state, causing others to perceive them as threatening or disturbing. Thus, chronic-pain sufferers' uncertain status and inability to provide objective evidence to verify their pain conditions can elicit stigmatizing reactions from a variety of sources, such as healthcare providers, co-workers, and family members (Jackson, 2005; Monsivais, 2013).

Combined with a myriad of pain conceptualizations and diagnostic criteria, providers' inability to definitively explain patients' pain conditions also contributes to stigmatizing and deleterious provider-patient interactions (Jackson, 2005; Slade, Molloy, & Keating, 2009). These interactions are especially likely to occur if the healthcare professionals suspect their chronic-pain patients to have drug-seeking motives (Cohen et al., 2011).

Considerable research evidence suggests that chronic pain patients experience stigmatization from healthcare providers. For example, the majority of patients diagnosed with the chronic facial pain disorder known as TMPDS (temporomandibular pain and dysfunction syndrome) reported that doctors considered their pain to be "imaginary" and that they had feelings of estrangement from others (Lennon, 1989); consequently, these patients also commonly reported dissatisfied intimate relationships and relied on secrecy as a method to minimize experienced stigma (Lennon, 1989).

Research by Cohen et al. (2011) suggests that healthcare professionals are prone to label patients' pain as "imaginary" and to question the patients' care-seeking motives if such patients fail to validate the effectiveness of pain-management techniques. Practitioners' doubt that the reported chronic pain is "real" contributes to these patients' common dissatisfaction with acute and chronic back pain treatments (Verbeek et al., 2004). In turn, distrust of medical professionals has implications that can dramatically affect treatment options. For example, Shah and Diwan (2010) found that both pain practitioners and their patients are reluctant to select methadone as a treatment regimen for chronic neuropathic pain due to the risk of being socially stigmatized, regardless if methadone may be clinically indicated.

The strongest literature linking stigmatization with health-related outcomes is from research on individuals with HIV and other disease conditions. For instance, in a LA County-based sample of 223 low-income, HIV-positive residents, Kinsler et al. (2007) reported that approximately one-fourth of participants experienced provider stigma; after controlling for participants' sociodemographic characteristics and CD4 counts, such perceived stigma was associated with low access to care at the study's commencement (OR= 3.29, 95% CI= 1.55-7.01) and six-month follow-up (OR= 2.85, 95% CI= 1.06-7.65) (Kinsler et al., 2007). Similarly, undergraduates with chronic health conditions (e.g., asthma and diabetes) at a large public university were also reported to access healthcare services less frequently and experience a decreased quality of life as a result of anticipated stigma from health professionals; such results applied to undergraduates in the sample who had internalized and experienced previous stigmatizing interactions with healthcare providers (Earnshaw & Quinn, 2011).

Based on the prior literature with stigma, it appears that feelings of perceived stigma among individuals with chronic pain may elicit negative health outcomes that are not attributable to patients' disease status. The limited literature on stigma among chronic pain patients supports this assertion; stigmatizing reactions from chronic pain sufferers' family, friends, and previous healthcare providers have been associated with lowered self-esteem as well as negative attitudes and behaviors toward those professionals offering assistance at pain clinics (Holloway, Sofaer-Bennett, & Walker, 2007). Further, although stigmatizing interactions have been associated with help-seeking behaviors among adults with moderate to severe psoriasis, they were also associated with increased work interference and alcohol consumption (Ginsburg & Link, 1993). Similarly, Roeloffs et al. (2003) reported that 67% of depressed patients believed that the stigma associated with their condition negatively affected their ability to maintain employment and health insurance.

Although the literature suggests a negative association between perceived stigma and psychological and physical health outcomes, anomalies to this relationship have been observed. Crocker and Major (1989) argued that membership in stigmatized groups may offer protective effects for one's self concept if he or she devalues the dimensions of the "out-group" and assigns increased emphasis to the characteristic dimensions of the "in-group." However, the researchers caution that the protection of one's self-concept does not suggest a benign or even beneficial effect of stigmatizing interactions on other psychological constructs (Crocker & Major, 1989).

In addition to the negative health outcomes associated with perceived stigma, chronic pain sufferers also often experience comorbid psychological conditions. For

example, a number of studies link the chronic-pain experience with panic disorders (Arnow et al., 2006; McWilliams, Cox, & Enns, 2003). A particularly strong link exists between chronic pain and depression, negative mood, and perceived stress. For instance, strong associations between depressive symptoms and elevations in pain, negative affect, and perceived stress have been observed among a sample of older women with osteoarthritis (Zautra & Smith, 2001). A lack of intrapersonal coping resources, such as high self-esteem and optimism, has also been found to be associated with greater pain severity, pain interference, and depressed mood among chronic-pain patients as well (Cannella et al., 2007).

Pain severity has also been suggested to influence other health constructs in addition to one's psychological health. For example, among a sample of young adults with and without chronic pain, Graham and Streitl (2010) identified pain severity as being uniquely associated with chronic pain sufferers' sleep quality; such an association remained after controlling for subjects' gender, body mass index (BMI), depressed mood, health behaviors, perceived health, scholastic/interpersonal self-esteem, and perceived stress. Because the majority of studies examining the link between pain severity and health complaints (e.g., poor sleep quality) have been significantly and moderately positive, any attempt to investigate the connections between pain stigma and health must control for pain severity itself (Smith et al., 2000).

Despite the well-documented prevalence of perceived stigma and comorbid conditions among chronic pain sufferers, little research has been conducted to better understand the impact of perceived stigma among this group. Before research can be conducted on the effects of stigmatization among individuals with chronic pain, a method

of measuring perceived stigma among such individuals needs to be refined. Fagioletti (2009) presented a Chronic Pain Perceived Stigma Scale and identified three subscales via factor analysis in a preliminary pilot study of eight women with rheumatoid arthritis. These subscales included stigma-elicited social isolation, relation of pain to sufferers' identity, and the perceived attribution of subjects' personality characteristics to their respective pain from others (Fagioletti, 2009). This scale advanced the literature, but it did not have the sample size to properly develop the scale or to investigate correlates of the subscales with health-related outcomes. Further, the generalizability of findings in this initial study was limited by the sole use of women with rheumatoid arthritis (RA). Because RA is more readily accepted as a "real" medical condition than are other chronic pain conditions, those individuals with RA most likely perceive stigma to a lesser extent than chronic-pain sufferers generally do. Moreover, because young adulthood is associated with optimal health, undergraduates with chronic pain may be subjected to stigmatizing interactions more often than older individuals.

One goal of this honors thesis is to further develop the Chronic Pain Perceived Stigma Scale with data from a larger sample of undergraduates with diverse sources of chronic pain via exploratory factor analysis. A second goal of this thesis is to examine the degree to which perceived stigma is associated with depressed mood, stress, anxiety, pain interference, and pain severity among undergraduate students with chronic pain. The final goal is to determine the degree to which perceived stigma is associated with depressed mood over and above pain severity and sociodemographic factors (e.g., age, gender, and socioeconomic status). I hypothesized that perceived stigma would be

associated with greater depression, even after controlling for pain severity and sociodemographic factors.

Methods

Overview

This research was conducted with data collected during Fall 2012 as part of a larger project to better understand the extent to which stress, pain, emotion, and health behaviors are related among students both with and without chronic pain. Participants had to be undergraduate college students over the age of 18. Only individuals with chronic pain were included in the present research; chronic pain was self-reported and was specified as pain that had persisted continually for more than three months or pain that was sporadic for more than six months. These inclusion criteria resulted in a sample of 103 undergraduates with diverse sources of chronic pain, such as upper/lower-back pain, migraines, full-body achiness, and injury-related pain. Due to incomplete data from four subjects, the final sample size included 99 undergraduates with chronic pain.

Measures

Perceived stigma. Originally adapted from Lennon's (1989) Facial Pain Stigma Scale, the current Chronic Pain Perceived Stigma Scale includes 29 items that were mainly designed to assess respondents' stigma perceptions and the methods by which they minimize these stigma-related experiences (Lennon, 1989). Examples of such questions include: "I sometimes feel that people don't believe that I have chronic pain unless a physician tells them so;" "After I started treatment for chronic pain, I found myself educating others about the experience;" and "I have sometimes wished that people

could see my pain” (Lennon, 1989). Each item included in this scale has Likert response options ranging from (1) “Strongly disagree” to (5) “Strongly agree”, and these items are presented in Appendix A by order of survey appearance. Although Lennon (1989) indicated items 14 (“Most people have no idea what it is like to have chronic pain”) and 24 (“I’ve learned that it is best to keep the fact that I feel pain to myself”) as needing to be reverse-scored, such scoring does not appear to be conceptually correct; consequently, items 14 and 24 were not reverse-scored in the present research. The Cronbach’s alpha statistic for the scale’s inter-item consistency in this sample was .92.

Depressed mood. In order to determine the extent to which depressed mood was prevalent in this sample of undergraduates, the Center for Epidemiological Studies Depression Scale (CES-D) was utilized (Radloff, 1977). The scale consists of 20 items designed to assess the frequency of depressed mood across a one-week span, and each item includes response options ranging from (0) “Rarely or none (less than 1 a day)” to (3) “Most or all of the time (5-7 days)” (Radloff, 1977). After four items are reverse-scored, each respondent’s answers are summed, and higher scores on this scale indicate more depressed mood. The CES-D is able to identify depressed mood effectively in chronic pain populations as well as in healthy ones (Geisser, Roth, & Robinson, 1997). A score of 16 is indicative of clinical depression in a normal population (Radloff, 1977), but a score of 19 is more appropriate for samples with chronic pain (Turk & Okifuji, 1994); because individuals with chronic pain are more likely to report somatic complaints, the higher CES-D cutoff is used to avoid overestimating the prevalence of depression within samples of chronic-pain sufferers (Turk & Okifuji, 1994). The Cronbach’s alpha statistic for the CES-D’s reliability in this sample was .90.

Perceived stress. The 10-item Perceived Stress Scale (PSS-10; Cohen, Kamarck, & Mermelstein, 1983) was included as a way to measure the degree to which the respondents' appraised their current life situations and experiences as stressful. The PSS is the most widely used instrument to quantify respondents' stress perceptions. Its scale includes items with answer options ranging from (0) "Never" to (4) "Very often" (Cohen, Kamarck, & Mermelstein, 1983). After the appropriate four items in the scale are reverse-coded, each respondent's answers to the questionnaire items are summed; the higher a respondent's score on this scale, the more he or she perceives events as being very stressful and believes that the stressful events are beyond his or her coping means (Cohen, Kamarck, & Mermelstein, 1983). The Cronbach's alpha statistic for the PSS in this sample was .88.

Pain severity. Developed specifically for chronic pain patients, the West Haven-Yale Multidimensional Pain Inventory's (WHYMPI) Acute Pain Severity subscale was used to quantify subjects' recent pain severity (Riley et al., 1999). Consisting of three items, this scale gathers information about respondents' recent chronic-pain experiences and has response options for each question that range from (0) "No pain" to (6) "Very intense"; after averaging each subject's responses, a higher score on the WHYMPI's Acute Pain Severity subscale indicates a greater degree of pain severity in the respective respondent (Kerns, Turk, & Rudy, 1985). The Cronbach's alpha statistic for the subscale's reliability in this sample was .86.

Pain interference. The Pain Interference subscale from the WHYMPI was included in this study in order to gain a better understanding of the sample's pain-related disability. This scale includes nine items that quantify subjects' recent levels of pain-

related disability (Kerns, Turk, & Rudy, 1985). After averaging each subject's responses, which range from (0) "No interference" to (6) "Extreme interference", the extent to which respondents' lives are compromised by their respective chronic pain conditions is known. As is the case with the Acute Pain Severity subscale, a higher score on the WHYMPI's Pain Interference subscale indicates a greater degree of pain interference (Kerns, Turk, & Rudy, 1985). The Cronbach's alpha statistic for the Pain Interference subscale in the current sample was .94.

Anxiety. Spielberger's State-Trait Anxiety Inventory (STAI; Spielberger & Gorsuch, 1983) was utilized to measure trait anxiety, which is a tendency to assess life events as stressful and to be anxious. This scale consists of 20 items with response options that range from (1) "Almost never" to (4) "Almost always" (Spielberger & Gorsuch, 1983). After the appropriate items are reverse-scored and the response options are totaled, a final score within the range of 20-80 is reached; a score of 39-40 indicates the presence of clinical anxiety (Spielberger & Gorsuch, 1983; Knight, Waal-Manning, & Spears, 1983). The Cronbach's alpha statistic for the STAI's reliability in this sample was .91.

Socioeconomic status. Two ladder scales from the MacArthur socioeconomic status (SES) scale (Goodman et al., 2001) were used to assess SES. One question asks participants to identify which "rung" on a ten-rung ladder that their parents or guardians would fall; the other question asks them to identify the "rung" onto which they would fall in comparison to their college's community members. A composite score of these two ladders' scales was calculated by summing the scores and taking their average. The Cronbach's alpha statistic for this composite SES measure in the current sample was .42

and thus was indicative of the scale's low reliability; however, the composite score was used rather than the individual items because it was later determined to be more strongly associated with perceived stigma than either of the individual SES items in this sample.

Statistical Analyses

Data analyses were performed with the use of SPSS 21. Specifically, a principle component factor analysis with varimax rotation was performed in order to determine the Chronic Pain Perceived Stigma Scale's underlying factor structure. Pearson correlation tests were then conducted to determine the extent to which the Chronic Pain Perceived Stigma Scale and its emergent subscales were associated with the study's demographics and variables of interest. Lastly, hierarchical linear regression modeling was utilized to determine the unique effect of perceived stigma on depressed mood within this sample of undergraduate chronic-pain sufferers.

Results

Participant Characteristics

Participants were recruited from undergraduate classes and widely distributed postings (both online and on paper) at a large university in central Pennsylvania. Of the 99 undergraduates included in the sample, 66% of the participants were female, and the mean age of this sample was 20.49 years ($SD= 2.01$ years). The majority (87.4%) of the subjects were white, reflecting the population from which they were recruited. African Americans (8.7%), Asians (5.8%), and American Indians/Alaskan Natives (1.0%) were also included in the sample; as is made apparent by the provided percentages, subjects were permitted to identify with and select multiple races.

Descriptive Statistics

Table 1 presents the mean and standard deviations of the variables involved in this investigation. The mean score on the Chronic Pain Perceived Stigma Scale was 43.42 ($SD=22.01$), with a majority of participants reporting some perceived stigma ($Range= 0-113$). The mean score on the depressed mood (CES-D) scale was 16.31 ($SD=10.06$), with 32.3% meeting the criteria for clinical depression using a cutoff score of 19. The sample's mean score on the trait anxiety (STAI) scale was 43.68 ($SD=9.78$), with 64.8% meeting the criteria for clinical anxiety using a cutoff score of 40.

Factor Analysis

The principle component factor analysis with all of the Chronic Pain Perceived Stigma Scale items indicated the existence of three factors with eigenvalues greater than two; this finding was supported by the scree plot depicted in Figure 1. Thus, a three-factor solution was selected that explained 52.86% of the variance observed in perceived stigma.

Following the selection of a three-factor solution, a rotated factor matrix was utilized to load the Chronic Pain Perceived Stigma Scale's 29 items onto their respective best-matched factor; the item composition of each subscale is presented in Table 2. Because item 10r failed to load well and conform to any of the three subscales' emergent themes, it was thus omitted from future analyses. Each subscale's label was determined subjectively to reflect the main theme of its included items; each component is further described below.

The first component of the Chronic Pain Perceived Stigma Scale that was identified seemed to reflect others' failure to validate chronic pain sufferers' health complaints. Because items with this general message were most strongly loaded onto this subscale, this component was labeled "Lack of Validation". This subscale accounted for 35.96% of the total variance observed in the sample's Chronic Pain Perceived Stigma Scale scores (Cronbach's alpha= .91).

The second identified subscale accounted for 9.99% of the total variance reported in the sample's Chronic Pain Perceived Stigma Scale scores (Cronbach's alpha= .82). Items that loaded onto this factor reflected respondents' efforts to educate their support systems about their chronic pain conditions. This subscale's theme may be indicative of respondents' desire for others to accept chronic pain as a "real" medical condition and is thus suggestive of a misinformed and uneducated public concerning this health issue. This component was consequently labeled "Desire to Educate".

The last subscale accounted for 6.91% of the total variance observed in the sample's Chronic Pain Perceived Stigma Scale scores (Cronbach's alpha= .77). This factor included items that were associated with the isolating effects of chronic pain's subjective and potentially invisible nature and was thus labeled "Social Isolation".

Correlations with Perceived Stigma

In order to examine the extent to which the Chronic Pain Perceived Stigma Scale and its subscales were associated with the study's variables and demographic measures, Pearson correlations were performed (see Table 3). The vast majority of the computed correlations were statistically significant and appeared in the expected directions. For

instance, the Chronic Pain Perceived Stigma Scale was positively associated with the depressed mood, perceived stress, and pain interference measures ($ps < .01$). Moreover, the Chronic Pain Perceived Stigma Scale was also positively associated with the pain severity, trait anxiety, and SES measures ($ps < .05$). No association between perceived stigma and age was observed, which is unsurprising due to the sample's limited age range. Gender was also not significantly associated with perceived stigma in this sample.

Hierarchical Linear Regressions

The final statistical analyses involved the creation of hierarchical linear regression models. The demographic factors that were significantly associated with perceived stigma were controlled for in the regression models. The total perceived stigma scale was used because it was most strongly associated with depressed mood and other key variables (e.g., pain severity and SES). As is presented in Table 4, perceived stigma accounted for 16.6% of the variance observed in depressed mood ($p < .01$) over and above the effect of pain and demographic factors.

Discussion

As anticipated, the majority of participants endorsed items on the Chronic Pain Perceived Stigma Scale, with an average of 43.42 on a scale ranging from 0 to 116; only one individual indicated he/she never perceived at least some stigma. This finding suggests that perceived stigma is common even among an undergraduate population who has chronic pain. A factor analysis of the Chronic Pain Perceived Stigma scale resulted in three unique subscales: "Lack of Validation", "Desire to Educate", and "Social Isolation". However, the overall scale also held together well and demonstrated the

strongest associations with the psychosocial and health-related variables examined in the present research. Specifically, the Chronic Pain Perceived Stigma Scale was significantly and positively associated with depressed mood, perceived stress, pain severity, pain interference, and trait anxiety ($ps < .05$). Further, as expected, perceived stigma was uniquely associated with depressed mood over and above pain severity and demographic factors. Overall, these findings suggest that pain-related stigma is a significant problem on campus and may contribute to depressed mood among undergraduate students who have chronic pain.

With respect to the Chronic Pain Perceived Stigma Scale's factor analysis, its results were somewhat similar to the subscales reported by Fagioletti (2009). For instance, 8 of the 13 items in the Lack of Validation subscale were included in Fagioletti's "Attribution to Personality" subscale (2009). Both subscales focus on respondents' doubt that their support systems accept their chronic pain as "real." Five of the 10 items that comprise the Desire to Educate subscale were also found in Fagioletti's "Individuation" subscale (2009). Although these two subscales included some of the same items, their remaining item compositions were divergent. Unlike the "Individuation" subscale, the Desire to Educate subscale is partially comprised of items that reflect chronic-pain sufferers' initiatives to educate and convince their support systems of their condition's validity, such as: "If I were to make a new friend, one of the first things I would do is educate him or her about my chronic pain". In contrast, the "Individuation" subscale is stated to reflect the ways in which chronic-pain sufferers believe their condition makes them distinct from the general population (Fagioletti, 2009). Both the present factor analysis and the one performed by Fagioletti (2009) found

a factor that focused on feelings of isolation. However, only one of the five items included in the present Social Isolation subscale was included in Fagiolletti's (2009) "Isolation" subscale. Reasons for the two sets of subscales' differing item compositions are likely related to the samples utilized. Whereas Fagiolletti (2009) performed a principle factor analysis on the Chronic Pain Perceived Stigma Scale using data from older female subjects ($n=8$) diagnosed with rheumatoid arthritis, the current research was performed using data from 99 undergraduate subjects with chronic pain. Because the college-aged population is generally regarded as exceptionally healthy, the current sample may have yielded a factor structure that is more accurate and valid for those individuals with chronic pain who do not conform to society's expectations.

The findings of stigma's positive association with depressed mood, psychological stress, and anxiety are in agreement with those results previously reported in the stigma literature (Zautra & Smith, 2001; Cannella et al., 2007), but are the first to our knowledge linking perceived stigma to adverse psychological outcomes among undergraduate students with chronic pain. Because the Lack of Validation subscale was positively associated with each of the above measures as well as the Chronic Pain Perceived Stigma Scale ($ps < .05$), interventions designed to promote the acceptance of chronic pain as a "real" medication condition among the general public may be the most promising in the elimination of stigma from the chronic-pain experience. Further, as the Social Isolation subscale was positively associated with depressed mood, pain severity, pain interference, and trait anxiety ($ps < .05$), interventions designed to minimize chronic pain-related feelings of isolation may also potentially improve the physiological and psychological functioning of individuals with chronic pain. Lastly, the Desire to Educate subscale's

positive association with pain interference ($ps < .01$) also highlights the possibility of improving chronic-pain sufferers' physical condition through their own efforts to educate their support systems of chronic pain's "real" medical validity.

Perceived stigma was not, however, associated with age and gender; the null association with age was likely due to the restricted age range in the present sample. Although a null association was also observed between depressed mood and gender, such a finding was not surprising, as college students do not typically evidence a gender difference in depression (Hammen & Padesky, 1977).

This study is the first to demonstrate that perceived stigma is uniquely associated with depressed mood among undergraduates with chronic pain. After accounting for the impact of pain severity and SES, over 16% of the variance in depressed mood was explained by perceived stigma. Because 32.3% of the subjects met the threshold for clinical depression (i.e., score of 19 or greater on the CES-D), the "real-world" implications of this finding are troubling. In addition to depression's well-documented association with pain severity and perceived stress within the chronic-pain population (Zautra & Smith, 2001), clinical depression's sequelae (e.g., diabetes and angina) are serious chronic conditions as well (Saba et al., 2007). Consequently, future research should focus on intervention efforts to reduce depressed mood specifically among individuals with chronic pain.

Implications

The current research contains significant implications for individuals with chronic pain, particularly with respect to the association observed between perceived stigma and

depressed mood in this population. Although the health consequences from perceived stigma have been documented in other populations, such as in those individuals diagnosed with HIV or psoriasis, this research is the first to suggest that the variability in depressed mood can be partially explained by perceived stigma (Kinsler et al., 2007; Ginsburg & Link, 1993). As 32.3% of the study's participants met the criteria for clinical depression, targeted efforts are thus needed to minimize and protect this unique population from the harmful and clinically significant effects of perceived stigma.

Limitations

Although the final hierarchical linear regression model demonstrated that perceived stigma uniquely and significantly accounted for the sample's variability in depressed mood, the current research possesses some limitations. For instance, this study's data was gathered from a homogenous sample of subjects, particularly with respect to the sample's age ($M= 20.49$ years, $SD= 2.01$ years) and race (87.4% white). Consequently, additional research is needed to ascertain if the current findings are generalizable beyond Caucasian undergraduate students. In addition to the study's limited generalizability, its small sample size ($n=99$ subjects) and cross-sectional design may have compromised the ability to detect statistically significant results in the data as well. As future research projects utilize longitudinal within-subjects designs, a better understanding of the observed associations' causalities will be obtained.

Despite the limitations of the current research, it nevertheless significantly contributes to the literature's understanding of perceived stigma's effect on adverse psychological, health-related outcomes within the chronic pain population. Further

research efforts are needed to not only replicate this small study's findings but to also investigate the unique role of perceived stigma in additional health outcomes, such as overall self-reported health and clinician-determined depression. By better understanding the ways in which perceived stigma contributes to comorbid conditions in this specific population, prevention efforts can be designed and implemented to protect and enhance chronic-pain patients' quality of life.

Conclusion

Research on the effects of perceived stigma on chronic pain sufferers' physical and psychological well-being is extremely limited. Because college-aged populations are generally thought to be in good health, this segment of the chronic-pain population has been examined even less often. Of the researchers who have focused on undergraduates with chronic conditions, Earnshaw and Quinn (2011) reported that such individuals who anticipated stigmatizing healthcare provider-patient interactions accessed healthcare services less frequently and experienced a decreased quality of life. With respect to the current research, this study appears to be the first to suggest that perceived stigma contributes to depressed mood among undergraduate students with chronic pain. The implications of this finding have "real-world" applications and should be further investigated. Additionally, the mechanisms by which perceived stigma contributes to depressed mood should also be examined. By identifying and understanding stigma's unique role in other adverse health outcomes, researchers should be able to focus on and devise interventions to eliminate stigmatizing interactions and their associated ill effects from the chronic-pain experience.

Table 1: Examined Variables' Means and Standard Deviations

Variable	<i>M</i>	<i>SD</i>
Chronic Pain Perceived Stigma Total	43.42	22.01
Lack of Validation	16.91	11.66
Desire to Educate	16.09	8.77
Social Isolation	10.42	5.28
Depressed Mood	16.31	10.06
Perceived Stress	18.78	6.78
Pain Severity	1.35	1.21
Pain Interference	1.07	1.20
Trait Anxiety	43.68	9.78
Age	20.49	2.01
Socioeconomic Status	4.53	1.41

Table 2: Subscale Compositions and Respective Factor Loadings

Item Number	Item Wording	Loading (95% CI)
Lack of Validation		
2	It often seems that doctors and other medical professionals don't really believe that I experience chronic pain.	0.42
4	If I had a close relative who had been treated for chronic pain, I would advise him/her to tell only his/her most trusted friends.	0.53
5	I sometimes feel that people don't believe that I have chronic pain unless a physician tells them so.	0.41
7	When I interact with other individuals who have chronic pain, they often don't understand the severity of my chronic pain.	0.43
8	I think that doctors and medical professionals believe I have a drug addiction, and that I do not really suffer from chronic pain.	0.81
9	Many people assume that having chronic pain is a sign of personal weakness.	0.54
11	Many people assume that a person who suffers from chronic pain has a deep-seated psychological problem as well.	0.71
12	People have a way of associating the occurrence of chronic pain with psychiatric difficulties.	0.77
13	When people learn that you have been treated for chronic pain, they begin to search for flaws in your personality.	0.77
18	I think that my family and friends believe I have a drug addiction, and that I do not really suffer from chronic pain.	0.77
19	I often feel totally alone with my pain.	0.47
27	If an employer knows that a person has a history of treatment for chronic pain, he will probably pass over their application in favor of another applicant.	0.55
29	I have told people close to me to keep the fact of my treatment for chronic pain a secret.	0.57

Desire to Educate

3	When I talk to other individuals who have chronic pain, we help each other by confirming and validating our pain and related experiences.	0.39
6	Doctors and other medical professionals help my friends and family to appreciate the extent of my chronic pain condition.	0.53
16	Having chronic pain has made me feel different from other people.	0.47
20	If I were to make a new friend, one of the first things I would do is educate him or her about my chronic pain.	0.67
21	After I started treatment for chronic pain, I found myself educating others about the experience.	0.71
22	If I thought an employer might discriminate against a person because of their history of treatment for chronic pain, I would not apply for the job.	0.47
23r	I rarely feel the need to hide the fact that I have been treated for chronic pain.	-0.40
25	I have found that it is a good idea to help the people close to me understand what treatment for chronic pain involves.	0.84
26	When I talk to people close to me about my experience with chronic pain, I make a special effort to tell them about the experiences I have had that may have caused the pain.	0.75
28	I feel it is my duty to help educate the public about problems involving chronic pain.	0.87

Social Isolation

1	There is a part of me that only other people who have experienced chronic pain can understand.	0.52
14	Most people have no idea what it is like to have chronic pain.	0.50
15	I have sometimes wished that people could see my pain.	0.55
17	One problem with having chronic pain is that people don't believe that you really hurt.	0.56
24	I've learned that it is best to keep the fact that I feel pain to myself.	0.55

Note: The “r” designation is indicative of a reverse-scored item. Item number refers to the question number as shown in Appendix A.

Table 3: Correlations Between Examined Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Stigma Total	1	.91**	.86**	.75**	.31**	.32**	.24*	.42**	.25*	.02	-.03	.25*	.11
2. Lack of Validation		1	.64**	.57**	.41**	.44**	.21*	.41**	.31**	.07	-.14	.24*	.19
3. Desire to Educate			1	.56**	.10	.14	.18	.36**	.10	.02	.07	.19	.11
4. Social Isolation				1	.30**	.16	.33**	.32**	.25*	-.05	-.02	.19	-.06
5. CES-D					1	.65**	.32**	.45**	.68**	.06	-.01	.19	.19
6. PSS-10						1	.17	.22*	.72**	-.07	.08	.12	-.03
7. Pain Severity							1	.40**	.22*	-.07	.06	.05	.04
8. Pain Interference								1	.22*	.11	.04	.04	.19
9. Trait Anxiety									1	-.13	.01	.27**	-.002
10. Age										1	-.27**	.07	.21*
11. Gender											1	.009	-.17
12. SES												1	.13
13. Race													1

Note: * $ps < .05$ ** $ps < .01$

Table 4: Hierarchical Linear Regression Model for Role of Stigma on CES-D Scores

Model	R	R Square	Adjusted R Square	R Square Change	F Change	Significant F Change
1	0.21 ^a	0.04	0.03	0.04	3.71	0.06
2	0.22 ^b	0.05	0.03	0.01	0.56	0.46
3	0.36 ^c	0.13	0.09	0.08	7.28	0.008
4	0.41 ^d	0.17	0.12	0.04	3.82	0.05

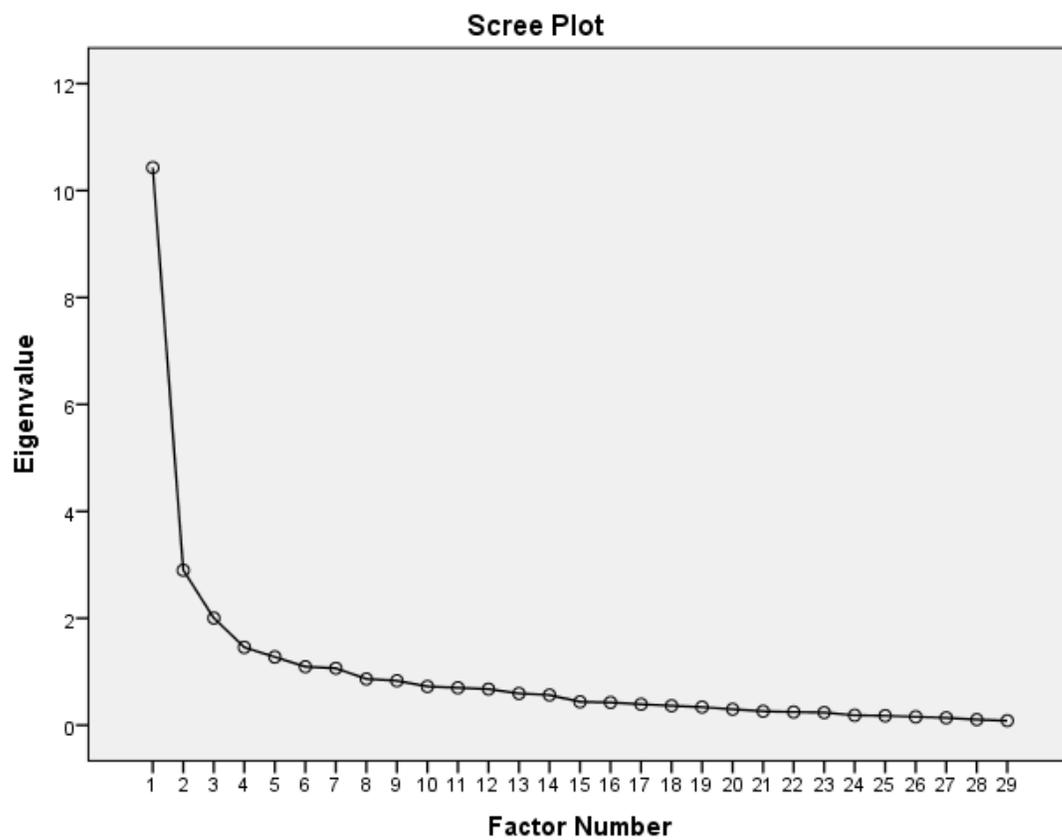
a. Predictors: (Constant), SES

b. Predictors: (Constant), SES, Race (white or non-white)

c. Predictors: (Constant), SES, Race (white or non-white), WHYMPI Pain Severity

d. Predictors: (Constant), SES, Race (white or non-white), WHYMPI Pain Severity, Chronic Pain Perceived Stigma Scale Total

Figure 1: Scree Plot of Factor Analysis Conducted on Chronic Pain Perceived Stigma Scale Items



Appendix A: Chronic Pain Perceived Stigma Scale Items in Order of Survey Appearance (Lennon, 1989; Fagiolletti, 2009)

1. There is a part of me that only other people who have experienced chronic pain can understand.
2. It often seems that doctors and other medical professionals don't really believe that I experience chronic pain. ❖
3. When I talk to other individuals who have chronic pain, we help each other by confirming and validating our pain and related experiences. ❖
4. If I had a close relative who had been treated for chronic pain, I would advise him/her to tell only his/her most trusted friends.
5. I sometimes feel that people don't believe that I have chronic pain unless a physician tells them so. ❖
6. Doctors and other medical professionals help my friends and family to appreciate the extent of my chronic pain condition. ❖
7. When I interact with other individuals who have chronic pain, they often don't understand the severity of my chronic pain. ❖
8. I think that doctors and medical professionals believe I have a drug addiction, and that I do not really suffer from chronic pain. ❖
9. Many people assume that having chronic pain is a sign of personal weakness.
10. Most people believe that a person with chronic pain is just as emotionally stable as the average person.
11. Many people assume that a person who suffers from chronic pain has a deep-seated psychological problem as well.
12. People have a way of associating the occurrence of chronic pain with psychiatric difficulties.
13. When people learn that you have been treated for chronic pain, they begin to search for flaws in your personality.
14. Most people have no idea what it is like to have chronic pain.
15. I have sometimes wished that people could see my pain.
16. Having chronic pain has made me feel very different from other people.
17. One problem with having chronic pain is that people don't believe that you really hurt.

18. I think that my family and friends believe I have a drug addiction, and that I do not really suffer from chronic pain. ❖
19. I often feel totally alone with my pain.
20. If I were to make a new friend, one of the first things I would do is educate him or her about my chronic pain.
21. After I started treatment for chronic pain, I found myself educating others about the experience.
22. If I thought an employer might discriminate against a person because of their history of treatment for chronic pain, I would not apply for the job.
23. I rarely feel the need to hide the fact that I have been treated for chronic pain.
24. I've learned that it is best to keep the fact that I feel pain to myself.
25. I have found that it is a good idea to help the people close to me understand what treatment for chronic pain involves.
26. When I talk to people close to me about my experience with chronic pain, I make a special effort to tell them about the experiences I have had that may have caused the pain.
27. If an employer knows that a person has a history of treatment for chronic pain, he will probably pass over their application in favor of another applicant.
28. I feel it is my duty to help educate the public about problems involving chronic pain.
29. I have told people close to me to keep the fact of my treatment for chronic pain a secret.

Note: the symbol "❖" indicates the items that were added by Fagioletti to assess chronic pain respondents' fear of being perceived as a drug abuser.

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