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# CHRONIC PAIN ACCEPTANCE: OPTIMISM MEDIATES THE RELATION BETWEEN DISPOSITIONAL MINDFULNESS AND PAIN ACCEPTANCE

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CHRONIC PAIN ACCEPTANCE: OPTIMISM MEDIATES THE  
RELATION BETWEEN DISPOSITIONAL MINDFULNESS AND PAIN  
ACCEPTANCE

By

KELLI JANE MILES, Bachelor of Science

Presented to the Faculty of the Graduate School of

Stephen F. Austin State University

In Partial Fulfillment

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For the Degree of

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RELATION BETWEEN DISPOSITIONAL MINDFULNESS AND PAIN  
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## ABSTRACT

Chronic pain is associated with many indicators of maladjustment. We expected that five individual components of dispositional mindfulness would be positively associated with pain willingness (Hypothesis 1) and activity engagement (Hypothesis 2). A mediational hypothesis was tested, whereby dispositional mindfulness would be positively associated with optimism and optimism would in turn be positively associated with both pain willingness and activity engagement (Hypothesis 3). Both Hypothesis 1 and 2 were partially supported. Acting with awareness and nonjudging were the only mindfulness components that were positively associated with pain willingness. Other components of mindfulness were either negatively associated with pain willingness (observing) or were nonsignificant predictors of pain willingness (describing, nonreactivity). Compared to pain willingness, more components of mindfulness were positive predictors of activity engagement. Results also support Hypothesis 3. Optimism accounted for a significant indirect association between dispositional mindfulness and pain willingness as well as between dispositional mindfulness and activity engagement.

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## CHRONIC PAIN ACCEPTANCE: OPTIMISM MEDIATES THE RELATION BETWEEN DISPOSITIONAL MINDFULNESS AND PAIN ACCEPTANCE

Pain is a powerful and underestimated force in our world today. Americans experience pain more than cancer, heart disease, and diabetes combined (Nahin, 2015). There are many ways to categorize pain, such as acute pain, which can be sudden and intense but lasts less than six months (Turk, Meichenbaum, & Genest, 1983). Acute pain results from experiences such as a broken bone, a bruise or laceration to the skin, or the labor of childbirth. There is also chronic pain, which can start as acute pain but then lingers on and does not subside for at least three months (Merksey & Bogduk, 1994). Arthritic pain, headaches, pain associated with cancer, and lower-back pain are common examples of chronic pain.

Widespread negative consequences of chronic pain emerge as a result of pain resistance to treatment and slowly infiltrating into other areas of functional living. These consequences may include costs to individual ability to function in daily life, abuse and addiction to opioids or other substances, anxiety, and depression. Chronic low-back pain has recently become the leading cause of disability in Americans less than 45 years old and causes 12% of all sick leave (Arena & Blanchard, 1996; National Center for Health Statistics, 2006). Pain has major economic influences for people and for society. The annual cost of pain, which includes everything from medical bills, lost income, and lost vocational productivity, is an estimated \$560 billion to \$635 billion a year (Gaskin &

Richard, 2012). Similarly, opioid addiction has become a front running issue in the United States. The National Center for Health Statistics reported that almost two million Americans abuse prescription opioids each year, and 91 Americans are fatally affected by opioid overdoses every day (2016). Unfortunately, substance abuse may begin as a coping mechanism to manage chronic pain. The literature suggests those who experience severe pain are more likely to engage in substance abuse. For example, Alford et al. (2016) studied links between chronic pain and substance abuse (i.e., illegal drug use, excessive alcohol use, misuse of prescription drugs). Among participants engaging in substance use, 87% reported suffering from chronic pain. Moreover, half of those using illegal drugs, 79% of those drinking to excess, and 81% of those abusing prescription drugs reported that their motivation was to alleviate their chronic pain. Research is also beginning to reveal that negative emotional states such as anxiety and depression are strongly associated with the experience of pain and difficulty coping with pain (Beesdo, Pine, Lieb, & Wittchen, 2010; Cui, Matsushima, Aso, Masuda, & Makita, 2009; Kato, Sullivan, Evengård, & Pedersen, 2006; Lee & Tsang, 2009). People are more likely to report feeling anxious or depressed if they are experiencing pain. For example, 33.7% of people experiencing chronic pain report feelings of anxiety or depression, as compared to just 10.1% of people who are not experiencing chronic pain (Gureje, Von Korff, Simon, & Gater, 1998). Additionally, those who have chronic low-back pain have been shown to be at a higher risk for anxiety or depressive disorders (Sullivan, Reesor, Mikail, & Fisher, 1992), and those that suffer from irritable bowel syndrome, a chronically painful and

disruptive gastrointestinal disease, have reported higher rates of major depression and panic disorder (Kato et al., 2006; Walker, Katon, Jemelka, & Roy-Byrne, 1993). With pain being such a prevalent issue affecting millions of people and leading to a range of negative societal consequences, one must question “who copes with pain well?” This was the motivation behind the current study and was where predictors of adjustment to pain emerged as our focus.

### Mindfulness-Based Interventions

Mindfulness-based interventions (MBIs) have gained substantial credibility and have attracted significant attention in health psychology and related fields as an increasing emphasis in science is emerging on their effectiveness in helping individuals manage stressors. Positive outcomes of MBIs have been documented for a wide variety of indicators of psychological well-being including perceived stress, rumination, and emotion regulation (Robins, Keng, Ekblad, & Brantley, 2012; Shapiro, Oman, Thoresen, & Plante, 2008), as well as certain physiological stress responses such as cortisol levels, blood pressure, and immune-system functioning (Carlson, Speca, Farris, & Patel, 2007).

MBIs have been introduced among those experiencing chronic pain under assumptions that mindfulness and interventions incorporating self-awareness may actually reduce symptoms and improve emotional functioning (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). Little empirical or theoretical work, however, examines specific psychological resources that may be characteristic of mindful individuals or that may predict more positive responses to pain as a result of being

mindful. Previous work with individuals experiencing chronic pain has taken somewhat of a “kitchen sink” approach in measuring outcomes of MBIs incorporating a diverse mix of indicators of psychological well-being and a similarly diverse set of pain responses. However, no previous studies have modeled the psychological resources through which a mindful disposition might predict more positive pain responses. Similarly, little is known as to whether dispositional mindfulness—how mindful an individual is on a day-to-day basis—predicts greater levels of pain acceptance. Modeling and understanding the processes through which mindfulness relates to accepting pain is a useful contribution to the chronic pain literature and was the primary goal of the current study. To address this gap, the current study explored the relation between dispositional mindfulness and pain acceptance, which has emerged as an important determinant of positive psychological well-being (Shapiro et al., 2008), especially in terms of responding to persistent pain and the continuation of normal everyday activities. Because experimental and correlational research has indicated positive associations between mindfulness and optimism, (e.g., Heckenberg, Hale, Kent, & Wright, 2018; Malinowski & Lim, 2015) and because optimism has positive consequences for those facing stressors including physical pain (Carver & Bridges, 1994; Cousins, Cohen, & Venable, 2015; Goodin & Bulls, 2013; Pearlin & Schooler, 1978), optimism was examined as a potential mediator of the relation between mindfulness and pain acceptance.

## Mindfulness

Existing psychological literature most commonly describes mindfulness as paying attention to the present moment with intent and a non-judgmental attitude (Kabat-Zinn, 2003). The distinct combination of both refined attentional skills and a non-evaluative attitude toward potential or present mental experiences are considered core components of mindfulness (Bishop, Lau, Shapiro, & Carlson, 2004; Brown, Ryan, & Creswell, 2007; Malinowski, 2012). Mindfulness originated thousands of years ago in the use of Eastern psychology, and more specifically, in the Buddhist practice of mindfulness and meditation (Montero, 2017). Recently, the therapeutic community in Westernized nations have begun to show a noticeable increase in the use of Eastern psychology and are starting to reap the benefits of a long-standing practice in the field of meditation. Mindfulness in state form can vary across situations in different individuals. State mindfulness is fleeting and often provoked, whereas, dispositional mindfulness is a trait-level construct that involves a day-to-day tendency to be mindful of one's experiences. Some research suggests that dispositional mindfulness allows individuals to change levels of psychological distress and adaptive functioning in pursuit of a more positive psychological existence (Brown & Ryan, 2003). One way in which practicing mindfulness might positively affect psychological symptoms and adaptive functioning is by initiating a fundamental change in perspective on an individual's internal experience. Engaging in mindfulness practice may allow an individual to learn how to observe his/her thoughts, emotions, and sensations objectively, focusing intently on the ongoing, ever-

changing process of awareness. With repeated mindfulness practice, individuals could potentially develop greater insight into their cognitive tendencies, which may, in turn, allow them to alter their negative patterns of thinking and therefore react more positively to them.

Because practicing mindfulness requires awareness and control of cognitive processes as well as the ability to assess the ongoing flow of consciousness, it has been described as a meta-cognitive process (Bishop et al., 2004). Dispositional mindfulness has been conceptualized as either a one-dimensional (e.g., Brown & Ryan, 2003), two-dimensional (e.g., Cardaciotto, Herbert, Forman, & Moitra, 2008), or—as explored in the current study—a multi-dimensional construct with up to five operational mindfulness facets (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Feldman, 2007). The degree to which the different mindfulness facets correlate with pain acceptance has yet to be explored, limiting understanding of the distinct ways in which mindfulness may be beneficial in coping with stressors such as to pain. The aim of this study was to overcome this unaddressed gap in the literature by assessing the role of five different mindfulness facets in predicting pain acceptance levels in college students, using the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; Baer & Carmody, 2008). This measure considers factors including non-reactivity in inner experience (non-reacting), observing sensations, perceptions, thoughts, feelings (observing), acting with awareness (act-aware), describing or labeling with words (describing), and non-judging of experience (non-judging).

## Mindfulness-Based Stress Reduction Techniques

Mindfulness interventions have been shown to have positive effects on psychological well-being and cognitive function in healthy individuals (Shapiro et al., 2008) as well as to enhance aspects of physical functioning (e.g., reduced cortisol levels and blood pressure, improved immune system functioning; Carlson et al., 2007).

Mindfulness-based stress reduction (MBSR) techniques such as sitting meditation, hatha yoga and loving-kindness meditation have been shown to reduce psychological distress and stress-related physical symptoms in not only chronic pain patients, but also patients with other medical illnesses and in nonclinical settings (Keng, Smoski, & Robins, 2011). These techniques allow an individual to practice adding pause to their distressing cognitions and realign their thinking patterns to a more positive and less reactional perspective. As evidence that mindfulness may promote emotion regulation and positive emotional states, in a controlled experimental trial, Robins et al. (2012) observed that participating in MBSR techniques increased levels of self-compassion and decreased levels of fear of emotion and worry. These improvements could regulate emotional experience and support an individual's attempt at a more positive internal experience. Additionally, Shapiro (2008) examined the effects of mindfulness intervention practices on psychological well-being and cognitive functioning in the college population. This study suggested that adherence to the mindfulness intervention practices reduced negative outcomes such as perceived stress and rumination.



Positive physical functioning outcomes have also been shown to increase in the presence of MBSR techniques (Matchim, Armer, & Stewart, 2011). MBSR practices were assessed in a study specifically designed for breast cancer survivors and were found to significantly improve both psychological and physiological outcomes including increased state mindfulness levels and reduced blood pressure, heart rate, and respiratory rates (Matchim et al., 2011). These are important findings in that physiological arousal may make regulation of cognitions and emotions difficult for those facing physiological stressors such as pain.

Research documents the efficacy of MBIs and MBSR techniques in the treatment of chronic pain. Specifically, MBSR techniques have been found to increase pain-related coping and decrease levels of anxiety and depression among individuals suffering from fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007). MBSR techniques may help to redirect cognitions toward a more positive, manageable, and less permanent perspective. Meta-analytic reviews also suggest that MBIs may be effective in suppressing psychological distress (depression and anxiety) in both clinical and nonclinical samples (Grossman et al., 2007; Khoury et al., 2013). Additionally, as it pertains to chronic pain, a recent review summarizing 10 studies by Chiesa and Serretti (2011) indicated that MBIs may actually increase pain acceptance and ratings of quality of life as well as reduce pain-related psychological distress in chronic pain patients.

## Mindfulness and Optimism

Optimism is a future-oriented cognitive disposition that involves positive-outcome expectancies (Chang, Maydeu-Olivares, & D’Zurilla, 1997). Ample theoretical and empirical support exists identifying optimism as a psychological resource with adjustment-related benefits for those facing potential stressors (Carver & Bridges, 1994; Pearlin & Schooler, 1978). Experimental and correlational studies indicate a positive relation between mindfulness and optimism (Heckenberg, Hale, Kent, & Wright, 2019; Kiken & Shook, 2011; Malinowski & Lim, 2015). For full-time working adults, dispositional mindfulness is associated with higher levels of optimism, which, in turn, is associated with stronger work-engagement and well-being (Malinowski & Lim, 2015). Mindfulness has been linked to higher levels of optimism in those employed as urban firefighters, whose occupation involves a high level of stress as well as cyclists, whose sport requires an ability to tolerate pain (Jones & Parker, 2018). Undergraduates exposed to a laboratory induction of mindfulness reported higher levels of optimism compared to control participants (Kiken & Shook, 2011). Heckenberg et al. (2019) recently tested the effects of an online MBSR program in a community-based sample of adults. Participants reported higher levels of dispositional mindfulness and optimism as well as lower levels of anxiety following exposure to the online program. Mindfulness may specifically improve positive outlooks regarding stressful experiences (Follette, Palm, & Pearson, 2006; Kabat-Zinn, 1990). Follette et al. (2006) specifically proposed that mindfulness may increase one’s ability to tolerate stress by keeping a healthy distance from

distressing emotions. There is evidence of this proposed model in those facing physiological stressors. For example, Boselie, Vancleef, Smeets, and Peters (2014) observed that inducing optimism in college students counteracted the negative effects of pain (exposure to cold pressor task) on performance in an executive function task. Because regulating cognition and emotion is a skill of executive function, this particular finding prompted the researchers to call for mindfulness-based interventions to enhance optimism and improve adjustment in chronic pain patients (Boselie et al., 2014). However, no previous studies have tested whether mindfulness is associated with indicators of adjustment to pain through optimism.

One argument that has been forwarded in the optimism literature which has implications for reactions to chronic pain is that optimistic individuals are able to cope with conflict more efficiently and are able to disengage from a goal that is evaluated as unattainable (Carver, Scheier, & Segerstrom, 2010).

### Optimism vs. Hope

As it pertains to the current study, a distinction between the very-similar constructs of hope and optimism is necessary to note. It is apparent that both hope and optimism are similarly oriented towards the future, as opposed to being situated in the past. Snyder et al. (1991) suggests a multidimensional approach to hope, which involves two cognitive components: agency and pathways. Agency is demonstrated by adherence to goals of the past, the present, and the future, whereas pathways involve the formation of a goal-attainment plan, or strategy. The additive components of this framework offer a

clear conceptualization of hope being rooted in goal-orientation. Similarly, optimism is also future-oriented, but in a slightly different manifestation.

Scheier, Carver, and Bridges (1994) emphasize a distinction between optimists and pessimists with respect to their coping strategies. They suggest that optimists use more problem-solving strategies and adaptive emotion regulation approaches as compared to pessimists (who primarily use maladaptive coping strategies when faced with similar distressing situations) and is important to consider within the context of the current study. We examine coping mechanisms in terms of pain acceptance in the current study, which are most compatible with optimism in the model.

Among those experiencing pain, optimism is reliably associated with adaptation and lower pain sensitivity (Cousins, Cohen, & Venable, 2015; Goodin & Bulls, 2013). Personal predictions and confidence in how—and if—one will be able to cope with pain has been shown to predict the amount of pain one experiences (Jensen, Karoly, & Harris, 1991; Turk & Flor, 1999). Both pain intensity and duration are associated with a person's expected ability to cope with pain (Bachiocco, Scesi, Moreselli, & Carli, 1993) as well as the amount of disability a person lives with due to pain (Bunketorp, Lindh, Carlsson, & Stener-Victorin, 2006). Additionally, Manning and Wright found that women's personal confidence in their ability to endure childbirth without medication is a strong predictor of their eventual success in doing so (1983). In other words—women who believed they could tolerate the pain of childbirth without medication, did. Optimism has been shown to predict a variety of pain-related experiences including acceptance of

pain and adjustment to pain (Wright et al., 2011), as well as the reduction of pain intensity ratings and pain catastrophizing (Hanssen, Peters, Vlaeyen, & Meevissen, 2013; Wright et al., 2011).

### Pain Acceptance

Although many of us have experienced some amount of pain in our lives, the amount of distress that people feel from an injury or disease varies widely from person to person. One person may find that an aching tooth makes it impossible to get out of bed, whereas another person may find the same pain a relatively small annoyance and continue on with their regular daily activities. People vary considerably in how much pain they can tolerate. It has been estimated that certain people can stand up to eight times as much pain as others (Rollman & Harris, 1987). Pain acceptance may explain some of the variation in pain tolerance among different types of people. It also may underlie much of the variation we see in how people react to or cope with their pain.

The chronic pain literature makes a distinction between general psychological acceptance and pain acceptance. McCracken and Zhao-O'Brien (2010) describe general psychological acceptance as acceptance of experiences that are undesirable and pain acceptance as a specific way in which general psychological acceptance may manifest: acceptance of the undesirable experience of chronic pain. In chronic pain patients, pain acceptance is demonstrated by lower reports of pain intensity, less pain-related avoidance and anxiety, lower levels of depression, fewer hours spent resting or sleeping, and better work status (McCracken, 1998). Understanding predictors of pain acceptance could be of

interest to clinicians and practitioners aiming to promote these positive outcomes in pain patients. Researchers have identified two components of pain acceptance, pain willingness and activity engagement (Vowles, McCracken, McLeod, & Eccleston, 2008). Both are accounted for in sub-scales of the Chronic Pain Acceptance Questionnaire (CPAQ; Vowles et al., 2008). Pain willingness encompasses an individual's attitude toward allowing, as opposed to controlling, their pain. Activity engagement represents the degree to which an individual participates in normal daily activities, despite persistent pain.

### Mindfulness and Pain Acceptance

Previous experimental research suggests that exposure to mindfulness-based intervention is associated with reduced sensory pain, affective pain, and somatic complaints, as well as improved pain-coping strategies and quality of life among fibromyalgia patients (Grossman et al., 2007). Additionally, in a randomized-controlled trial, Henriksson and colleagues compared the effects of a mindfulness-based intervention for individuals experiencing chronic pain and a control pain discussion forum and observed greater reductions in pain intensity and greater increases in pain acceptance and life satisfaction for the intervention group compared to the control group (Henriksson, Wasara, & Rönnlund, 2016). This finding supports the notion that practicing mindfulness may enhance psychological resources that facilitate the acceptance of pain. Previous work has analyzed mindfulness and its association with both general psychological acceptance and pain acceptance. A general tendency toward acting

with awareness is strongly associated with experiential acceptance and psychological flexibility among patients experiencing chronic pain ( $r = .52$ ; De Boer, Steinhagen, Versteegen, Struys, & Sanderman, 2014). Costa and Pinto-Gouveia (2011), documented a moderate positive association between mindfulness and pain acceptance (activity engagement:  $r = .490, p < .001$ ; pain willingness:  $r = .202, p < .05$ ) in a sample of Portuguese chronic pain patients. Costa and Pinto-Gouveia measured mindfulness using a scale that is limited in scope. Specifically, they used the mindfulness subscale of Neff's (2003) Self-Compassion Scale. This subscale includes items that assess holding painful thoughts and feelings in mindful awareness. Similarly, in studying mindfulness and general psychological acceptance, De Boer et al. (2014) measured mindfulness with a unidimensional measure of being in the present moment. This preliminary evidence is limited in that it only points to a relation with only certain aspects of mindfulness. Measures that capture the broader concept of mindfulness could relate to pain acceptance in different ways. In addition, no previous studies have examined mindfulness and pain acceptance in samples recruited outside of primary or tertiary care settings (e.g., community health centers, pain clinics). Studying predictors of pain acceptance in samples with more diverse responses to pain could increase generalizability and validity. For example, recruiting outside of the patient population could potentially avoid problems with restricted range in participant levels of pain acceptance. For patients who report to their primary care physician or a pain clinic, pain may have progressed to a point that pain acceptance has weakened. Studying college students' expectations about

their responses to pain could aid in avoiding this sampling bias and gaining insight into predictors of pain acceptance at an earlier stage of its development.

It is possible that the open, non-reactive emotion regulation strategies that are included in a mindful disposition predict higher levels of pain acceptance because of the positive frames of mind that are associated with these emotion regulation strategies. They may also predict more positive outlooks regarding current and future daily activities or openness to letting go of one's control over pain. Research has not examined these associations thereby warranting a mediating construct in our design. Modeling the characteristics which might mediate positive associations between mindfulness and pain acceptance is a logical next research objective as knowledge of such mediators could be useful in assessing the efficacy of mindfulness interventions to tailoring training to maximize patient gains in pain acceptance.

#### Purpose of the Current Study

There is ample evidence to suggest that mindfulness plays a role in better overall mental health and general psychological acceptance. Research also suggests that mindfulness interventions have positive impacts on the psychological well-being of patients and their experience with pain. Mindfulness training increases pain acceptance in pain patients (Henriksson et al., 2016), and dispositional mindfulness predicts both general psychological acceptance and pain acceptance in pain patients (De Boer et al., 2014).



The primary purpose of the current study was to replicate and extend from Costa and Pinto-Gouveia (2011) by examining the relation between mindfulness and pain acceptance in a community sample rather than a clinical sample. In addition, this study will include a more comprehensive measure of mindfulness than the one used by previous researchers who have documented associations between dispositional mindfulness and acceptance (Costa & Pinto-Gouveia, 2011; deBoer et al., 2014).

A secondary goal of the current study was to examine optimism as a possible mechanism through which mindfulness may be associated with pain acceptance. A simple mediation model was used to test this.

### Hypotheses

In light of previous research, the following hypotheses were derived:

- 1) Dispositional mindfulness will be positively correlated with pain willingness.
- 2) Dispositional mindfulness will be positively correlated with activity engagement.
- 3) Optimism will mediate the relation between mindfulness and pain acceptance.

Although specific hypotheses are not derived, correlations for each facet of dispositional mindfulness (non-reacting, observing, acting with awareness, describing, and non-judging) with each facet of pain acceptance (pain willingness and activity engagement) were examined.

## Method

### Participants

Participants were recruited online from the general population using Mechanical Turk (MTurk;  $n = 228$ ) and advertisements in chronic pain forums and mindfulness forums on the social news aggregation, web content rating, and discussion website, Reddit ( $n = 35$ ). Participants recruited through MTurk received \$.25 for the 30-minute study. Participants recruited through Reddit were offered an entry into a raffle for an Amazon gift card in return for their participation. The ethnic/racial makeup of the sample was 66.9% White, 3.8% Black, 29.3% Asian, and 1.6% Mixed/Other. The mean age of the sample was 35.37 years. Exclusion criteria included (1) being less than 18 years of age, (2) reports of experiencing pain for less than 3 months, (3) reports of pain levels suggestive of malingering. The most common diagnosis was back/spinal pain ( $n = 144$ ; 54.8%), followed by headaches/migraines ( $n = 85$ ; 32.3%) and neuropathic pain ( $n = 36$ ; 13.7%). The majority of participants reported chronic pain that lasted 12 months or more ( $n = 133$ ; 50.6%). A small portion of the sample described chronic pain that was not current or ongoing ( $n = 34$ , 12.9 %) while the majority of participants described their current experience with chronic pain that was ongoing ( $n = 224$ ; 85.2%). Previous or current experiences with psychiatric conditions were common. The most common

psychiatric condition reported was anxiety disorder ( $n = 101$ , 38.4%), followed by mood disorder/depression ( $n = 65$ , 24.7%).

A total of 84 participants (31.9%) reported having undergone surgery for their pain-related condition. A majority of participants reported some form of previous or current prescriptive drug treatment for their pain-related condition (22.4% analgesic, 9.5% hormones, anti-inflammatory 45.2%). Following suggestions by Fritz and MacKinnon (2007) and effect sizes obtained from Malinowski and Lim (2015) and Wright et al. (2011), a sample size of 258 was required to test for mediation.

### Materials

Informed consent page. Participants were presented with a consent page containing information about the study purpose, requirements, risks, benefits, and incentives (see Appendix A).

The Five Facet Mindfulness Questionnaire (FFMQ). Dispositional mindfulness was measured with the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The FFMQ is a scale consisting of 39 items assessing five core components of mindfulness: observing, describing, acting with awareness, non-judging, and non-reacting. Participants responded to items (e.g., “I pay attention to how my emotions affect my thoughts and behavior”) on a 5-point Likert-type scale from 1 (*never or very rarely true*) to 5 (*very often or always true*). The FFMQ has been supported as psychometrically sound across studies, with internal consistencies among subscales, construct and predictive validity, and confirmative factor analyses (Baer et al., 2006; Bruin, 2012). In

the current study, internal consistency was demonstrated across all subscales ( $\alpha = .787$ : observing;  $\alpha = .829$ : describing;  $\alpha = .880$ : act-aware;  $\alpha = .883$ : non-judging;  $\alpha = .813$ : non-reacting) (see Appendix B).

The Life Orientation Test Revised (LOT-R). Optimism was measured using the Life Orientation Test Revised (LOT-R; Scheier, Carver, & Bridges, 1994). The scale is made up of 10 statements assessing the general level of optimism with which the participant approaches situations in life (e.g., “I’m always optimistic about my future”, “I rarely count on good things happening to me”). Participants read each statement and rated the degree to which they agree or disagree using a 5-point Likert scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Higher scores indicated higher levels of optimism. The LOT-R has shown adequate internal consistency ( $\alpha = .78$ ) and test-retest reliability ( $r = .79$ ; Scheier et al., 1994). In the current study, strong internal consistency was demonstrated ( $\alpha = .827$ ) (see Appendix C).

Chronic Pain Acceptance Questionnaire - Revised (CPAQ-R). Pain acceptance was assessed with the Chronic Pain Acceptance Questionnaire - Revised (CPAQ-R; McCracken et al., 2006) which is an updated version of the original 20-item Chronic Pain Acceptance Questionnaire (CPAQ; McCracken et al., 2004). Participants responded to positively worded items such as “Although things have changed, I am living a normal life despite my chronic pain” on a 7-point Likert scale that ranged from 0 (*never*) to 6 (*always*). The CPAQ-R displays strong internal consistency, with alphas of .82 (activity engagement) and .78 (pain willingness). Additionally, the two factors of the CPAQ-R

have been found to significantly predict pain-related disability and distress, thus indicating predictive validity. In the current study, strong internal consistency was documented ( $\alpha = .847$ : pain willingness;  $\alpha = .903$ : activity engagement) (see Appendix D).

### Supplementary Measures

Demographics. A demographic questionnaire was used to assess basic demographic information (age, sex, race, and ethnicity) as well as information about duration of pain, pain levels, diagnoses, and treatment for pain-related illnesses and chronic pain (see Appendix E).

Attention checks. Attention checks were implemented as a means of assessing participant attention while completing the survey. In order to justify exclusion of participants who failed to pay attention or follow instructions, two attention check questions were used.

### Procedure

Participants were recruited online from the general population using Mechanical Turk and Reddit. During the informed consent process, participants were told that the purpose of the study was to understand individual differences in responses to pain. After giving informed consent, participants were directed to a secure website that is not publicly accessible. Completion of the survey in its entirety took no more than 30 minutes. The study was conducted entirely online and through a single survey. Upon completion and leaving the Qualtrics survey, participants were thanked for their

participation and were presented with a debrief sheet containing contact information for the researchers, the University Institutional Review Board, and counseling services.

### Data Analysis

Pearson's  $r$  coefficients were used to test the first hypothesis that dispositional mindfulness will be positively correlated with pain willingness and the second hypothesis that dispositional mindfulness will be positively correlated with activity engagement.

A simple mediation model was used to test the third hypothesis that optimism will mediate the relation between mindfulness and pain acceptance. A simple mediation model includes three relations and two effect pathways (Hayes, 2013). In the current model, the three relations are:  $a$ , dispositional mindfulness (predictor) to optimism (mediator);  $b$ , optimism to pain acceptance (criterion); and  $c'$ , dispositional mindfulness to pain acceptance. The two pathways that are included in the total effect ( $c$ ; the relation between the predictor variable and the outcome variable) are the direct effect ( $c'$ ; the amount of variance in pain acceptance accounted for by dispositional mindfulness while controlling for optimism), and the indirect effect, the amount of variance in pain acceptance accounted for by dispositional mindfulness through optimism.

Analyses were performed using SPSS version 25. The PROCESS macro, developed by Hayes (2013), was used to test the significance of the indirect effect. PROCESS uses ordinary least squares regression to infer a linear relation. A theoretical sample is formed by confidence interval bootstrapping (no fewer than 5,000 resamples are recommended; Hayes, 2009). Bootstrapping allows for inferences based on the effects

rather than on the sample distribution. Five thousand bootstrap resamples and 95% confidence intervals were used in the current study. The confidence intervals indicated whether the indirect effect was statistically significant from zero ( $\alpha = .05$ , two-tailed). If the confidence interval does contain zero, then the indirect effect can be interpreted as not statistically different from zero. Percent mediation ( $P_M$ ) was used to measure the effect size of the indirect effect. This method created a ratio of the indirect effect to the total effect and designated the proportion of the total effect that was accounted for by the indirect effect (Preacher & Kelley, 2011).

## Results

### Data Cleaning, Screening, and Assumptions

Data were cleaned, screened, tested for assumptions, and analyzed using SPSS statistical software. A total of 554 people participated in the study. Six participants were removed from analysis for completing less than 90% of the survey (McCabe, Mack, & Fleeson, 2012). For participants who were missing less than 10% of responses, missing responses were mean imputed (a total of 30 missing values; Schafer & Graham, 2002).

Univariate outliers were addressed by identifying participants whose responses were 3.29 standard deviations above or below the mean (Tabachnick & Fidell, 2012). Two participant's scores on the mindfulness composite were more than 3.29 standard deviations above the mean and were replaced with Winsorized values (Tabachnick & Fidell, 2012). Multivariate outliers were assessed using Mahalanobis distance. One participant's responses were identified as multivariate outliers and thus were removed from the dataset. There were a large number of participants who did not pass either one or both of the attention checks incorporated into the survey and were removed from the dataset (122 participants were removed for failing the first attention check; 72 participants were removed for failing the second attention check). Duplicate IP addresses are a cause of concern given that the survey was given exclusively online. A total of 23 participants were removed for having duplicated IP addresses assigned to their



submission. A total of 13 participants were removed for answering illogically to demographic items regarding age and duration of pain. A total of 38 participants were removed from the dataset for not having experienced pain for at least 3 months. To control for potential exaggeration of symptoms, cases were excluded based on extremely high scores on the Least and Current Pain responses. Likely exaggeration was assessed by using the sum of these two pain scales. A score  $\geq$  or  $>$  16.5 was used as the cutoff as this score yielded a False Positive of 3.5% when reanalyzing published data from Bianchini et al., (2018) who used a known-groups design to determine self-reported malingering. Based on this criteria, 16 participants were removed. The final participant total was 263.

Use of a multiple regression model requires testing several common data assumptions: normality, linearity, independence, and lack of multicollinearity and heteroscedasticity. Univariate normality was assessed using skew and kurtosis statistics. Skew statistics for composite scores for the primary study variables all fell between -1 and 1, and kurtosis statistics for composite scores for the primary study variables all fell between -2 and 2. Linearity was tested with visual inspection of the scatterplots for each variable combination. No non-linear patterns were identified, indicating the assumption of linearity was met. Homoscedasticity was assessed with a visual inspection of the P-P Plots (plotting residuals against predicted values). No patterns were present indicating heteroscedasticity. All variable combinations had a Durbin-Watson value close to 2, with values ranging from 2.06 to 2.13, indicating the assumption of independence was met.

The tolerance and variance inflation factors were used to test for multicollinearity. The tolerance values were all above .2 and the variance inflation factors were all below 10, indicating no multicollinearity in the data (Field, 2013; Tabachnick & Fidell, 2012).

### Bivariate Correlations

Table 1 presents the bivariate correlations for and Table 2 presents descriptives for age, the mindfulness subscales and composite, optimism, pain willingness, and activity engagement. The results showed that pain willingness was moderately and positively correlated with acting with awareness ( $r [261] = .302, p < .001$ ) and non-judging ( $r [261] = .358, p < .001$ ), whereas it was weakly and negatively correlated with observing ( $r [261] = -.252, p < .001$ ). There was a small positive correlation between pain willingness subscale scores and scores on the mindfulness composite, ( $r[261] = .167, p = .007$ ). There was also a moderate and positive correlation between pain willingness and optimism ( $r [261] = .243, p < .001$ ). The results also showed that activity engagement was moderately and positively correlated with observing ( $r [261] = .321, p < .001$ ), describing ( $r [261] = .368, p < .001$ ), and non-reacting ( $r [261] = .490, p < .001$ ). There was a moderate and positive correlation between activity engagement subscale scores and scores on the mindfulness composite ( $r [261] = .392, p < .001$ ). There was also a moderate and positive correlation between activity engagement and optimism ( $r [261] = .404, p < .001$ ) (see Table 1).

Table 1  
*Bivariate Correlations for Survey Measures*

Variables	1	2	3	4	5	6	7	8	9	10
1. Age (in years)	-									
2. Mindfulness Observing	.125*	-								
3. Mindfulness Describing	.327**	.401**	-							
4. Mindfulness Acting with Awareness	.348**	.052	.497**	-						
5. Mindfulness Nonjudging	.287**	-.059	.371**	.612**	-					
6. Mindfulness Nonreactivity	.098	.428**	.310**	-.007	.005	-				
7. Mindfulness Composite Total	.383**	.516**	.800**	.715**	.656**	.497**	-			
8. Optimism- Mean	.202**	.112	.346**	.367**	.405**	.275**	.478**	-		
9. Pain Willingness- Sum	.208**	-.252**	.119	.302**	.358**	-.118	.167**	.243**	-	
10. Activity Engagement- Sum	.066	.321**	.368**	.100	.060	.490**	.392**	.404**	-.031	-

Note. \*  $p < .05$ . \*\*  $p < .01$ .

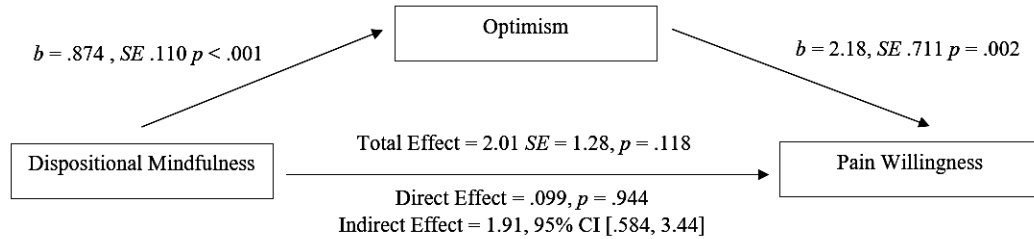
Table 2  
*Descriptive Statistics for Survey Measures*

	<i>M</i>	<i>SD</i>	<i>Range</i>
Age (in years)	35.37	11.31	18.00 – 73.00
Mindfulness Observing	3.42	0.70	1.25 – 5.00
Mindfulness Describing	3.32	0.75	1.38 – 5.00
Mindfulness Acting with Awareness	3.19	0.85	1.13 – 5.00
Mindfulness Nonjudging	3.11	0.88	1.00 – 5.00
Mindfulness Nonreactivity	3.16	0.73	1.00 – 5.00
Mindfulness Composite Total	3.24	0.50	1.71 – 4.60
Optimism- Mean	3.13	0.92	1.00 – 5.00
Pain Willingness- Sum	32.87	9.68	9.00 – 60.00
Activity Engagement- Sum	49.62	12.47	12.00 – 77.00

### Mediation Analyses

Because age was positively correlated with the dispositional mindfulness composite, optimism, and pain willingness, age was entered as a covariate in both mediation analyses. Pain duration did not correlate with optimism, pain willingness, activity engagement, or dispositional mindfulness. The same was the case for pain severity, with one exception. Pain severity was negatively correlated with pain

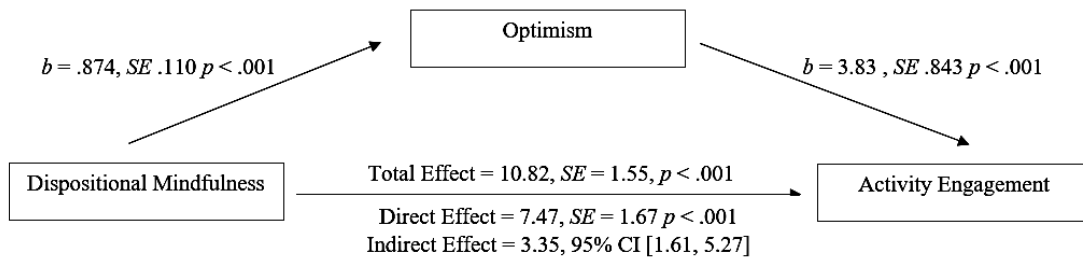
willingness,  $r(261) = -.334, p < .001$ . Because neither pain severity nor pain duration were correlated with both predictor variables and criterion variables, we did not control for pain severity or pain duration in the mediation analyses. Controlling for age, we found that the relation between dispositional mindfulness and optimism was significant and positive. Higher levels of dispositional mindfulness were associated with higher levels of optimism. The data also suggests a positive correlation between optimism and pain willingness. Higher optimism was associated with higher levels of pain willingness. The total effect for the relation between dispositional mindfulness and pain willingness, or the sum of the direct and indirect effects, was equal to a point estimate of 2.01. The indirect effect, assessing the variance explained by optimism in the relation between dispositional mindfulness and pain willingness was significant (point estimate of 1.91; 95% CI [.584, 3.44]; completely standardized indirect effect = .098). This suggests that dispositional mindfulness is positively related to pain willingness through its positive association with optimism. The direct effect of dispositional mindfulness on pain willingness did not remain significant (point estimate of .099; 95% CI [-2.66, 2.86]) in this model (see Figure 1).



*Figure 1.* Mediation model of Dispositional Mindfulness as a predictor of Pain Willingness, mediated by Optimism. The confidence interval for the indirect effect is a bootstrapped CI based on 5,000 resamples.

Controlling for age, we also found that the relation between optimism and activity engagement was significant, such that higher levels of optimism were associated with higher reports of activity engagement. The total effect for the relation between dispositional mindfulness and activity engagement, or the sum of the direct and indirect effects, was equal to a point estimate of 10.82. The indirect effect, assessing the variance explained by optimism in the relation between dispositional mindfulness and activity engagement was significant (point estimate of 3.35; 95% CI [1.61, 5.27]; completely standardized indirect effect = .133). This suggests that dispositional mindfulness is positively related to activity engagement through its positive association with optimism.

The direct effect of dispositional mindfulness on activity engagement remained significant (point estimate of 7.47; 95% CI [4.19, 10.74]) in this model (see Figure 2).



*Figure 2.* Mediation model of Dispositional Mindfulness as a predictor of Activity Engagement, mediated by Optimism. The confidence interval for the indirect effect is a bootstrapped CI based on 5,000 resamples.

## Discussion

Chronic pain is associated with many indicators of maladjustment, including increased anxiety and depression (Beesdo et al., 2010; Cui, Matsushima, Aso, Masuda, & Makita, 2009; Kato, Sullivan, Evengård, & Pedersen, 2006; Lee & Tsang, 2009), increased drug use and misuse (Alford et al., 2016), and decreased financial flexibility (Gaskin & Richard, 2012). Coming from a different angle, the current study attempts to understand what predicts adjustment to chronic pain. Pain acceptance is one psychological process that appears to be critical in adaptation to chronic pain (Carvalho, Gillanders, Palmeira, Pinto-Gouveia, & Castilho, 2018). Previous work has indicated that dispositional mindfulness is associated with experiential acceptance and psychological flexibility as well as pain acceptance among patients experiencing chronic pain (Costa & Pinto-Gouveia, 2011; deBoer et al., 2014). The current study sought to address three main gaps in the literature. First, the preliminary evidence linking mindfulness and pain acceptance (Costa & Pinto-Gouveia, 2011) is limited in that it involved one broad conceptualization of mindfulness, holding painful thoughts and feelings in mindful awareness. Second, previous studies have only examined links between mindfulness and pain acceptance in samples recruited from primary and tertiary care settings (e.g., Costa & Pinto-Gouveia, 2011; deBoer et al., 2014). Third, little empirical work has examined specific psychological resources that may predict more positive responses to pain among

individuals with more mindful dispositions. We expected that five individual components of dispositional mindfulness (observing, describing, acting with awareness, nonjudging, nonreactivity) would be positively associated with pain willingness (Hypothesis 1) and activity engagement (Hypothesis 2). Previous research has indicated positive associations between mindfulness and optimism (e.g., Malinowski & Lim, 2015) and optimism has been shown to predict acceptance of pain (Wright et al., 2011). Thus, we tested a mediational hypothesis, whereby dispositional mindfulness would be positively associated with optimism and optimism would in turn be positively associated with both pain willingness and activity engagement (Hypothesis 3).

#### Implications: Hypothesis 1-2

Hypothesis 1 was partially supported. Acting with awareness and nonjudging were the only mindfulness components that were positively associated with pain willingness. Other components of mindfulness were either negatively associated with pain willingness (observing) or were nonsignificant predictors of pain willingness (describing, nonreactivity). Pain willingness involves the recognition that avoidance and control are often ineffective coping mechanisms in terms of adapting to persistent pain (McCracken, Vowles, & Eccleston, 2006). It is possible that acting with awareness and nonjudging may be more compatible with or conducive to this recognition than observing, describing, and nonreactivity. Previous research has suggested that engaging in induced mindfulness-based interventions can help with reducing physical and psychological pain outcomes (Grossman et al., 2007), as well as increasing pain



acceptance and life satisfaction in the chronic pain sample (Henriksson et al., 2016). It is possible that, to assist those who especially struggle with avoidance and control in managing their pain, mindfulness interventions should highlight acting with awareness and perhaps discourage a tendency to evaluate experiences as good or bad.

Results also provided partial support for Hypothesis 2. Compared to pain willingness, however, more components of mindfulness were positive predictors of activity engagement (i.e., observing, describing, nonreactivity). Interestingly, the only two significant positive predictors of pain willingness, acting with awareness and nonjudging, were not significant predictors of activity engagement. Considering the individual components of mindfulness as predictors of pain willingness and activity engagement thus revealed that the set of mindfulness components that predict activity engagement are quite different from those that predict pain willingness. Further, mindfulness components appear to be stronger and more consistent predictors of activity engagement compared to pain willingness. In this way, results of the present study fall in parallel with Costa and Pinto-Gouveia (2011) who also documented a stronger association between mindfulness and activity engagement compared to mindfulness and pain willingness in a sample of Portuguese pain patients. Results of the current study suggest that a variety of mindful tendencies may be more common among those are more accepting of pain. Moreover, because our sample was recruited from the general population and not a primary or tertiary care setting these relationships may exist among

individuals who are coping with pain, regardless of whether they are currently seeking medical treatment for pain.

It is somewhat surprising that one component of mindfulness, observing, was positively related to activity engagement but negatively related to pain willingness. These results support the need to distinguish pain willingness from activity engagement as a separate aspect of pain acceptance. From a therapeutic perspective, these results also suggests that the broad application of mindfulness interventions to all individuals who are struggling to cope with pain may not be the most efficient or effective approach. Though replication of the present findings and longitudinal or experimental evidence indicating direction and causation will be a necessary to support clinical applications, tailored mindfulness interventions targeting an individual's unique barriers to pain management may be warranted. It is possible that patients who struggle with avoidance and control over pain-related stressors (i.e., those low on pain willingness) may risk iatrogenic effects with over-emphasis on observing one's sensations, perceptions, thoughts, and feelings (i.e., the mindfulness principle of observing). On the other hand, to encourage forging ahead with daily activities in the face of pain, patients may especially benefit from mindfulness interventions that emphasize observing and labeling experiences. These contingencies may become more or less relevant with time as an individual adjusts to the diverse obstacles of pain management.

### Implications: Hypothesis 3

Results of the current study also support Hypothesis 3. Optimism accounted for a significant indirect associations between dispositional mindfulness and pain willingness and a significant indirect association between dispositional mindfulness and activity engagement. The finding that dispositional mindfulness was no longer associated with pain willingness after accounting for optimism suggests that the positive association between mindfulness and pain willingness documented in the current study and in previous work (Costa & Pinto-Gouveia, 2011) may largely be due to its shared features with or facilitation of optimism.

Dispositional mindfulness's total effect on activity engagement as well its indirect effect on activity engagement via optimism were much larger than its total and indirect effects on pain willingness. However, dispositional mindfulness maintained its association with pain willingness after accounting for optimism. Taken together, these findings have two noteworthy implications. First, optimism has the potential to provide a stronger account of the mechanism underlying the relationship between dispositional mindfulness and activity engagement than the relationships between dispositional mindfulness and pain willingness. Second, there likely are other psychological resources, beyond optimism, that account for the relatively stronger association between dispositional mindfulness and activity engagement.

The previously mentioned argument that optimistic individuals are able to cope with conflict more efficiently and are able to disengage from goals that are evaluated as unattainable (Carver et al., 2010; MacLeod, 1996; Rasmussen et al., 2006; Segerstrom & Nes, 2006) adds important insight for interpreting the mediation findings of the current study. It is possible that receptive non-reactive mind states in which individuals observe and describe their thoughts and feelings bolster optimism making it easier for individuals to cope with the conflict of experiencing pain while attempting to remain active. Acting with awareness and maintaining nonjudgmental mind states, on the other hand, may make it easier for those managing chronic pain to stay optimistic and disengage from the unattainable goals of avoiding and controlling pain.

### Limitations

The biggest limitation of the current study is the cross-sectional nature of these data do not allow us to determine the temporal nature of the relations between mindfulness and optimism and optimism and pain acceptance. Though our interpretations have focused on how mindfulness might lead to activity engagement and pain willingness, the same variables may relate to one another in the opposite direction. It is possible, for example, that exposure to the outdoors and increased mobility made possible by activity engagement promote nonreactive mind states. Although the language of mediation analyses refers to relationships as direct or indirect “effects,” the data analyzed here are cross-sectional, and cause-and-effect relationships are strictly

theoretical. It should also be noted that the correlations observed may be due, in part, to common method variance related to the mode of report for the mindfulness, optimism, and pain acceptance variables. Finally, given that the survey was administered online, environmental factors may have influenced participant recording and are unknown in type to the researchers.

### Future Research

Future research should focus on psychological processes other than optimism that might mediate the relation between dispositional mindfulness and pain acceptance. Multiple mediator models could offer a more comprehensive means of understanding the psychological processes that underlie their association. Future studies might also investigate the unique contribution each component of mindfulness makes in the prediction of pain acceptance using regression models rather than simply examining bivariate correlations. It may also be worth considering whether certain factors such as socioeconomic status or the course or duration of one's pain-related condition may change the ways in which mindfulness relates to pain acceptance. Our results build upon Boselie et al.'s (2014) experimental evidence that inducing optimism counteracts the negative effects of pain on performance in an executive function task and add credence to their call for the development and empirical testing of mindfulness-based interventions to enhance optimism and improve adjustment in chronic pain patients (Boselie et al., 2014). A key argument in favor of mindfulness-based interventions in the context of chronic pain management is that learning mindfulness principles does not have to involve long

commutes to a health care professional's office, large financial investments, substantial time commitments or glaring vocational interruptions. Mindfulness components, rather, involve subtle change in thinking that can be exercised in small increments. Internet-based mindfulness interventions (e.g., Heckenberg et al., 2019) can even be undertaken at home, without the need for face-to-face professional guidance. The accessibility of mindfulness lends itself to a wide variety of people in a wide variety of financial and geographic circumstances.

### Conclusion

The current study adds to the existing literature on dispositional predictors of pain acceptance. While results of previous studies are in many ways consistent with the current study's findings, our findings offer a more comprehensive representation of dispositional mindfulness than in previous studies that have explored its relation to pain acceptance. Results replicate a previous finding that dispositional mindfulness is more strongly associated with activity engagement than pain willingness (Costa & Pinto-Gouveia, 2011) and extend previous research by identifying optimism as one mechanism via which dispositional mindfulness might be associated with pain acceptance. A benefit of exploring multiple components of mindfulness was elucidating the different ways in which pain willingness and activity engagement relate to mindfulness. With replication, our findings could better inform clinicians' approaches to promoting pain acceptance in chronic pain treatment using the tenets of mindfulness.

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## APPENDIX A

### Informed Consent

**Consent is hereby given to participate in the study titled:** Mindfulness, Optimism, and Pain Acceptance

**PURPOSE:** The purpose of this study is to examine the relationship between mindfulness and pain acceptance in a pain-patient sample.

**DURATION:** The length of time you will be involved with this study is approximately 30 minutes.

**PROCEDURES:** If you agree to be in this study, we will ask you to complete survey questions related to your experience of pain and emotions. There are no right or wrong answers, and you may quit the study withdrawing your participation at any time without penalty.

**RISKS:** There are no known risks with this study beyond minor distress from considering situations that could be emotionally upsetting and involve physical pain. The benefits of participation are monetary compensation and having your opinions and perspectives included in research about pain.

**CONFIDENTIALITY:** The records of this study will be kept private. Your name will not be attached to answers you provide. The investigators will have access to the raw data. In any sort of report that is published or presentation that is given, we will not include any information that will make it possible to identify a participant. This number will not be tied to any type of identifying information about you. Once collected, all data will be kept in secured files, in accord with the standards SFASU, federal regulations, and the American Psychological Association. In addition, please remember that the experimenters are not interested in any individual person's responses. We are interested in how people in general respond to the scenarios and measures.

**VOLUNTARY NATURE OF THE STUDY:** Your participation in this study is voluntary. In addition, you may choose to not respond to individual items in the survey. Your decision whether to participate will not affect your current or future relations with SFASU nor any of its representatives. If you decide to participate in this study, you are free to withdraw from the study at any time without affecting those relationships.

**CONTACTS AND QUESTIONS:** Sarah Savoy, Ph. D.: savoyse@sfasu.edu (936) 468-5117; Kelli Miles: mileskj@jacks.sfasu.edu (469) 644-2999. If you have questions or concerns regarding this study and would like to speak with someone other than the experimenters, you may contact The Office of Research and Sponsored Programs at (936) 468-6606.

**BENEFITS:** Mechanical Turk participants in the study will be compensated \$0.25 upon completion of the survey and Reddit participants will have the opportunity to enter into a \$25.00 raffle.

## APPENDIX B

### Five Facet Mindfulness Questionnaire

Please rate each of the following statements with the number that best describes *your own opinion* of what is *generally true for you*.

Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

1. When I'm walking, I deliberately notice the sensations of my body moving.
2. I'm good at finding words to describe my feelings.
3. I criticize myself for having irrational or inappropriate emotions.
4. I perceive my feelings and emotions without having to react to them.
5. When I do things, my mind wanders off and I'm easily distracted.
6. When I take a shower or bath, I stay alert to the sensations of water on my body.
7. I can easily put my beliefs, opinions, and expectations into words.
8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
9. I watch my feelings without getting lost in them.
10. I tell myself I shouldn't be feeling the way I'm feeling.
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
12. It's hard for me to find the words to describe what I'm thinking.
13. I am easily distracted.
14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
15. I pay attention to sensations, such as the wind in my hair or sun on my face.
16. I have trouble thinking of the right words to express how I feel about things.
17. I make judgments about whether my thoughts are good or bad.
18. I find it difficult to stay focused on what's happening in the present.
19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.



21. In difficult situations, I can pause without immediately reacting.
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
23. It seems I am "running on automatic" without much awareness of what I'm doing.
24. When I have distressing thoughts or images, I feel calm soon after.
25. I tell myself that I shouldn't be thinking the way I'm thinking.
26. I notice the smells and aromas of things.
27. Even when I'm feeling terribly upset, I can find a way to put it into words.
28. I rush through activities without being really attentive to them.
29. When I have distressing thoughts or images, I am able just to notice them without reacting.
30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
32. My natural tendency is to put my experiences into words.
33. When I have distressing thoughts or images, I just notice them and let them go.
34. I do jobs or tasks automatically without being aware of what I'm doing.
35. When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about.
36. I pay attention to how my emotions affect my thoughts and behavior.
37. I can usually describe how I feel at the moment in considerable detail.
38. I find myself doing things without paying attention.
39. I disapprove of myself when I have irrational ideas.

## APPENDIX C

### Life Orientation Test – Revised

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

A = I agree a lot

B = I agree a little

C = I neither agree nor disagree

D = I disagree a little

E = I disagree a lot

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax.
3. If something can go wrong for me, it will. (R)
4. I'm always optimistic about my future.
5. I enjoy my friends a lot.
6. It's important for me to keep busy.
7. I hardly ever expect things to go my way. (R)
8. I don't get upset too easily.
9. I rarely count on good things happening to me. (R)
10. Overall, I expect more good things to happen to me than bad.

## APPENDIX D

### Chronic Pain Acceptance Questionnaire – Revised

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is ‘Always True,’ you would write a 6 in the blank next to that statement.

0	1	2	3	4	5	6
Never true	Very rarely true	Seldom True	Sometimes true	Often true	Almost always true	Always true

1. I am getting on with the business of living no matter what my level of pain is.
2. My life is going well, even though I have chronic pain.
3. It’s OK to experience pain.
4. I would gladly sacrifice important things in my life to control this pain better.
5. It’s not necessary for me to control my pain in order to handle my life well.
6. Although things have changed, I am living a normal life despite my chronic pain.
7. I need to concentrate on getting ride of my pain.
8. There are many activities I do when I feel pain.
9. I lead a full life even though I have chronic pain.
10. Controlling my pain is less important than any other goals in my life
11. My thoughts and feelings about pain must change before I can take important steps in my life.
12. Despite the pain, I am now sticking to a certain course in my life.
13. Keeping my pain level under control takes first priority whenever I’m doing something.
14. Before I can make any serious plans, I have to get some control over my pain.
15. When my pain increases, I can still take care of my responsibilities.
16. I will have better control over my life if I can control my negative thoughts about pain.
17. I avoid putting myself in situations where my pain might increase.
18. My worries and fears about what pain will do to me are true.
19. It’s a great relief to realize that I don’t have to change my pain to get on with life.
20. I have to struggle to do things when I have pain.

## APPENDIX E

### Demographic Questions

1. Sex
2. Race/Ethnicity
3. Are you Hispanic or Latino?
4. What is your age in years? (example: 32)
5. Are you currently experiencing chronic pain that has lasted for a period of at least 3 months?
6. Have you been in chronic pain in the past (for a period of at least 3 months)?
7. Please indicate which diagnoses best describes your pain condition(s).
8. In what year did your pain start?
9. How long did the pain last/has the pain lasted? (in months)
10. Please indicate all areas of injury/pain.
11. What medications are you currently taking or have taken in the past to treat your pain related condition?
12. Have you ever undergone surgery for your pain related condition?
13. If you have ever undergone surgery, when was the most recent surgery?
14. Use the pain scale described below to rate your pain for the question below:
  - 0- pain free
  - 1- very minor annoyance, occasional minor twinges
  - 2- minor annoyance, occasional strong twinges
  - 3- annoying enough to be distracting
  - 4- can be ignored if you are really involved in your work/task, but still distracting
  - 5- cannot be ignored for more than 30 minutes
  - 6- cannot be ignored for any length of time, but you can still go to work and participate in social activities
  - 7- makes it difficult to concentrate, interferes with sleep, but you can still function with effort
  - 8- physical activity is severely limited; you can read and talk with effort; nausea and dizziness caused by pain
  - 9- unable to speak, crying out or moaning uncontrollably, near delirium

10- unconscious, pain makes you pass out

What number on the pain scale (0-10) best describes your pain right now?

15. Use the pain scale described below to rate your pain for the question below:

0- pain free

1- very minor annoyance, occasional minor twinges

2- minor annoyance, occasional strong twinges

3- annoying enough to be distracting

4- can be ignored if you are really involved in your work/task, but still distracting

5- cannot be ignored for more than 30 minutes

6- cannot be ignored for any length of time, but you can still go to work and participate in social activities

7- makes it difficult to concentrate, interferes with sleep, but you can still function with effort

8- physical activity is severely limited; you can read and talk with effort; nausea and dizziness caused by pain

9- unable to speak, crying out or moaning uncontrollably, near delirium

10- unconscious, pain makes you pass out

What number on the pain scale (0-10) best describes your worst pain?

16. Use the pain scale described below to rate your pain for the question below:

0- pain free

1- very minor annoyance, occasional minor twinges

2- minor annoyance, occasional strong twinges

3- annoying enough to be distracting

4- can be ignored if you are really involved in your work/task, but still distracting

5- cannot be ignored for more than 30 minutes

6- cannot be ignored for any length of time, but you can still go to work and participate in social activities

7- makes it difficult to concentrate, interferes with sleep, but you can still function with effort

8- physical activity is severely limited; you can read and talk with effort; nausea and dizziness caused by pain

9- unable to speak, crying out or moaning uncontrollably, near delirium

10- unconscious, pain makes you pass out

What number on the pain scale (0-10) best describes your least pain?

17. Use the pain scale described below to rate your pain for the question below:

0- pain free

1- very minor annoyance, occasional minor twinges

2- minor annoyance, occasional strong twinges

3- annoying enough to be distracting

4- can be ignored if you are really involved in your work/task, but still distracting

5- cannot be ignored for more than 30 minutes

6- cannot be ignored for any length of time, but you can still go to work and participate in social activities

7- makes it difficult to concentrate, interferes with sleep, but you can still function with effort

8- physical activity is severely limited; you can read and talk with effort; nausea and dizziness caused by pain

9- unable to speak, crying out or moaning uncontrollably, near delirium

10- unconscious, pain makes you pass out

What number on the pain scale (0-10) best describes your average pain?

18. Please indicate any previous or current psychiatric history.

19. Please indicate any previous or current medical diagnosis/diagnoses.

## APPENDIX F

### Debriefing Form

Your time and participation are appreciated. The purpose of this study was to examine the relationship between mindfulness and pain acceptance in a pain-patient sample.

If you have any questions or concerns please contact Kelli Miles at [mileskj@jacks.sfasu.edu](mailto:mileskj@jacks.sfasu.edu) or Dr. Savoy at [savoysc@sfasu.edu](mailto:savoysc@sfasu.edu). The researchers may also be reached by phone through the psychology department: (936) 468-4402. Additionally, you may also contact the SFASU Office of Research and Sponsored Programs at [orsp@sfasu.edu](mailto:orsp@sfasu.edu) or 936-468-6606 if you would like more information regarding any questions or concerns.

As a reminder, the information you provided today is confidential and is not attached to your identifying information. In the event you feel any psychological distress, the SFA Counseling Services may be contacted at (936)-468-2401. If you would like information about counseling services at SFASU you may click on the following link. <http://www.sfasu.edu/counselingservices/>

## VITA

After completing high school at Coppell High School in Coppell, Texas, Kelli went on to study communication sciences and disorders at The University of Mississippi in Oxford, Mississippi. She completed her Bachelor of Science in Communication Sciences and Disorders in May 2016. Kelli then went on to study at Stephen F. Austin State University in July 2018, where she received her Masters of Arts degree in General Psychology in December 2019.

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