ATTITUDES TOWARD MINDFULNESS

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Faculty Adviser: Dr. Amanda Sesko

Essay completed in partial fulfillment of the requirements for graduation with Global Honors, University of Washington, Tacoma

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Attitudes Toward Mindfulness and Adherence in Chronic Pain Management

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Abstract

Chronic pain is a global public health problem, affecting 10-25% of the population. Mindfulness is an effective treatment but requires consistency. Because of its benefit, it is important to examine obstacles to mindfulness practice. In order to determine if negative attitudes toward mindfulness are related to non-adherence, 748 adults with chronic pain were recruited to fill out a series of questionnaires assessing treatment adherence and attitudes toward mindfulness. We found that positive attitudes toward mindfulness predicted reduced adherence. However, those who had more positive feelings toward mindfulness made more *attempts* at the therapy. Upper and middle-class participants had more positive attitudes than lower class, but less adherence. Racial minorities had less positive attitudes than Whites, but more positive subjective feelings and greater adherence. The effect of class on attitudes and attempts indicates the need ground the therapy in localized social contexts.

Keywords: mindfulness, adherence, chronic pain, culture

Attitudes Toward Mindfulness and Adherence in Chronic Pain Management

Chronic pain affects 10-25% of the population, and exerts a greater burden on people of lower socioeconomic status, those in rural areas, and minorities (Day & Thorn, 2010; Goldberg & McGee, 2011; Treede et al., 2015). Globally, this burden is felt more by marginalized people who suffer health consequences from high allostatic load, and less access to quality treatment (Goldberg & McGee, 2011). Pain from injury, degenerative disease, or illness can lead to years of suffering, from a median of seven years, to more than twenty years for a fifth of patients (International Association for the Study of Pain, n.d.). Loss of ability due to pain can result in increased stress and isolation, exacerbating conditions which lower functionality and quality of life beyond the underlying dysfunction (Gerdle et al., 2019; Hall et al., 2011). These impacts to the individual ripple through community and economy via a diminished ability to contribute to the household as well as the burden of care on families and medical systems (Dueñas et al., 2016). Centralized pain syndromes—when pain exists because of neurological stimulus, and not from any physical threat—such as fibromyalgia, migraine, and chronic pelvic pain, are notoriously difficult to manage because the pathophysiology is less well understood (Eller-Smith et al., 2018). The current work examines an effective alternative treatment which has been gaining popularity among healthcare providers: Mindfulness.

Mindfulness as a Therapeutic Intervention

Mindfulness is a promising therapeutic intervention for reducing stress, lowering pain perception, and increasing coping skills in chronic pain patients; but lasting effects require a lifestyle change that is difficult to maintain (Davidson & Goleman, 2017; Davis et al., 2015). Mindfulness—the practice of intentionally and repetitively bringing awareness to the present moment—is free, widely available, and as effective as cognitive behavioral therapy as a

treatment for day-to-day chronic pain (Davis et al., 2015; Kabat-Zinn, 2013). Mindfulness can lower cortisol levels and stress reactivity, and increase immune system functioning and general wellbeing (Davidson & Goleman, 2017). However, mindfulness practices are not normalized in Western traditions to the extent that they are in cultures that have integrated spiritual meditation practices throughout their history. Therefore, mindfulness and meditation are likely to be more socially supported in their cultures of origin than for Western cultures. This study seeks to understand the socially constructed nature of attitudes toward mindfulness and how they relate to adherence in treatment programs for those experiencing chronic pain.

Increasing Adherence through the use of Mindfulness Treatment

Adherence is the degree to which a patient complies with and participates in the recommendation of their health care professionals and is dependent upon factors such as ability, social support, income, emotional factors, personality, complexity, and duration (Bogg & Roberts, 2013; Brannon et al., 2018; DiMatteo, 2004a, 2004b; DiMatteo et al., 2000; Falagas et al., 2008; Ingersoll & Cohen, 2008; Pollack et al., 2009; Stults-Kolehmainen & Sinha, 2014). Compliance with treatment directly affects healthcare outcomes for the patient, but patients have difficulty creating new habits. Simple, short-term “cures” are often easier for patients to maintain than long-term lifestyle and behavioral changes (Brannon et al., 2018).

In chronic pain patients, mindfulness has been shown to decrease stress reactivity and catastrophizing, increasing coping abilities and lowering perceptions of pain (Davis et al., 2015). Mindful responding—the metacognitive process of continuously returning attention to the present moment, and making this adjustment without judging oneself for wandering—is a key component of mindfulness; meditation practices and adherence to instruction have a same-day positive effect on mindful responding, and the ability to respond mindfully reduces experiences

of stress while increasing positive affect and reducing negative affect from the individual's baseline (Lacaille et al., 2018). Frequency of practice is correlated with stronger effects overall and a positive feedback loop is created between mindful responding and ability to adhere to mindfulness instruction (Lacaille et al., 2018).

In order to ingrain lasting changes to neurophysiology, an estimated 1000 hours of practice is required (Davidson & Goleman, 2017). For this reason, it is important to examine obstacles to the formation of mindfulness habits. Some barriers to adherence have been identified, such as the need for patient education and a perceived lack of knowledge, even among those who are familiar with mindfulness as a beneficial practice (Russell et al., 2018; Wahbeh & Oken, 2012). One possible barrier is a patient's attitude toward mindfulness practices.

The Effects of Attitudes towards Mindfulness on Adherence

Because adherence to medical treatment is low across age groups, it is important to identify individual attributes that contribute to non-adherence, such as personality traits, as well as beliefs across groups that transcend age, like cultures (Chia et al., 2006). Differences in adherence have been shown to have cultural biases rooted in perception of authority. Chia et al. (2006) found that culturally, Japanese older adults place physicians in high regard, and are likely to rely on authority figures, and therefore adhere to the regime; By contrast, African American adults suspected doctors' advice due to historical abuses and were less likely to adhere.

However, other cultural norms and beliefs may contribute to attitudes toward mindfulness. Recently, cultural competency training and attention to culture-bound syndromes has educated Western healthcare and mental health workers on how to best understand and treat patients from non-Western cultural backgrounds (Paniagua et al., 2013). Less attention has been paid to how patients from Western cultures are integrating and accepting beneficial methods

derived from non-Western traditions. As more empirical data becomes available, and mindfulness practices are integrated into Western medicine, it is important to understand how culturally constructed attitudes toward mindfulness can be addressed to provide the most benefit. Culturally constructed attitudes toward mindfulness might affect whether a person believes it is worth their time, or may contribute to negative perceptions of meditation practice or stigma toward those who practice meditation. We hypothesize that negative and ambivalent perceptions of and attitudes toward mindfulness will be related to lower patient adherence to mindfulness interventions.

Mindfulness is useful in managing physical health, including treatment-resistant chronic pain. However, patients may have conceptions of mindfulness as a spiritual practice outside their cultural comfort zone, or as a way to control thoughts and emotions, and therefore not related to the body. After unsuccessful allopathic care, mindfulness interventions may be perceived as dismissing pain as "all in your head." It is important to understand these conceptions in order to devise proper education and administration of programs.

Overview of Current Research

Beliefs and culture have an impact on a person's likelihood to comply with medication regimens—specifically, belief in the efficacy of an intervention predicts adherence (Chia et al., 2006). If mindfulness as an intervention is viewed as lacking medical credibility because it is outside of cultural norms, it may lower beliefs in efficacy, which may decrease adherence. Indeed, a patient's trust in a doctor's authority to prescribe an effective intervention predicts their likelihood to adhere (Chia et al., 2006). If the patient views meditation as a non-serious, ineffective, or inappropriate intervention (e.g., "they're saying it's all in my head"), this may decrease trust and lower adherence. Existing research on mindfulness and adherence examines

whether or not mindfulness increases adherence to other treatments, if adherence has a benefit, or takes into account the duration and difficulty, but does not examine whether someone's attitude toward mindfulness correlates with lack of adherence (Berghoff et al., 2017; Lacaille et al., 2018). Much of the research around treatment adherence is related to pharmaceuticals and Western medical treatments. Therefore, in the current work we investigate the relationship between attitudes towards mindfulness and adherence to mindfulness treatment among individuals experiencing chronic pain. We hypothesize negative or ambivalent attitudes toward mindfulness will be related to lower patient adherence to mindfulness interventions. In addition, we are interested in how this relationship may be affected by individual difference (in personality, need for cognitive closure) and vary across social groups (e.g., social class, race).

Method

Participants and Design

Participants were 748 adults recruited from online chronic pain communities on social media (Facebook and Reddit) who were directed via a flier to an online survey (328 Females, 379 Males, 1 Trans Woman, 1 Trans Man; 79.4% White, 5.2% Black, 6.3% Hispanic, 1.5% Asian, 4.8% American Indian or Alaska Native, 1% Hawaiian or Pacific Islander, 1.8% multiracial; *M* age = 34.03, *SD* = 9.40, ranged from 16 to 62). The most represented country of origin was the United States (89.3%, *n* = 668) while other countries made up 10.7% of the sample (*n* = 80). A majority considered themselves to be middle class (67.3%, *n* = 478) followed by lower class (18.2%, *n* = 129) and upper class (14.5%, *n* = 103). An additional 642 participants were excluded from data analysis for reasons such as giving nonsense answers. All data reported above and in the results section represent our final N with these participants excluded for giving gibberish answers (e.g., bots) and/or taking the survey multiple times (e.g., scammers). At the

end of the survey, participants were offered access to a second survey to anonymously enter their email address for a lottery to receive one of 400 Amazon Gift Cards as thanks for their time.

The design of the study was correlational, using self-reported survey data to observe the relationship between attitudes toward mindfulness and adherence to healthcare providers' mindfulness treatment plan, while controlling for and examining possible confounds or mediating factors (personality, need for cognitive closure, mindfulness, intensity of treatment, and demographic variables).

Procedure

Participants followed the link to an online survey, where they read and agreed to an informed consent document notifying them of the study's purpose, procedure, risks, benefits, and the voluntary nature of the study. Next, they were asked if they had experienced chronic pain lasting more than three months, and if their healthcare provider (such as a medical doctor, osteopath, nurse practitioner, psychotherapist, or rehabilitation specialist) had advised them to practice mindfulness or meditation for the purposes of dealing with their chronic pain conditions. Those who indicated yes to both screening questions were presented with the study. Those who answered no were directed to a page thanking them for their interest and informing them they did not meet the study qualifications.

To measure mindfulness, participants filled out the Fifteen-item Five Facet Mindfulness Questionnaire (Baer, 2003) on a scale from 1-never or very rarely true to 5-very often or always true. This instrument measures the five facets of mindfulness (observe, describe, act with awareness, non-judging of inner experience [nonjudge], non-reactivity to inner experience [nonreact]). Observe examples include, "When I take a shower or bath, I stay alert to the sensations of water on my body" and "I notice how foods and drinks affect my thoughts, bodily

sensations, and emotions." Describe examples include, "I have trouble thinking of the right words to express how I feel about things" and "Even when I'm feeling terribly upset, I can find a way to put it into words." Act with awareness examples include, "I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted" and "I do jobs or tasks automatically without being aware of what I'm doing." Nonjudge examples include, "I believe some of my thoughts are abnormal or bad and I shouldn't think that way" and "I tell myself I shouldn't be feeling the way I'm feeling." Nonreact examples include, "When I have distressing thoughts or images, I 'step back' and am aware of the thought or image without getting taken over by it" and "When I have distressing thoughts or images, I just notice them and let them go."

Next, participants were asked to quantify the advice of their healthcare professional and their adherence to that advice on a modified Brief Adherence Rating Scale (Byerly et al., 2008). First they were asked about the prescription "How many days did your healthcare professional advise you to practice mindfulness or meditation each week? Please give your answers in # of days (1 day…7 days)." Then they were asked about *attempts* at mindfulness "Over the <u>first month</u> of practicing mindfulness, in general how many times did you attempt the meditation you were prescribed each week?" (about 1 day a week - about 7 days a week). Finally, they were asked to use a slider bar from 1%-100% to report adherence (*non-adherence rate*), "Over the first month of practicing mindfulness, what percentage of times did you do *less than* the prescribed duration of mindfulness?"

Participants were then asked to rate a series of questions we designed about attitudes toward mindfulness on a Likert-type scale from 1-strongly disagree to 7-strongly agree. To understand the difference between personal beliefs and cultural beliefs, statements were divided into subscales of *belief in efficacy* and *sociocultural acceptability.* Example statements about

belief in the efficacy of mindfulness included, “Mindfulness is a legitimate medical practice” and “My doctor prescribed mindfulness because they believe the pain is primarily psychological rather than physical,” and “My chronic pain symptoms have improved since beginning a mindfulness practice.” Statements designed to measure sociocultural acceptability included “I would feel embarrassed if someone walked in on me during mindfulness practice”, and “Mindfulness is a common practice in my community” and “others are accepting of my mindfulness practice.” Participants additionally rated their personal feelings toward mindfulness on a feeling thermometer ranging from zero/cold/not positive to 100/hot/positive.

Next, participants completed a measure of Big-Five personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability [neuroticism]) using the Ten-Item Personality Inventory (Gosling et al., 2003). Participants were asked to rate word pairs following the statement “I see myself as:” on a scale from 1-Disagree Strongly to 7-Agree strongly. Openness items included, “open to new experiences, complex” and “conventional, uncreative.” Conscientiousness items included, “dependable, self-disciplined” and “disorganized, careless.” Extraversion items included, “extraverted, enthusiastic” and “reserved, quiet.” Agreeableness items included, “sympathetic, warm” and “critical, quarrelsome.” Emotional Stability items included, “calm, emotionally stable” and “anxious, easily upset.”

Need for cognitive closure (NCC; order, predictability, decisiveness, ambiguity, closed-mindedness) was then measured with the Brief Need for Closure Scale (Roets & Van Hiel, 2011) on a scale from 1-strongly disagree to 6-strongly agree. Order examples include, “I find that a well-ordered life with regular hours suits my temperament” and “I find that establishing a consistent routine enables me to enjoy life more.” Predictability examples include “I don't like

to go into a situation without knowing what I can expect from it" and "I don't like to be with people who are capable of unexpected actions." Decisiveness examples include, "When I am confronted with a problem, I'm dying to reach a solution very quickly" and "I would quickly become impatient and irritated if I would not find a solution to a problem immediately." Ambiguity examples include "I feel uncomfortable when I don't understand the reason why an event occurred in my life" and "I dislike it when a person's statement could mean many different things." Closed-Mindedness examples include "I feel irritated when one person disagrees with what everyone else in a group believes" and "I do not usually consult many different opinions before forming my own view."

To understand their subjective experience with chronic pain participants were asked to rate their pain with sliders on a scale of zero (no pain at all) to 100 (the most pain imaginable). Items included daily average pain, "On average, I rate my day-to-day chronic pain as," maximum pain ratings, "On the days I am experiencing the most pain from my chronic condition(s), I would rate my pain as," and minimum pain ratings, "On the days I am experiencing the least pain from my chronic condition(s), I would rate my pain as."

Finally, participants were asked to provide demographic information such as gender, biological sex, age, race, ethnicity, sexual orientation, socioeconomic status (lower, middle, upper class), country of residence, environment over the lifespan (urban, suburban, rural, mix) and religious affiliation. Participants were then debriefed about the true purpose of the study, thanked for their time, and asked if they would like to be placed into a lottery to receive a gift card for compensation. Those who indicated 'yes' were directed to a separate survey to enter their name and email. The emails were placed into a lottery to win a $5 Amazon gift card and winning participants were contacted with a gift card code.

Results

Correlations between Attitudes toward Mindfulness and Adherence

To test the main hypothesis, that positive attitudes toward mindfulness will be related to increased adherence, correlations between attitudes as measured on the attitude scale and the feeling thermometer and adherence were run. As depicted in Table 1, there was a significant relationship between positive attitudes toward mindfulness and more attempts, but lower adherence to prescribed mindfulness interventions. Specifically, on the attitudes scale, the higher participants rated efficacy of mindfulness, $r(720) = .10$, $p = .006$, sociocultural acceptability of mindfulness, $r(717) = .13$, $p < .001$, and overall mindfulness, $r(712) = .13$, $p < .001$, the higher their non-adherence rate. In addition, as participants' subjective ratings of feelings toward mindfulness on the feeling thermometer increased, the non-adherence rate at which they did *less than* prescribed also increased, and the effect was moderate $r(723) = .65$, $p < .001$. However, there was also a significant positive correlation between subjective feelings toward mindfulness on the feeling thermometer and attempts at mindfulness, $r(725) = .11$, $p = .004$.

To capture adherence to the prescribed amount of mindfulness, we computed a difference variable by taking the attempted amount away from the reported prescribed amount (prescribed – attempted, higher numbers = *more* adherence). Only one relationship was significant: As subjective feelings towards mindfulness on the feeling thermometer went up, adherence increased $r(724) = .10$, $p = .009$. We did not find any other significant relationships with this difference score for any of the other measures, we do not report on it further. No other significant relationships were found, $ps > .05$.

Correlations between Attitudes toward Mindfulness and Pain Experience

To test the relationship between attitudes towards mindfulness and experiences of pain, correlations were run between self-reported daily pain, highest pain days, the difference between high and low pain days (to assess the degree of variability in experienced pain; high – low) and attitudes toward mindfulness on the scale and on the feeling thermometer. The more average daily pain participants experienced, the higher their reported attitudes of the efficacy of mindfulness, $r(718) = .11$, $p = .003$, sociocultural acceptability of mindfulness, $r(714) = .16$, $p < .001$, and overall positive attitudes toward mindfulness, $r(710) = .16$, $p < .001$. Similarly, the more pain participants experienced on their highest pain days, the higher their reported attitudes of the efficacy of mindfulness, $r(718) = .22$, $p < .001$, sociocultural acceptability of mindfulness, $r(714) = .17$, $p < .001$, and overall positive attitudes toward mindfulness, $r(710) = .23$, $p < .001$.

No significant relationship was found between lowest pain days and attitudes toward mindfulness on subscales of efficacy of mindfulness, $r(718) = -.07$, $p = .062$; sociocultural acceptability of mindfulness, $r(714) = .01$, $p = .851$; or overall attitude toward mindfulness, $r(710) = -.04$, $p = .260$. But, the greater the difference between most pain and least pain days (i.e., the larger the variability in experienced pain), the higher participants rated the efficacy of mindfulness, $r(718) = .23$, $p < .001$, sociocultural acceptability of mindfulness, $r(714) = .12$, $p < .001$, and overall positive attitudes towards mindfulness, $r(710) = .21$, $p < .001$.

Additionally, a significant relationship between all experiences of pain and subjective feelings toward mindfulness on the feeling thermometer was found, such that as daily pain increased so did the degree of positive feeling toward mindfulness, $r(719) = .54$, $p < .001$; as highest pain increased so did the degree of positive feeling toward mindfulness, $r(719) = .57$, $p < .001$; as lowest pain increased, the degree of positive feelings toward mindfulness increased

$r(719) = .40$, $p < .001$; and subjective positive feelings increased as the difference between most pain and least pain increased $r(719) = .08$, $p = .033$.

Correlations between Adherence and Personality

Overall, there was no significant correlation found between personality traits and adherence to prescribed mindfulness interventions. Extraversion had no effect on attempts, $r(717) = .06$, $p = .125$; or non-adherence rate $r(715) = .01$, $p = .754$. Agreeableness was not significantly correlated with attempts, $r(715) = -.01$, $p = .707$; or non-adherence rate $r(713) = -.01$, $p = .840$. Nor did conscientiousness have an effect on attempts, $r(720) = -.05$, $p = .185$; or non-adherence rate $r(718) = .04$, $p = .351$. Emotional stability did not have an effect on attempts, $r(718) = -.07$, $p = .064$; or non-adherence rate $r(716) = -.02$, $p = .619$. And openness to experience did not predict attempts, $r(720) = -.01$, $p = .801$; or non-adherence rate $r(719) = -.01$, $p = .901$.

Correlations between Attitudes toward Mindfulness and Personality

To understand the relationship between the personality and attitude toward mindfulness, correlations were run. Agreeableness positively correlated with sociocultural acceptability of mindfulness, $r(711) = .13$, $p < .001$ and overall attitudes toward mindfulness $r(707) = .11$, $p = .004$. Agreeableness was not related to ratings of attitudes about the efficacy of mindfulness, $r(713) = .07$, $p = .063$. The higher a participant's conscientiousness, the more positive sociocultural attitudes they reported, $r(714) = .17$, $p < .001$. However, conscientiousness was not related to attitudes about efficacy, $r(718) = -.03$, $p = .502$, or overall attitude $r(710) = .07$, $p = .053$. Higher emotional stability was related to more positive sociocultural acceptability, $r(713) = .17$, $p < .001$, and overall attitude toward mindfulness, $r(708) = .08$, $p = .039$. However, there was no relationship between emotional stability and ratings of efficacy, $r(715) = -.02$, $p = .693$.

No relationship was found between openness to experience and attitudes about the efficacy mindfulness, $r(718) = .06$, $p = .092$, sociocultural acceptability, $r(714) = .05$, $p = .192$, or overall attitudes toward mindfulness, $r(710) = .06$, $p = .093$. Likewise, there was no significant correlation between extraversion and attitudes about the efficacy of mindfulness, $r(715) = .04$, $p = .248$, sociocultural acceptability, $r(713) = .02$, $p = .609$, or overall attitudes toward mindfulness, $r(708) = .30$, $p = .039$.

No relationship was found between personality and subjective ratings on the feeling thermometer of attitudes toward mindfulness—extraversion, $r(716) = .04$, $p = .313$; agreeableness, $r(714) = .04$, $p = .356$; conscientiousness, $r(719) = .06$, $p = .124$; emotional stability, $r(717) = .02$, $p = .686$, or openness to experience, $r(719) = .03$, $p = .464$.

Correlations between Adherence and Need for Cognitive Closure

Participants who were prescribed less days of mindfulness by their healthcare provider also reported lower levels of need for cognitive closure on all bNFC subscales: order, $r(714) = -.09$, $p = .020$, predictability, $r(712) = -.17$, $p < .001$, decisiveness, $r(712) = -.11$, $p = .004$, ambiguity, $r(718) = -.09$, $p = .013$, and closed-mindedness, $r(713) = -.10$, $p = .006$. There was a significant negative correlation between bNFC subscales and attempts at adherence for predictability, $r(711) = -.12$, $p = .002$, decisiveness, $r(712) = -.08$, $p = .042$, and closed-mindedness, $r(713) = -.10$, $p = .007$; no relationship between attempts and NFC was observed for order, $r(714) = -.04$, $p = .304$, or ambiguity, $r(718) = -.04$, $p = .285$. Participants adhered less than prescribed when they scored higher on order, $r(712) = .08$, $p = .034$, predictability, $r(709) = .08$, $p = .026$, and decisiveness, $r(710) = .09$, $p = .015$; but there was no relationship between discomfort with ambiguity, $r(716) = .07$, $p = .054$, or closed-mindedness, $r(711) = .07$, $p = .059$ and adherence.

Correlations between Attitudes toward Mindfulness and Need for Cognitive Closure

Need for cognitive closure was related to more positive attitudes toward mindfulness on all subscales and subjective rating of feelings toward mindfulness on the feeling thermometer. The higher the rating on the order subscale, the higher participants rated efficacy of mindfulness, $r(712) = .417$, $p < .001$, sociocultural acceptability of mindfulness, $r(710) = .373$, $p < .001$, and overall positive attitudes towards mindfulness, $r(706) = .454$, $p < .001$. The more need for predictability the participants reported, the higher they rated efficacy of mindfulness, $r(709) = .450$, $p < .001$, sociocultural acceptability of mindfulness, $r(707) = .363$, $p < .001$, and overall positive attitude towards mindfulness, $r(703) = .472$, $p < .001$. The higher decisiveness the participants reported, the higher they rated efficacy of mindfulness, $r(710) = .462$, $p < .001$, sociocultural acceptability of mindfulness, $r(706) = .380$, $p < .001$, and overall positive attitudes towards mindfulness, $r(702) = .490$, $p < .001$. The greater the discomfort with ambiguity, the higher participants rated efficacy of mindfulness, $r(716) = .497$, $p < .001$, sociocultural acceptability of mindfulness, $r(712) = .383$, $p < .001$, and overall positive attitudes towards mindfulness, $r(708) = .510$, $p < .001$. The greater the rating of closed-mindedness, the higher participants rated efficacy of mindfulness, $r(711) = .390$, $p < .001$, sociocultural acceptability of mindfulness, $r(709) = .304$, $p < .001$, and overall positive attitudes towards mindfulness, $r(705) = .403$, $p < .001$.

Additionally, there was a significant positive relationship between all bNFC subscales and subjective feelings toward mindfulness (feeling thermometer). As need for order increased so did the degree of positive feeling toward mindfulness, $r(713) = .205$, $p < .001$; need for predictability and feeling toward mindfulness, $r(710) = .196$, $p < .001$; need for decisiveness and feeling toward mindfulness $r(711) = .204$, $p < .001$; discomfort with ambiguity and feeling

toward mindfulness, $r(717) = .181$, $p < .001$; and closed-mindedness and feeling toward mindfulness, $r(712) = .119$, $p = .002$.

Correlations between Attitudes and Five-Factor Mindfulness

To test the relationship between attitudes and use of the five factors of mindfulness, a series of correlations were run. Mindful observing was positively related to positive attitudes toward mindfulness on the subscales of efficacy, $r(714) = .332$, $p < .001$, sociocultural acceptability, $r(711) = .188$, $p < .001$, overall attitude, $r(706) = .305$, $p < .001$ and on the subjective feeling thermometer, $r(717) = .196$, $p < .001$. Describe items were positively correlated with positive attitudes toward mindfulness on the subscales of efficacy, $r(715) = .130$, $p < .001$, sociocultural acceptability, $r(713) = .168$, $p < .001$, overall attitude, $r(708) = .170$, $p < .001$, but did not correlate with the subjective feeling thermometer, $r(718) = .071$, $p < .056$. Non-reactivity to inner experience was correlated with positive attitudes toward mindfulness on the subscales of efficacy, $r(718) = .348$, $p < .001$, sociocultural acceptability, $r(714) = .282$, $p < .001$, overall attitude, $r(711) = .369$, $p < .001$ and subjective feeling thermometer, $r(720) = .164$, $p < .001$. However, reacting with awareness was *negatively* correlated with positive attitudes toward mindfulness on the subscales of efficacy, $r(717) = -.347$, $p < .001$, sociocultural acceptability, $r(714) = -.216$, $p < .001$, overall attitude, $r(709) = -.329$, $p < .001$ and the subjective feeling thermometer, $r(720) = -.133$, $p < .001$. Non-judging of inner experience items were also *negatively* related to positive attitudes toward mindfulness on the subscales of efficacy, $r(713) = -.383$, $p < .001$, sociocultural acceptability, $r(709) = -.312$, $p < .001$, overall attitude, $r(705) = -.403$, $p < .001$ and subjective feeling thermometer, $r(716) = -.145$, $p < .001$.

An overall mindfulness score on the five facets scale was positively related to subjective feeling thermometer ratings, $r(688) = .076$, $p = .045$, but was not correlated with efficacy, $r(685)$

= .041, p = .284, sociocultural acceptability, r(682) = .053, p = .166, or overall attitude toward mindfulness, r(678) = .054, p = .157.

Correlations between Adherence and Five-Factor Mindfulness

To test the relationship between adherence and use of the five factors of mindfulness, a series of correlations were run. Mindful observing was not correlated with attempts, r(719) = .004, p = .920, or non-adherence rate, r(717) = .046, p = .220, but as mindful observing increased, the difference between what the doctor prescribed and attempts also increased, r(718) = .102, p < .006. Describe items were not correlated with attempts, r(720) = .022, p = .549, non-adherence rate, r(718) = -.030, p = .422, or the difference between prescribed and attempts, r(719) = .017, p < .653. Reacting with awareness was negatively correlated with non-adherence rate, r(720) = -.088, p < .018, and the difference between prescribed and attempts, r(721) = -.100, p < .007, but was not related to attempts, r(722) = .045, p = .227. Reacting with awareness was positively related to the subjective feeling thermometer, r(720) = -.133, p < .001. Non-judging of inner experience was negatively correlated to non-adherence rate, r(715) = -.087, p < .019, but did not correlate with attempts, r(717) = .013, p = .731, or the difference between prescribed and attempts, r(716) = -.054, p = .146. Non-reactivity to inner experience was negatively correlated to non-adherence rate, r(720) = -.075, p < .045, but did not correlate with attempts, r(722) = -.051, p = .171, or the difference between prescribed and attempts, r(721) = .022, p = .549. An overall mindfulness score was not significantly correlated with non-adherence rate, r(687) = -.045, p = .243, attempts, r(689) = .021, p = .590, or the difference between prescribed and attempts, r(688) = -.006, p = .883.

Adherence and Attitudes by Groups

Adherence and Attitudes by Social Class

A one-way ANOVA revealed a significant effect of self-reported social class (lower, middle, upper) on sociocultural acceptability of mindfulness, $F(2, 699) = 3.05$, $p = .048$ and overall attitudes toward mindfulness, $F(2, 695) = 3.61$, $p = .028$, subjective feelings towards mindfulness on the feeling thermometer, $F(2, 704) = 7.98$, $p < .001$, and an effect on the non-adherence rate, $F(2, 703) = 18.09$, $p < .001$. As depicted in Table 2, post-hoc comparisons (LSD) showed that lower class participants had less positive sociocultural acceptability of mindfulness than participants in both middle, $p = .032$ and upper, $p = .025$, class participants. In addition, participants who rated themselves as lower in social class rated less overall positive attitude toward mindfulness than those in upper class, $p = .008$. Also, upper class participants indicated more positive attitudes toward mindfulness on the feeling thermometer than both lower, $p < .001$, and middle, $p < .001$, class participants. There was also a significant effect of social class on adherence, such that lower class participants adhered more than both participants in middle, $p = .02$, and upper, $p < .01$ class participants. No other significant differences were found for social class, ps > .07.

Adherence and Attitudes by Race

As depicted in Table 2, tests showed there was a significant effect of race (by White and racial minority) on both attitudes and adherence. Racial minorities rated mindfulness as less effective, $t(706) = 2.12$, $p = .035$, and had less positive overall attitudes $t(698) = 2.29$, $p = .022$, than Whites, but had more positive subjective feeling toward mindfulness, $t(698) = 2.29$, $p = .022$. White participants made more attempts at mindfulness, $t(708) = 3.34$, $p = .001$, but racial minorities had lower non-adherence rates, $t(706) = 3.54$, $p < .001$. There was a larger difference

between the amount prescribed and attempted for White participants, $t(707) = 2.06$, $p = .029$. No other significant differences were found for race, ps > .07.

Discussion

We hypothesized that negative or ambivalent attitudes toward mindfulness would be related to non-adherence. Contrary to the hypothesis, we found that more positive attitudes toward mindfulness on all subscales predicted *reduced* adherence to prescribed mindfulness interventions. However, those who self-rated with more positive feelings toward mindfulness were slightly more likely to make more *attempts* at the therapy (Table 1). This means that neither attitudes about the efficacy nor sociocultural acceptability of mindfulness were strong predictors of following a provider's advice; but more positive feelings towards mindfulness were. This is in contradiction to research that shows belief in a medication's necessity and benefit is positively associated with medication adherence (Chia et al., 2006). There may be enough of a difference between the way mindfulness and medications are viewed as treatments that the effect on adherence is not transferrable. Additionally, there are several belief-laden variables which were not controlled for, which could explain this discrepancy. Chia et al. (2006) found that self-efficacy, understanding of the illness, beliefs about control over symptoms, and how burdensome an intervention is perceived to be to have an effect on adherence. In the current research, positive feelings predicted attempts, and those positive feelings could have reduced how burdensome the intervention seemed.

The Role of Pain Experience

We were also interested in understanding the role of experiences of pain for attitudes toward mindfulness and found that those participants who experienced more pain on their highest pain days, and those with the greatest difference between high and low pain days, rated

more positive attitudes toward the efficacy, sociocultural acceptability, and overall attitude toward mindfulness. On the subjective feeling thermometer, daily pain also predicted positive feelings toward mindfulness. Research suggests higher pain levels are associated with greater adherence to medication (Markotic et al., 2013). Because positive feelings predicted attempts, understanding a patient's pain level in combination with attitude may help identify who is more likely to try the therapy, even if they don't complete it.

Does Personality Matter for Attitudes toward and Adherence to Mindfulness?

We tested whether personality played a role in adherence and found no significant effects. This is contrary to prior research on medication adherence, which have found that neuroticism/emotional stability is related to lower adherence and those who are agreeable and conscientious are likely to adhere (Axelsson et al., 2011; Bogg & Roberts, 2013). However, there were relationships between personality and attitudes toward mindfulness. Those who described themselves as more agreeable and emotionally stable were more likely to have higher sociocultural acceptability and overall attitudes, but not attitudes toward efficacy. Those who were conscientious had more positive sociocultural acceptability. Extraversion and openness to experience were not predictors of attitude, and no aspect of personality predicted subjective feelings toward mindfulness. At least in our data, personality does not seem to be a predictive factor in adherence to mindfulness treatment for those experiencing chronic pain, however positive attitudes may still improve attempts.

Does Need for Cognitive Closure Matter for Attitudes toward and Adherence to Mindfulness?

We tested whether a person's need for cognitive closure affected adherence and found that closed-mindedness, the need for predictability, and the need for decisiveness predicted less

attempts at mindfulness. Need for order, predictability, and decisiveness predicted higher non-adherence rates, but there was no relationship between discomfort with ambiguity or closed-mindedness and adherence. Contrary to predictions, need for closure was related to more positive attitudes toward mindfulness on all subscales and subjective rating of feelings toward mindfulness on the feeling thermometer. Need for closure predicted positive attitudes and lower adherence, which followed the overall trend in the sample. However, the need for decisiveness predicted less attempts in this sample. The need for decisiveness has been singled out as a unique part of the NFC construct that may not be adequately related to the other subscales (Roets et al., 2006). Because mindfulness requires a daily habit and long timelines to exert real change, future research should focus more in-depth about how need for decisiveness might affect adherence to any behavioral treatment.

Do Five-Factor Mindfulness Traits Matter for Attitudes toward and Adherence to Mindfulness?

We tested whether the five facets of mindfulness were related to attitudes toward mindfulness. Those who exhibited mindful observing, describing, and non-reactivity to inner experience had more positive attitudes toward mindfulness. Reacting with awareness and non-judging of inner experience predicted less positive attitudes toward mindfulness across the subscales. Those who had a high overall mindfulness score rated higher on the subjective feeling thermometer.

As mindful observing increased, the difference between what the doctor prescribed and attempts also increased. Reacting with awareness predicted a lower non-adherence rate and a lower difference between prescribed and attempts. Non-judging of and non-reactivity to inner experience predicted lower non-adherence rates. These findings are consistent with previous

research that shows that adherence to mindfulness increases five-factor mindfulness scores, which creates a feedback loop to support future adherence; this increased adherence and frequency predicts increases in positive affect and decreases in negative affect (Lacaille et al., 2018; Soler et al., 2014).

Do Socioeconomic Status and Race Matter for Attitudes toward and Adherence to Mindfulness?

Attitudes toward mindfulness were more positive among upper and middle class participants than lower class participants. However, lower class participants adhered to treatment more than both middle and upper class participants. Racial minorities rated mindfulness as less effective, and had less positive overall attitudes than Whites, but had more positive subjective feeling toward mindfulness and were more likely to adhere to their doctor's advice. A larger sample of racial minorities is needed for future research. Indeed, past research has shown differences in racial minority trust and deference to doctor's advice (Chia et al., 2006). While White participants were less adherent, they made more attempts at mindfulness and there was a larger difference between the amount prescribed and attempted.

Implications

We know from the current research that positive attitudes may not predict overall adherence to mindfulness treatment among individuals experiencing chronic pain, but positive feelings do predict attempts. Attempts without full adherence can be seen as a positive outcome, because even a small amount of mindfulness can show benefits to mood and pain levels, and because starting the habit begins the feedback loop that increases adherence over time (Davidson & Goleman, 2017; Davis et al., 2015; Kabat-Zinn, 2013; Lacaille et al., 2018). To observe long-

term benefits, the focus may not need to be on complete adherence, but rather on increasing positive feeling toward mindfulness and integrating the habit into a lifestyle.

Since adherence can be affected by the duration and complexity of treatment prescribed, there is a possibility that some aspect of participants with positive attitudes toward mindfulness may have affected the amount their doctor prescribed them. One such potential mechanism is social class, where we saw larger differences between amount prescribed and adherence, along with more attempts. In the United States, healthcare is for-profit, and more comprehensive healthcare can often be accessed with greater financial resources. Consistent, long-term access to pain clinics and mental health care where courses of mindfulness are prescribed may be difficult for those of less means. It is also possible that a person of lower social class may wait until they are in more pain before seeking expensive medical care, be prescribed a short course of mindfulness, or receive less follow-up care, thereby increasing their chance of adherence, even though they may not have as positive an attitude toward the practice.

Globalism, Culture, and Social Class

Meditation has become a part of pop culture in the United States, associated with new-age wellness and self-care. Subjective feelings toward mindfulness may be mediated by association with the dominant class (upper or high social class) and hegemonic culture. We often think of Western ideas being exported in the context of globalization, but *cultural globalization* can work in the opposite direction (Hopper, 2007). New ideas enter into the collective conscious via returning travelers, immigration, and the global exchange of ideas through our increasing technological connection. World Systems Theory provides a framework to observe this phenomenon: The Core-Periphery model describes the movement of ideas and capitol toward western core economies and western ideas toward the periphery (Wallerstein, 2015). Generally,

ideas that move toward the West are commodified. Through this process, practices like meditation become decontextualized from their spiritual, cultural, and social foundations (Kirmayer, 2015). The positive attitudes toward mindfulness among upper SES and White respondents should be examined through the lens of westernization.

Commodified ideas are frequently adopted by the Transnational Capitalist Class, which consists of those who associate themselves with a luxury and consumptive lifestyle (Sklair, 2015). A strong example of this is Yoga, which has been decoupled from its Vedic roots and has become a symbol of White, affluent wellbeing in the West. But mindfulness has the advantage of gaining much of its popularity through medical research and collaboration with Eastern religious figures such as the Dalai Lama through the Mind and Life Institute (Davidson & Goleman, 2017). Buddhism did not develop meditation to be used as a medical treatment, and the idea from some practitioners of Buddhism that meditation can't truly exist outside of a spiritual context must be acknowledged (Kirmayer, 2015). In essence, meditation was not designed to exist in a spiritual vacuum, and is always contextualized within the *Sangha,* which consists of all practitioners of Buddhism: Meditation is meant to have a socially supported component.

Limitations and future directions

While the current study had a large N and has the benefit of correlational research in that it studied individuals as they exist in their natural environments, it was also not conducted in a controlled environment that a lab study may have provided. Participants were able to access the study from their computer or mobile device from a multitude of settings—home, work, outdoors, loud, quiet, etc. and the environment may have had an effect on their answers. The Brief Adherence Rating Scale (Byerly et al., 2008) was adapted for the purposes of self-report, but has been validated for use by doctors in a psychiatric patient interview setting. In a previous BARS

study, an overestimation of adherence occurred when raters were exposed to patient self-report (Byerly et al., 2007). Given the self-report nature of this study, individual differences may result in artificially high adherence reports, and this could explain why negative attitudes produced more adherence for certain groups. This scale may need further validation in the self-report context as compared to an electronically monitored or doctor/patient interview setting.

We also used convenience sampling to gather our participants which is subject to selection bias. In addition, the survey was paused early due to an unexpected high response rate from the reddit forum r/ChronicPain, which limited opportunities to diversify the population. This forum has 53.3 thousand members, and we collected over 1,300 responses within 24 hours. Because our response goal was 500, and our lottery funds were limited, we were not able to collect data from other online communities. The population of Reddit may also skew toward certain demographic characteristics. One indicator of this potential skew is the majority male respondents when slightly more women are known to suffer from chronic pain (Umeda & Kim, 2019). Our sample of participants is subject to selection bias, volunteer bias, and computer-savvy bias, and the results may not generalize to the greater population. In addition, there may be confounding environmental variables which we have failed to account for. For instance, lack of adherence could simply be due to the difficulty of establishing new habits, or low energy levels or depression from living with chronic pain conditions.

Solutions

Mindfulness intervention is linked to positive outcomes for chronic pain patients, especially on day-to-day functioning, and can be as effective as cognitive behavioral therapy (Davis et al., 2015). Because mindfulness can be a free practice, and many people in the United States have limited access to more expensive healthcare like therapy visits, access to mindfulness

is an ideal intervention for those still suffering from chronic pain that is not or cannot be addressed by traditional medicine so long as inequitable policies remain in place.

Because socioeconomic status factors into attitudes and access, mindfulness practice should be recontextualized as a normal part of healthcare in areas with low socioeconomic status (or social class as measured in the current work). Hyper-localized pain treatment programs that focus on peers in the same community could create social acceptance, decouple the idea from pop-culture, and support adherence. Development within unique communities has the potential to foster innovation and new methods. Methodological innovations can be verified through research and spread to similar communities through facilitators from the community. Facilitators for mindfulness programs could be certified much more quickly than licensed mental health counselors and overseen by a psychiatrist or psychologist, which could serve to bridge some of the gap in representation among providers.

Sweeping policy shifts are necessary to address structural, social, and cultural determinants of chronic pain, disability, and their associated diseases globally—this recommendation is in line with the recommendations of the World Health Organization (Goldberg & McGee, 2011). The focus on exportation of Western medicine, such as opioid treatment for pain, is insufficient to treat the global epidemic (Goldberg & McGee, 2011). Changes to structural inequalities and injustices are necessary, but slow, and are never guaranteed. As we work to support these policy changes, it is imperative to provide accessible and cost-effective relief immediately. There is an opportunity to alleviate suffering through the distribution of mindfulness techniques, and the design of localized, social programs.

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Tables

Table 1

Correlation between Mindfulness and Adherence

	Prescribed	Attempted	Attempted Less Than Prescribed	Δ Prescribed - Attempted
Attitude:				
Mindfulness Efficacy e.g., “Mindfulness is a legitimate medical practice.” (1- strongly disagree to 7-strongly agree)	-.051	-.008	.102**	.052
Mindfulness Sociocultural Acceptability e.g., “Others are accepting of my mindfulness practice.”	-.062	-.055	.130**	.009
Overall Attitudes Towards Mindfulness	-.064	-.035	.132**	.034
Self-Rated Feeling Toward Mindfulness (0 negative to 100 positive)	.027	.106**	.654**	.097**

Note: * Indicates $p < .05$; ** $p < .01$; numbers represent correlations (Pearson’s r)

Table 2

Adherence and Attitude by Groups

Attitude:	Lower class	Middle class	Upper class	White	Racial Minority
Mindfulness Efficacy	4.27	4.35	4.51	4.32_a	4.48_b
	(0.74)	(0.79)	(0.90)	(0.78)	(0.84)
Mindfulness Sociocultural Acceptability	4.11_a	4.28_b	4.35_b	4.23	4.37
	(0.70)	(0.79)	(0.95)	(0.80)	(0.81)
Overall Attitude Toward Mindfulness	4.20_a	4.32	4.45_b	4.29_a	4.44_b
	(0.59)	(0.70)	(0.81)	(0.68)	(0.77)
Self-Rated Feeling Toward Mindfulness	58.12_a	61.08_a	67.04_b	62.51_a	57.76_b
	(18.57)	(16.91)	(15.72)	(16.49)	(19.21)
Non-Adherence Rate	51.56_a	57.59_b	67.22_c	59.26_a	52.65_b
	(18.78)	(20.46)	(17.38)	(20.43)	(18.34)

Note: Numbers outside the parenthesis represent means, numbers inside parenthesis represent standard deviations;

Subscripts that differ among rows indicate a significant difference at $p < .05$