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DEVELOPMENT OF THE PAIN RESPONSE STYLE INVENTORY: A NEW MEASURE FOR EXAMINING AMBIVALENCE TOWARD ENGAGING IN BEHAVIORAL TREATMENTS FOR CHRONIC PAIN

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by

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This work is dedicated to FJJ, whose mentorship made all of this possible.

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ABSTRACT

Over the previous half-century, the framework for chronic pain management has expanded beyond the biomedical perspective to include psychosocial treatments that fall under the cognitive-behavioral tradition. Chronic pain patients, however, tend to endorse the biomedical model, perceiving pain as a problem that requires medical interventions. Enhancing motivation to engage in cognitive-behavioral treatment has therefore been a major theoretical focus in the research literature, much of which has been informed by Motivational Interviewing (MI) and the Transtheoretical Model. At present, however, there is a paucity of empirical evidence supporting motivational enhancement in this context. Furthermore, the research literature has largely overlooked the importance of ambivalence, a core aspect of MI, which would indicate at least some interest in engaging in cognitive-behavioral treatment for pain. Therefore, the primary objective of the present study was to develop and test a new instrument, the Pain Response Style Inventory (PRSI), which can assess attitudes about treatment and is capable of measuring ambivalence. The PRSI consisted of two parts, the PRSI-A and PRSI-B, and employed two different methods for evaluating ambivalence. Using Amazon Mechanical Turk, the

PRSI-A, PRSI-B, and other measures of pain-related functioning were administered to 398 community-dwelling participants with chronic pain. The factor structure for both parts was tested with Exploratory Factor Analyses. The final version of the PRSI-A consisted of 7 items and showed the presence of one factor that demonstrated good internal consistency. The final 19-item PRSI-B consisted of three factors, which also showed good internal consistency. In order to evaluate aspects of predictive validity, separate sets of simultaneous regression analyses for the PRSI-A and PRSI-B were performed to evaluate the variance accounted for across measures of pain acceptance, pain-related anxiety, depression, and physical and psychosocial disability. Results indicated that both the PRSI-A and PRSI-B had significant direct effects on the measures of health-related functioning, after controlling for age, sex, average pain, and pain duration as well the Pain Stages of Change Questionnaire, a theoretically similar measure. The overall results indicated that two novel measures, which are capable of assessing ambivalent attitudes about chronic pain treatment, demonstrated good psychometric properties. These measures show promise for use in future studies that assess the relationship between attitudes and treatment response.

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Chapter 1

Introduction

Chronic pain affects millions of individuals worldwide and is a pressing public health concern (Bailey & Vowles, 2015; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006; Gaskin & Richard, 2012). Prevalence estimates for chronic pain, which is often described as pain lasting for at least three to six months, vary anywhere from 3% to 30% of adults (Breivik et al., 2006; Hardt, Jacobsen, Goldberg, Nickel, & Buchwald, 2008; Johannes, Le, Zhou, Johnston, & Dworkin, 2010). Furthermore, chronic pain encompasses a variety of conditions, from fibromyalgia and degenerative disk disease to arthritis and chronic back pain. The perceived severity of chronic pain, distribution within the body, and degree to which it impacts important role functioning can also vary significantly between individuals (Andersson, 2004). Still, chronic pain often interferes with what matters most to people, including social relationships, occupational pursuits, and family life (Breivik et al., 2006). In terms of its salience to public health, chronic pain involves a significant economic burden, both at the level of the individual and the healthcare system. The aggregate annual direct and indirect costs total in the billions of dollars in the U.S. (Gaskin & Richard, 2012).

Behavior Change in Chronic Pain Management

Historically, chronic pain was treated from the biomedical perspective, which involved interventions focused primarily on pain reduction and the biological aspects of pain (Gatchel, 2004). Since the 1960s, however, the framework for managing chronic pain has expanded to include a breadth of additional factors believed to maintain pain over time, including learning history and ongoing experience (Fordyce, 1976). The gate

control theory of pain (Melzack & Wall, 1965) was particularly influential in widening the scope of focus beyond the biomedical perspective. Contemporary chronic pain management strategies take into account, for instance, the significance of psychosocial influences on chronic pain, including how individuals, as well as those around them, respond to their pain and the dominant role of emotional factors, such as depression and anxiety, in perpetuating suffering and dysfunction (Gatchel, 2004). Persistent pain avoidance behaviors have been identified as particularly problematic, in that they may serve to exacerbate pain over the long term (Leeuw et al., 2007; Lethem, Slade, Troup, & Bentley, 1983).

Psychosocial Interventions. Evidence-based psychological treatments for chronic pain tend to be broadly subsumed under the cognitive-behavioral paradigm, with treatment targets that include altering various maladaptive response patterns to pain to increase overall quality of life (American Psychological Association's Society of Clinical Psychology, 2013; Turner, Holtzman, & Mancl, 2007). Cognitive-behavior therapy (CBT), for example, has demonstrated effectiveness in producing improvements in multiple facets of pain-related functioning, including mood and affect, adaptive coping, level of activity, and important role functioning pertaining to work, family, and leisure (Morley, Eccleston, & Williams, 1999). In particular, the targeting of maladaptive beliefs and catastrophizing as well as increasing adaptive coping skills in CBT for chronic pain has been associated with decreases in pain-related disability and pain intensity as well as depression (Jensen, Turner, & Romano, 2001; Vlaeyen & Linton, 2000).

In addition to CBT, more recent developments within the cognitive-behavioral tradition have demonstrated the benefits of taking an active approach toward pursuing

what constitutes a meaningful and vital life, even with chronic pain. Engagement in meaningful activity based on what an individual finds most important in life, i.e. based on one's values, is one of the central facets of Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012). A primary focus of ACT for chronic pain involves pain acceptance and helping pain patients shift their focus from ineffective struggling with the pain experience to the pursuit of goals and values (Vowles & Thompson, 2011). Research suggests that greater engagement in valued activities is associated with lower levels of pain-related distress and disability, with treatment studies further indicating that increased engagement in valued activities is associated with greater reductions in distress and disability (McCracken & Vowles, 2008; McCracken & Yang, 2006; Vowles, McCracken, & O'Brien, 2011).

Taken together, psychosocial interventions that fall within the cognitive-behavioral tradition, such as CBT and ACT, which emphasize taking an active, self-management approach toward chronic pain, appear to produce reliable gains in salient areas of pain-related functioning. Indeed, both CBT and ACT are listed among the psychological interventions with "strong research support" for chronic or persistent pain (American Psychological Association's Society of Clinical Psychology, 2013). In contrast to psychological treatments, however, the evidence supporting interventions subsumed by the medical model is often dubious, with strong pharmacological agents and sophisticated surgical techniques demonstrating limited efficacy in terms of pain reduction (Turk, Swanson, & Tunks, 2008). Considering the importance of active behavior change in chronic pain management, the limitations of the medical model are perhaps unsurprising. In general, the medical model encompasses passive approaches that

do not comport with the treatment of physical problems that necessitate some degree of intentional behavior change (Prochaska & DiClemente, 2005).

Motivational Models of Behavior Change

Although the empirical evidence appears to favor psychosocial interventions and behavior change, the majority of patients perceive chronic pain as a medical condition requiring biomedical interventions (Turk et al., 2008). In other words, patients typically desire medical treatments that offer fast relief and do not require changes in lifestyle (Dorflinger, Kerns, & Auerbach, 2013). Turk et al. referred to patients who endorse the biomedical perspective on chronic pain as "passive reactors," whereas the cognitive-behavioral framework assumes that people are "active processors of information." The active approach toward chronic pain treatment characteristic of psychosocial interventions generally includes altering automatic and ineffective responses to pain that do not result in durable pain reduction. Specific treatment facets necessitate a willingness to adopt self-management strategies, such as activity pacing and acquiring new coping strategies, as well as goal setting and problem solving skills (Turk et al., 2008; Turner et al., 2007). Shifting the behavioral repertoire in this manner can allow for learning and consolidating new skills to effectively manage pain and achieve improvements in quality of life. Nevertheless, among those who enter cognitive-behavior treatments, research indicates that as few as 50% of patients adhere to the interventions and that nonadherence is associated with worse outcomes (Nicholas et al., 2012; Nicholas et al., 2014).

Given the research support for CBT and ACT as well as the apparent dialectical opposition between psychosocial interventions and the more passive approaches endorsed by patients who tend toward the biomedical model, enhancing motivation to engage in

psychosocial interventions has been a major focus in chronic pain management. A related and secondary goal of motivational enhancement strategies includes increasing adherence to psychosocial interventions that fall outside the medical model (Alperstein & Sharpe, 2016). Further, interest in explaining treatment failures in terms of motivational principles has been steadily growing (Jensen, 2002), and, consequently, there has been an upsurge in chronic pain treatment research involving novel applications of motivational principles on how people change.

Motivational Interviewing. With regard to enhancing motivation to enter and adhere to psychosocial pain management programs, one area of particular interest has centered on Motivational Interviewing (MI), which is a person-centered intervention style rooted in humanistic psychology (Miller & Rollnick, 2013). Motivational Interviewing involves strengthening intrinsic motivation and commitment to change by evoking from patients the perceived benefits of behavior change and resolving reasons for sustaining current patterns of behavior (Miller & Rollnick, 2013). Research evidence supports MI-based interventions in promoting healthy behavior change among substance use populations, including alcohol and tobacco use disorders, and MI generally results in at least modest effect sizes (Burke, Arkowitz, & Menchola, 2003; Hettema, Steele, & Miller, 2005; Hettema & Hendricks, 2010). Motivational Interviewing has also been used in other domains of behavior change, such as diet, diabetes management, blood pressure, and exercise (Martins & McNeil, 2009; Van Dorsten, 2007). The initial applications of MI to chronic pain management focused on the broad support for MI in promoting healthy behavior change in a variety of contexts and the potential relevance of key theoretical aspects of the approach. More specifically, psychosocial interventions require

patients to be active participants, and treatment response was purported to be strengthened by enhancing motivation to participate in and adhere to pain management protocols (Jensen, 2002).

Transtheoretical Model. The Transtheoretical Model (TTM; Prochascha & DiClemente, 1982) is another theory that explains how people change and the core processes by which change occurs. The TTM outlines a series of five stages that lie along a continuum and indicate an individual's level of progress in considering, initiating, or maintaining behavior change (Prochaska & DiClemente, 1982). At each of the five stages, which include precontemplation, contemplation, preparation, action, and maintenance, a specific set of invariant tasks are posited to be required in order to progress to the next stage of change (Prochaska & DiClemente, 2005). Moving from precontemplation to contemplation, for instance, requires some awareness and ownership of the problem as well as a willingness to challenge the habitual facets of the problem that make it difficult to control. As in other behavioral health treatments, chronic pain patients vary in their degree of willingness to embrace the active, self-management approach toward their problem that is espoused in cognitive-behavioral theory, and the TTM may explain willingness levels to participate in and adhere to the treatment (Kerns & Rosenberg, 2000; Kerns, Rosenberg, Jamison, Caudill, & Haythornthwaite, 1997).

Applications of Motivational Models in Chronic Pain Management

In the context of enhancing motivation to engage in cognitive-behavioral treatments for chronic pain management, intervention strategies have tended to combine core facets of MI and the TTM, which have been described as a different yet "complementary and compatible" perspectives on how people change (Alperstein &

Sharpe, 2016; Jensen, 2002; Jensen, Nielson, & Kerns, 2003; Miller & Rollnick, 2013). In particular, an assessment process that categorizes chronic pain patients according to the stages of change in the TTM and delivering an intervention such that it takes into account patients' readiness to change has been posited to maximize favorable treatment outcomes (Jensen, 2002; Kerns et al., 1997; Novy, 2004; Osborne, Raichle, & Jensen, 2006). Furthermore, it has been proposed that MI techniques could promote progression toward engagement and enhanced willingness to take on an active, self-management approach to chronic pain treatment (Habib, Morrissey, & Helmes, 2005; Kerns & Rosenberg, 2000). According to Dorflinger et al. (2013), providers play an important role in the engagement process for patients by facilitating patient-centered dialogue aimed at collaboratively managing pain, communicating the limitations of the medical model, and enhancing motivation to engage in self-management strategies.

Empirical evidence. At present, the abundance of applied theory provides a cogent rationale for combined TTM and MI approaches as adjunctive components to evidence-based treatments for chronic pain, but there is a relative paucity of empirical evidence. In a systematic review, for example, Chilton, Pires-Yfantouda, and Wylie (2012) examined interventions with components designed to increase motivation within musculoskeletal health. Though the authors were unable to complete a meta-analysis due to variations in the mode of intervention delivery and the specific application of the motivational models, they noted a number of limitations that were characteristic of pilot data. In particular, multiple studies were inadequately powered and had internal validity issues as well as a lack of an active control condition, objectively rated proficiency in conducting motivation-based interventions, and follow-up data.

In a more recent systematic review and meta-analysis, which only included studies with an active control condition, Alperstein and Sharpe (2016) analyzed seven randomized controlled trials that included MI or TTM principles, or both, for chronic pain treatment. In terms of study quality, the authors reported that the descriptions of treatment content and setting were excellent and therapist training was good, though reports on treatment fidelity were poor. The results of the analyses indicated a small-to-medium effect size (five studies analyzed, $N = 631$; Hedge's $g = .44$) for treatment adherence measured immediately following intervention though there was no measurable effect size at six-month follow up. In addition, there was a small-to-medium effect size (four studies analyzed, $N = 449$; Hedge's $g = .27$) in pain intensity reductions immediately following treatment, which was again not replicated at six-month follow up.

As Alperstein and Sharpe's (2016) meta-analysis concluded, the empirical evidence did not support the routine use of motivational components in treating chronic pain patients with evidence-based treatments. However, the weak effect sizes may be attributable, at least in part, to methodological weaknesses in the studies. Further, the data did indicate some potential benefit for motivational enhancement in chronic pain treatment, and future research would help to present a clearer picture of the impact on treatment adherence and outcomes. Part of enhancing the evidence base would involve increasing the number of quality studies, with adequate power, therapist training, and established fidelity instruments.

In light of the relevance of patient motivations for behavioral change in MI, another critical step in improving the evidence base would involve assessing the associations between attitudes about behavior change and measures of psychosocial and

pain-related functioning. This would be an important part of establishing the relevance of foundational principles from MI to treatment response. Currently, only a single assessment instrument exists, the 30-item, self-report Pain Stages of Change Questionnaire (PSOCQ; Kerns et al., 1997), which was designed to evaluate treatment attitudes in relation to motivational models of behavior change. More specifically, the purpose of the PSCOQ was to reliably measure the degree to which pain patients were ready to adopt a self-management, cognitive-behavioral approach to treatment as well as to provide stage-specific intervention guidance. The initial evaluation confirmed a four-factor structure and indicated that the PSCOQ had good internal consistency and criterion-related validity (Kerns et al.). Nevertheless, the initial study of the PSOCQ also presented some potential problems. For instance, the "action" and "maintenance" stages had poor discriminant validity, as they were strongly correlated (r = .80), and a clear "preparation" stage was not identified. Taken together, the results for the PSOCQ indicated that the 5-stage model in the TTM may not accord with pain populations. In addition, the scale anchors to PSOCQ questions do not allow for measuring ambivalence, a critical weakness due to the salience of this construct in MI.

Ambivalence and Behavior Change

Miller and Rollnick (2013) have described MI as a particular type of intervention strategy compatible with other psychosocial treatments that helps individuals challenge the status quo and enhance motivation to change. In particular, MI was designed for people who feel ambivalence, defined as simultaneously holding conflicting feelings or attitudes for and against behavior change. Motivational Interviewing therefore focuses on eliciting, evoking and strengthening reasons for change. For an individual who is in the

precontemplation stage of the TTM, reasons for making lifestyle changes have not yet been considered, thus, the person may not hold any conscious reasons for change. In this situation, MI may be less useful clinically because there is no apparent change talk to evoke, particularly with chronic pain patients who adhere strictly to a passive, medical model perspective on treatment. Similarly, when an individual is in the action stage of the TTM, any residual reasons for sustaining unhealthy behavior patterns are dominated by reasons for behavior change, and adaptive change has already been initiated. As treatments based on cognitive-behavioral theory tend to assume that people are in the action stage of change, MI was developed for "less ready" individuals (Miller & Rollnick, 2013).

Based on the theory underlying MI and the TTM, it appears that endorsing some interest in taking an active, self-management approach toward pain management, even while holding views in support of biomedical interventions, would be an important precondition for implementing motivational techniques as an adjunct to evidence-based chronic pain treatments. In other words, an instrument in this domain should not only be able to measure overall positive or negative perspectives on active approaches to pain management, but must also measure the degree to which people hold both views simultaneously. Therefore, a key weakness of the PSOCQ is that this instrument is incapable of assessing for ambivalence. In particular, the Likert-type scale used for rating items includes a middle value anchored to *neutral*, thus it is impossible to discriminate between an answer choice representing an average rating between two felt extremes, indicative of ambivalence, or alternatively, true indifference. When it comes to active, self-management strategies, the distinction between being *indifferent* and being

ambivalent becomes crucial, as indifferent could be construed as a passive endorsement of the medical model, i.e. unenthusiastic feelings toward active pain management approaches. On the other hand, ambivalence indicates at least some motivation to take an active approach toward, for instance, living a more meaningful life and enhancing coping skills. This particular limitation of bipolar scales has long been recognized in the field of social psychology, in that bipolar scales are unable to measure the degree to which an individual holds to conflicting views simultaneously (Jonas, Broemer, & Diehl, 2000).

Measuring ambivalence. Two methods in particular, *felt* or *subjective ambivalence* and the *attitudinal component technique* have each demonstrated promise detecting the simultaneous presence of both positive and negative expectancies, feelings, or attitudes toward something (Jonas et al., 2000). With regard to subjective ambivalence, the respondent is asked to respond directly to ambivalence items. For instance, with the Felt Ambivalence Towards Smoking Scale, typical items include *you have strong feelings both for and against smoking* and *you find yourself feeling torn between wanting and not wanting to smoke* and are anchored to a Likert-type scale (Lipkus et al., 2005), and higher levels of ambivalence on this scale are associated with increased desire to quit smoking.

In contrast to subjective ambivalence, the attitudinal component technique involves separate but closely related questions that ask respondents to answer based on the positive or negative aspects of behavior change presented independently (Jonas et al., 2000; Kaplan, 1972; Rice, 2013). This technique has been carried out by creating sets of paired items presented in random order and anchored to Likert-type scales (Rice, 2013). Thus, respondents are asked to consider the positive and negative qualities of an attitudinal object separately. In the domain of smoking cessation, research has suggested

that higher levels of ambivalence as measured by the attitudinal component technique were predictive of desire to quit (Lipkus, Green, Feaganes, & Sedikides, 2001). Ambivalence measured by this method has also been shown to moderate the relationship between attitudes and behavior in the context of both blood donation and eating a healthier diet (Conner et al., 2002).

Present Study: Summary and Objectives

Possessing the means to discriminate between patients who are indifferent toward behavior change from those who are ambivalent may have important treatment ramifications, with the latter type of patient demonstrating at least some measurable interest in more active, self-management approaches to pain management. Therefore, the purpose of the present study was to develop and test a self-report measure of ambivalence consistent with the motivational model of behavior change and cognitive-behavioral approaches to chronic pain management. Following item selection in a manner consistent with establishing the content validity of the item pool (DeVellis, 2012), a primary aim of this study was to administer the instrument to a sample size sufficient to determine psychometric properties and evaluate aspects of construct validity. It was hypothesized that attitudes about pain management, as assessed with the instrument under development, would lie along a continuum, from endorsing a biomedical perspective to ambivalence and more active, self-management beliefs about treatment. Further, it was hypothesized that attitudes about treatment would be significantly associated with measures of emotional and physical functioning in chronic pain management. Specifically, *it was hypothesized that scores indicative of a greater willingness to take a more active, self-management approach toward pain treatment would be associated with*

better overall pain-related and psychosocial functioning. Conversely, scores tending toward a passive, medical-model approach were hypothesized to be associated with poorer functioning.

Chapter 2

Methods

Sampling Procedures

In order to participate in the present study, all individuals met the following inclusion criteria (provided by self-report): 1) persistent pain for at least six months (e.g., diagnosed with a chronic pain condition); 2) experience of pain on at least four days out of each week; 3) aged between 18 and 70 years old; 4) consented to participate in the study; and 5) able to read written English. Individuals were excluded from participating in the study if they reported persistent pain that was due to cancer.

Potential participants were recruited nationally via Amazon Mechanical Turk (MTurk; Buhrmester, Kwang, & Gosling, 2011), a secure, Web-based means of obtaining data. MTurk consists of a large pool of individuals called "workers", who can use keywords to search for work assignments, referred to as "Human Intelligence Tasks" (HITs), to be completed for payment (Leeper, 2016). Workers are only allowed to complete a HIT once. The surveys that comprise the present study were uploaded to MTurk as a HIT with the following keywords: *survey, demographics, chronic pain, psychology, research, pain, VowlesLab, Bailey*. Prior to taking the survey, potential participants first had to pass a qualification survey (Appendix C), which consisted of the inclusion criteria. Workers who met the inclusion criteria were allowed to proceed to the full survey. Those who did not pass the qualification survey were blocked from completing the questionnaires. Participants were remunerated $3.00 for completing the survey. All data were collected between February 13, 2017 and April 12, 2017. Given that MTurk does not provide identifying information when Workers complete HITs, a

request made to the University of New Mexico's Internal Review Board for a waiver of consent was granted.

Participant Characteristics

The final participant pool consisted of 398 community-dwelling adults, of whom 61.1% were female. The majority (79.6%) identified as non-Hispanic White, followed by Black (7.3%), Asian (5.8%), and Hispanic (4%). Participants reported an average of 15 years of education (*SD* = 2.33). Most had completed either some college (33.9%) or attained a bachelor's degree (33.7%). The majority of participants were married or living with a partner (57.3%) or single (32.9%), followed by those who were divorced (7.0%) or widowed (1.88%). The average age was 39 years and ranged from 18 to 84 (*Median* = 36; *SD* = 11.8), and 97.7% of the sample was 65 years of age or younger. The sample included at least one respondent from every state with the exception of Hawaii, Montana, South Dakota, and Wyoming, for a total of 46 states represented. The most frequent states represented were Florida (*n* = 46), California (*n* = 34), Texas (*n* = 21), and New York (*n* = 20).

The average duration of pain was 7.9 years and ranged from 0 to 39 years (*Median* = 5; *SD* = 7.0). Most participants did not receive any benefits for their chronic pain (86.4%) and reported working full (46.5%) or part time (11.8%), not due to pain, followed by 11.3% of participants who reported not working because of pain and 7.3% who reported working part time because of pain. Among those receiving benefits for chronic pain, 6.3% reported social security disability, and 2.8% each receiving either worker's compensation or another benefit. A total of 396 participants reported on a primary pain region, with the most frequent locations being low back (42.7%), the lower

extremities (e.g. foot or leg pain; 14.7%), and neck or head pain (13.4%). Furthermore, 175 indicated a secondary pain region, reporting pain in the lower extremities (22.9 %), lower back (21.1%), and upper extremities (e.g. shoulder, arms, or hands; 20.0%).

Sample Size and Power

The minimum recommended sample size for conducting exploratory factor analyses with adequate power is 300 (Field, 2005; Tabachnick & Fidell, 2001). In order to better ensure robust and stable results, the present study attempted to recruit up to 400 participants. The final sample size of 398 therefore exceeded the minimum recommended threshold for factor analyses.

Measures

Study participants were assessed at a single point in time using the self-report instruments listed in the following subsection (see Appendix D). Measures were chosen based on their relevance to chronic pain functioning and hypothesized relations with the instrument under development, the Pain Response Style Inventory (PRSI), Parts A and B. More specifically, with the exception of the Brief Pain Inventory and PSOCQ (to be used as covariates), the self-report measures were included to examine the utility of the PRSI in the statistical prediction of pain-related emotional functioning, such as depression and pain-related anxiety, and physical functioning. All measures have been used extensively in prior published studies of psychosocial functioning among chronic pain patients (Bailey, Vowles, Witkiewitz, Sowden, & Ashworth, 2016; Vowles et al., 2011; Vowles, Sowden, & Ashworth, 2014). In addition to established self-report instruments, demographic information was also collected, including age, gender, education level, race

and ethnicity, and socioeconomic and partner status. Finally, information was collected pertaining to clinical history concerning chronic pain, including pain duration, intensity, and location as well as relevant medical diagnoses, treatment history, and medications.

Ambivalence Instruments

As noted, the overall aim of the present study was to develop and evaluate the PRSI for use as an assessment instrument in psychosocial treatments for chronic pain. The key objective in developing this measure was to be able to assess for the presence of ambivalence concerning willingness to engage in active, self-management approaches to treatment. As noted above, prior research indicated two options for framing item content that appeared to be acceptable for accomplishing the primary aim of the study, including *felt* or *subjective ambivalence* (Priester & Petty, 1996) and the *attitudinal component technique* (Kaplan, 1972). Subjective ambivalence involves querying respondents using individual items that are reflective of ambivalent attitudes. The attitudinal component technique, in contrast, requires creating item pairs of similar items, each of which separately query for two aspects of an ambivalent attitude. The development of the specific attitudes and domains that comprised the item pool was informed by the preceding review of the literature on behavioral interventions for chronic pain, including relevant measures such as the Chronic Pain Acceptance Questionnaire (McCracken, Vowles, & Eccleston, 2004) and PSOCQ (Kerns et al., 1997). Items for the PRSI were also developed using salient domains of focus in the chronic pain literature, including, pain avoidance (Leeuw et al., 2007), reliance on medications and expecting doctors to "fix" pain with surgical interventions (Turk et al., 2008), coping skills (Jensen et al.,

2001; Turner, Jensen, & Romano, 2000), and pain control beliefs (Gatchel, Peng, Peters, Fuchs, & Turk, 2007).

After identifying domains and potential items from the literature, specific items were generated based on two primary perspectives that may be endorsed among pain patients: the biomedical perspective and the active, self-management perspective. Two separate item pools were developed, one in accordance with subjective ambivalence and the other set with the attitudinal component technique. In order to help ensure the content validity of the questionnaire (DeVellis, 2012), the initial pool of items was sent out for feedback to a panel of four psychologists with expertise in chronic pain management, behavioral medicine and/or MI. The final version of the PRSI (Appendix A) that was tested with the participant pool included two separate instruments, each of which captured one of the two methods for evaluating ambivalent attitudes.

Pain Response Style Inventory - Part A (PRSI-A). The PRSI-A is consistent with the subjective ambivalence technique for assessing ambivalent attitudes (Priester & Petty, 1996). The final scale consisted of nine "double-barreled" items (Appendix A) that directly queried how much one feels *torn* between or has experienced *both* of the two different attitudes expressed in the item, e.g., item 1: *I feel torn between wanting to have doctors fix my pain and wanting to find ways to cope on my own*. Questions were anchored to a 5-point Likert-type rating scale (1, *not at all*, to 5, *very much*) and summed to calculate a total score. The final version of the PRSI-A demonstrated good internal consistency (Cronbach's $\alpha = .77$).

Pain Response Style Inventory - Part B (PRSI-B). The PRSI-B reflects the attitudinal component technique for measuring ambivalence (Kaplan, 1972). The final

scale included 25 item pairs (Appendix B), which were randomly presented to participants as part of a 50-item scale. The PRSI-B separately assessed each aspect of ambivalence (i.e., *change* and *sustain* attitudes), such as in the following item pair: item 5, *It's helpful to learn new ways of living better with pain* (denoting an interest in change) and item 11, *The idea of learning to live better even with pain is a waste of time* (denoting an interest in sustaining behavior). Thus 25 of 50 items each comprised *change* and *sustain* scales, which were combined to create the final 25-item scale that was used for scoring. Respondents were asked to indicate on a 5-point Likert-type scale, ranging from 1, *not at all*, to 5, *very much*, how much each item described how they think or feel at present. Scoring was calculated using two methods: 1) a difference score approach and 2) the Griffin formula (described in the following subsection). The final version of the PRSI-B demonstrated very good internal consistency for both the Difference (Cronbach's $\alpha = .92$) and Griffin (Cronbach's $\alpha = .84$) scoring methods.

Covariates

Brief Pain Inventory (BPI). The BPI (Cleeland & Ryan, 1994) is a pain assessment instrument designed to measure pain intensity and the degree to which pain interferes with functioning. Though it was originally used with cancer pain patients, the instrument has since been validated in chronic non-cancer pain (Tan, Jensen, Thornby, & Shanti, 2004). The measure asks respondents to report on pain location, intensity, treatments, and pain interference. The items are anchored to an 11-point Likert-type rating scale. The scale anchors for the pain interference items range from 0 (*does not interfere*) to 10 (*completely interferes*), and the anchors for pain intensity range from 0 (*no pain*) to 10 (*pain as bad as you can imagine*). The BPI has demonstrated good

internal consistency (α = 0.85 for the Intensity Scale and α = 0.88 for Interference Scale) with chronic non-cancer pain patient samples. Additionally, a factor analysis confirmed the validity of the BPI's two-factor structure, comprising pain intensity and pain interference (Tan, Jensen, Thornby, & Shanti, 2004). The BPI was selected as a covariate because of the importance of controlling for pain intensity and disability (which was significantly associated with pain interference) when assessing for willingness to engage in an active-self management approach toward treatment that will be assessed with the PRSI.

Pain Stages of Change Questionnaire (PSOCQ). As noted above, the PSOCQ (Kerns et al., 1997) is a 30-item, self-report instrument with four scales (Precontemplation, Contemplation, Action, and Maintenance) that correspond to the stages of change in the TTM (Prochaska & DiClemente, 2005). The goals of the PSCOCQ included assessing for chronic pain patients' willingness to take on a "self-management approach" to their condition. Items consist of statements purported to be characteristic of each stage (e.g., Precontemplation: *My pain in a medical problem and I should be dealing with physicians about it* and Maintenance: *I have made a lot of progress in coping with my pain*) and are anchored to a 5-point Likert-type rating scale that measures level of agreement (1, *strongly disagree*, to 5, *strongly agree*). Regarding inter-scale correlations, the four scales demonstrated adequate discriminant validity with the exception of the Action and Maintenance scales (r = .80). The PSOCQ also demonstrated adequate internal consistency, with Cronbach's alpha for the scales ranging from .64 to .88. The purpose of including this instrument in the present study was to test

the incremental validity of the PRSI beyond the PSOCQ in terms of the statistical prediction of pain-related functioning.

Measures of Pain-Related Psychosocial Functioning

British Columbia Major Depression Inventory (BCMDI). The BCMDI (Iverson & Remick, 2004) is a 16-item instrument that assesses for the presence and severity of Major Depressive Disorder (MDD), according to the DSM-IV criteria (American Psychiatric Association, 2000). Questions are anchored to a 5-point Likert-type rating scale that measures severity (1, *very mild problem*, to 5, *very severe problem*). Total scores (range 0-80) can be calculated and higher scores reflect increased symptom severity. The BCMDI has demonstrated good psychometric properties and excellent sensitivity and specificity for MDD (Iverson & Remick, 2004). A measure of depression was specifically chosen because of its relevance to the biopsychosocial perspective on chronic pain (Gatchel, 2004).

Chronic Pain Acceptance Questionnaire (CPAQ). The CPAQ (McCracken et al., 2004) is a 20-item instrument that measures pain-related acceptance. Items are anchored to a seven-point Likert-type scale that ranges from 0 (*never true*) to 6 (*always true*) and summed to derive a total score. Research in chronic pain has demonstrated strong empirical support for the CPAQ's factor structure and psychometric properties (Vowles, McCracken, McLeod, & Eccleston, 2008; Wicksell, Olsson, & Melin, 2009).

Pain Anxiety Symptoms Scale-20 (PASS). The PASS (McCracken & Dhingra, 2002) is a 20-item instrument that evaluates fear, anxiety and avoidance behaviors in the context of pain. This measure is anchored to a frequency scale ranging from 0 (*never*) to 5 (*always*) and higher scores represent increased pain anxiety. The PASS has

demonstrated good reliability, validity, and utility in prior studies involving chronic pain populations (Roelofs et al., 2004).

Sickness Impact Profile – Chronic Pain (SIP-CP). The SIP-CP (McEntee, Vowles, & McCracken, 2016) was used to measure Physical and Psychosocial Disability. The SIP-CP includes 42 items taken from the original 136-item version of the SIP (Bergner, Bobbitt, Carter, & Gilson, 1981). Using item response theory, the items in the CIP-CP were selected as the strongest indicators of disability in a chronic pain sample of over 700 individuals (McEntee et al., 2016). The initial study evaluating the SIP-CP demonstrated support for a two-factor structure and superiority over the existing factor structure of the original SIP. Scores on the SIP-CP Physical and Psychosocial Disability scales range from 0 to 1 and higher scores indicate greater levels of disability. The SIP-CP has demonstrated adequate internal consistency for both Physical Disability and Psychosocial Disability.

Analytic Plan and Statistical Methods

Instrument scoring - PRSI-B. Social psychology research has indicated that instead of examining the "positive" and "negative" aspects of an attitude as separate scales, which tend to demonstrate low-to-moderate correlations, it is preferable to use a formula approach to derive an overall ambivalence score (Cacioppo, Gardner, & Berntson, 1997; Conner et al., 2002; Jonas et al., 2000). In order to provide a thorough examination of the utility of the PRSI-B, two different scoring methods were implemented, both of which have been used in prior research.

Griffin formula. The Griffin formula (Thompson, Zanna, & Griffin, 1995) is considered among the strongest means of calculating ambivalent attitudes in the social

psychology literature (Conner et al., 2002; Jonas et al., 2000). It is calculated by the following equation:

$$\text{Ambivalence} = (P + N)/2 - |P - N|$$

In the above formula, *P* represented the *change* item and *N* indicated the *sustain* item in each given pair. For each sustain-change item pair, scoring ranged from -1 to 5, with a total of 11 possible scores within that range. The score range fell in increments of .5 from -1 to 4, with an increment of 1 between 4 and 5. Scores on items that tended toward -1 indicated either 1) a strong desire to sustain behavior *or* 2) a strong desire to change in that domain. Scores that tended toward 5 indicated increased levels of ambivalence. In addition, *degree* of ambivalence is captured using the Griffin formula, e.g. scoring a 5 on both items in a pair resulted in a final score of 5, but a score of 3 on both items, which is also indicative of ambivalence, albeit less so, resulted in a final score of 3.

Difference Score method. The Difference score method involved 1) multiplying all sustain items by negative one and then 2) summing each sustain item with its paired change item to create a difference score (Rice, 2013). Thus for each sustain-change item pair, scoring ranged from -4 to 4 in increments of 1, with a total of nine possible scores within that range. Scores on items that tended toward -4 indicated strong desire to sustain behavior, and scores tending toward 4 indicated strong desire to change in that domain. Scores of 0 indicated that both the sustain and change items within a pair were given the same score by the respondent, thus indicating an ambivalent attitude on that domain.

Item-level analyses and factor structure. Following the implementation of the scoring procedure, the first step involved item-level analyses, including examining individual items for collinearity using bivariate correlations as well as item-total

correlations and the distribution of individual responses. Items were considered for deletion if bivariate correlations exceeded $r = .85$, indicative of collinearity (Kline, 2011), item-total correlations were less than $r = .20$ (Everitt & Skrondal, 2010), or significant skewness or kurtosis was present. Next, separate exploratory factor analyses (EFA) were performed on the PRSI-A and PRSI-B, using the two different scoring approaches. The EFAs were performed using an iterative approach, where individual items were examined for adequate factor loadings and factor correlations were used to inform the rotation method. *A priori*, it was assumed that the factors that comprise the both parts of the PRSI would be correlated, favoring an oblique rotation. In accordance with Tabachnick and Fidell (2001), a minimum factor correlation of .32 was the threshold used to confirm this assumption. All EFAs were conducted using the Mplus software package, version 7.3 (Muthén & Muthén, 2012).

Exploratory factor analyses were particularly well suited to the aims of the present study because EFAs are often used to discover the patterns in which items, known as *indicators*, from a measure correlate with one another (Tabachnick & Fidell, 2001). Exploratory factor analyses were thus used to uncover patterns among the indicators that are manifested in the factor structure, which could then inform the creation of subscales. As part of this process, items that were least useful in explaining the factors were deleted. The utility of individual items was evaluated by examining the factor loadings. Though the minimum threshold for "fair" factor loadings has been reported as .45, it was decided that lowering this threshold would be appropriate for the present study. While it was important to reduce the item content of the scale by eliminating indicators whose variance explained by the respective factor was negligible, it was also important to have

enough items in the PRSI-B such that respondents are unlikely to be aware that each item has a similar ambivalence pair. It was hypothesized that the presence of more items would help mask the redundancy of the item content. Therefore, it was decided that a minimum factor loading of .32 struck an appropriate balance between maintaining sufficient factor loadings and minimizing the deletion of items.

The EFA models were tested with maximum likelihood estimation, which uses all available data, including cases with missing responses on indicators. A Geomin rotation was implemented, allowing items and factors to correlate. The adequacy of the EFA models were assessed using the chi-square statistic, which compares the degree of fit between the sample covariance matrix and the population covariance matrix. A non-statistically significant chi-square indicates good overall model fit (Kline, 2011), with eigenvalues over 1.0 indicating that factors accounted for a robust amount of variance in the measure. The EFA models were also evaluated against a residual-based measure: the root mean square error of approximation (RMSEA), which is another assessment of model fit between the sample and population matrices. Finally, incremental fit indices were used to assess fit, which compare the model against a statistical baseline model and include the comparative fit index (CFI) and Tucker-Lewis index (TLI). Established benchmarks suggest that an RMSEA < .05 and < .08 (Browne & Cudeck, 1993) and CFI and TLI > .95 and > .90, characterize models with good fit and acceptable fit, respectively (Hu & Bentler, 1999). The RMSEA hypothesis of close fit was also evaluated (H_0: RMSEA ≤ 0.05); a failure to reject this hypothesis (i.e., $p > .05$) is indicative of good model fit. *The final fit statistics were used to determine which of the*

Griffin or Difference scoring methods for the PRSI-B would be used for all subsequent analyses.

Correlation and regression analyses. Correlation analyses were used to explore the associations between the final versions of the EFA and the other constructs examined in the present study, represented by the different scales. For example, it was assumed that depression scores would be negatively correlated with PRSI-B subscale scores, using the difference score method, given that the literature indicates those who take on more active approaches to coping with pain demonstrate better psychosocial functioning (Jensen et al., 2001; Morley et al., 1999; Vlaeyen & Linton, 2000). Thus the correlation analyses were also designed to confirm the expected associations between health-related functioning and the PRSI scales. Furthermore, the correlation analyses were used to confirm the use of relevant covariates, such as pain duration and pain intensity.

The regression analyses were implemented to examine whether the PRSI-A and PRSI-B scores were significantly associated with important aspects of health-related functioning. As noted above, only the superior scoring method for the PRSI-B would be implemented at this stage. The purpose of this step was to further evaluate the predictive validity and potential clinical utility of the PRSI scales. This examination involved creating a series of simultaneous linear regression equations, where the five aspects of health-related functioning measured in the present study – physical and psychosocial disability (the two subscales of the SIP-CP), depression (BCMDI), pain-related anxiety (PASS), and chronic pain acceptance (CPAQ) - were regressed on specific background variables, the four subscales of the PSOCQ and, separately, on the 1) PRSI-A, 2) the subscales that emerged from the PRSI-B. Thus the result was two sets of simultaneous

regressions with each of the two parts of the PRSI. The background variables included age, sex, pain duration, and pain intensity, all of which were hypothesized to significantly covary with measures of health-related functioning. The four subscales of the PSOCQ were included in the regressions to examine the incremental validity of the PRSI scales after controlling for a theoretically similar instrument. All regression equations were calculated in Mplus (Muthén & Muthén, 2012) with full information maximum likelihood estimation, which uses all available data. The results of the regression analyses in Mplus are reported as standardized regression coefficients, or *betas*, which demonstrate the direct effects of predictor variables on the dependent measures in terms of standard deviation units. Similar to semipartial correlations, betas indicate the unique explanatory power of a predictor variable while controlling for all other predictors in a multiple regression model (Kline, 2011).

Chapter 3

Results

Of the 400 participant responses submitted to MTurk, two individuals did not answer the majority of questions and their surveys were rejected. Thus the final analyses were carried out on a sample of 398 individuals. Overall, missing data were a minor problem, with no item for any dependent measure, the PRSI-A, or the PRSI-B missing more than 2% of responses. Item-level analyses were carried out on the PRSI-A as well as separately on the two 25-item scales of the PRSI-B calculated by the Difference and Griffin methods.

Item-Level Analyses

PRSI-A. The nine-item scale demonstrated very good internal consistency (Cronbach's $\alpha = .81$) and corrected item-total correlations were all in the acceptable range (range $r = .44$ to .62). Item-level analyses also indicated that the removal of any one item did not substantially impact Cronbach's alpha, which ranged from $\alpha = .78$ to .80. The skewness and kurtosis indexes did not show significant deviations from normality for any item on this scale. Finally, the results of the data screening also indicated an absence of collinearity, with all inter-item correlations falling below the recommended cutoff of $r = .85$.

PRSI-B. Before calculating the 25-item scales for the subsequent analyses, an initial evaluation of the PRSI-B was performed by examining the bivariate correlations between the 25 item pairs. The correlations were all negative and low-to-moderate in magnitude (range $r = -.19$ to -.68), not including an exceptionally low correlation in item pair 7 and 39 ($r = -.05$), which corresponded to item 7 on the final 25-item ambivalence

scale (Appendix B) for the EFA. Furthermore, item pair 38 and 31 were positively correlated (r = .20), an unexpected finding, which corresponded to item 24 on the final ambivalence scale. As research indicates that items using the attitudinal component technique are generally uncorrelated (Jonas et al., 2000), these two item pairs were retained for the factor analyses, where the bivariate correlations could be used as a justification for deletion from the final scale should the factor loadings fall into the borderline range for acceptability. The remaining item-level analyses for this item set were carried out separately based on the two 25-item scales created using the Difference and Griffin scoring methods.

Difference method. The 25-item Difference scale of the PRSI-B (PRSI-B-D) demonstrated excellent internal consistency (Cronbach's α = .93), and the removal of any one item did not substantially impact Cronbach's alpha, which ranged from α = .92 to .93. In addition, the skewness and kurtosis indexes did not show significant deviations from normality for any item on this scale. Although the corrected item-total statistics demonstrated that the majority of correlations were in the acceptable range (range r = .25 to .86), three items were below the recommended cutoff, including items 7 (r = .08), 18 (r = .13), and 23 (r = .11). These three items were retained pending the results of the factor loadings from the EFA.

With regard to collinearity, bivariate correlations of the items within this scale indicated that item pairs 19 (*I can lead a full life even though I have chronic pain* and *I cannot lead a full life because I have chronic pain*) and 16 (*I will live a normal life even with my chronic pain* and *I will not be able to live a normal life until I get rid of my chronic pain*) were above the recommended cutoff of r = .85. This result was

unsurprising given the similarity in item content, and, therefore, item pair 19 was dropped from the final EFA analyses and the regression analyses.

Griffin method. The 25-item Griffin scale of the PRSI-B (PRSI-B-G) demonstrated very good internal consistency (Cronbach's $\alpha = .85$) and the removal of any one item pair did not substantially impact Cronbach's alpha, which ranged from $\alpha = .84$ to .86. Additionally, the skewness and kurtosis indexes did not show significant deviations from normality for any item on this scale. Furthermore, only item pair 14 on the PRSI-B-G demonstrated an item-total correlation ($r = .09$) below the recommended cutoff of .20, while the remaining item-total correlations ranged from .23 to .63. Item 14 was retained pending the results of the factor loadings from the EFA. In terms of collinearity, all inter-item correlations fell below the recommended cutoff of $r = .85$.

Factor Analyses

PRSI-A. All nine items of the PRSI-A were included in the initial EFA, the results of which demonstrated that two factors had an eigenvalue greater than or equal to 1.0. Further, chi-square analyses showed improved fit for the two- and three-factor solutions over solutions with one less factor. The three- and four- factor models each had a non-significant chi-square statistic, indicating the potential superiority of these solutions. Factor solutions with five or more factors did not converge. It thus appeared that either a two- or three-factor solution demonstrated the best model fit. In both of the two- and three-factor solutions, however, item 9 had a factor loading that was at or below the minimum threshold of .32. After removing item 9, the subsequent EFA failed to converge following a two-factor solution. In addition, the two-factor solution for the

subsequent EFA revealed that item 7 had a negative residual variance, indicating that this item should be dropped.

The final EFA for the PRSI-A included seven items, after dropping items 9 and 7, and failed to converge following a one-factor solution. Only one factor had an eigenvalue greater than one (2.89). Although the chi-square test of model fit showed that overall fit was mediocre, χ^2_M (14) = 24.8, p = .037, additional fit indices supported good model fit. Specifically, the incremental fit indices, CFI = .98 and TLI = .97, and residual-based fit index, RMSEA = .04 (90% CI [0.011, 0.072]), all indicated good model fit. The results also indicated a failure to reject the RMSEA hypothesis of close fit (p-value |RMSEA ≤ 0.05| = .60). All seven items of the final scale had factor loadings greater than .46. Internal consistency for the final 7-item scale was good (Cronbach's α = .77). See Figure 1 for a scree plot of the final eigenvalues and Table 1 for all factor loadings on this measure.

PRSI-B-D. The 25 paired items of the PRSI-B-D (Appendix B) were included in the initial EFA, and models with one- through six-factor solutions were tested. All six models had significant chi-square statistics and model comparisons showed that each successive model fit significantly better. Still, the results showed that three factors had eigenvalues greater than 1.0, providing an initial indication that the three-factor solution had a superior fit. The incremental fit indices and residual-based fit index indicated poor fit for the three-factor solution. Examination of the factor loadings provided an indication of the sources of poor fit, including item pair 24 (factor loading = .31), which had a loading below the minimum threshold of .32, and item pair 10, which cross loaded on factors 1 (factor loading = .36) and 3 (factor loading = .30). Item pairs 24 and 10 were

dropped, and subsequent analyses were performed using an iterative approach. As with the initial EFA, indices of fit were examined for each subsequent EFA along with factor loadings. Items were dropped that were below threshold or were cross loading on two factors.

The final EFA for the PRSI-B-D included 19 item pairs out of the initial 25. Items 10, 12, 14, 15, and 24 were dropped due to poor performance, and item pair 19 was deleted because of the collinearity with item 16 that was uncovered during the item-level analyses. As noted above in the report on item-level analyses, the two individual items that comprised pair 24 were also positively correlated (r =.20), an unexpected finding further justifying its removal. Though the final EFA included only two factors with eigenvalues greater than 1.0, the three-factor solution demonstrated good model fit. Furthermore, the items loaded onto the factors in a pattern that was interpretable, with factors 1, 2, 3, generally representing specific item content pertaining to 1) *pain as an obstacle to a meaningful life*, 2) *pain control efforts*, and 3) *openness to pain coping*, respectively. In terms of interpretation of factor scores, those who were higher on the factors indicated a tendency *not* to view pain as an obstacle to a meaningful life, *not* to engage in unhelpful efforts to control pain, and endorsed a greater openness to learning or using coping skills to manage pain. Based on the results, the three factors were labeled *Pain Obstacle*, *Pain Control*, and *Pain Coping*.

Regarding specific metrics of fit for the final EFA model, the chi-square test showed that overall fit was mediocre, χ^2_M (117) = 230.29, $p < .001$, though the additional fit indices supported good model fit. The incremental fit indices, CFI = .98 and TLI = .97, and residual-based fit index, RMSEA = .05 (90% CI [0.040, 0.059]), all indicated good

model fit. The results also suggested that the RMSEA hypothesis of close fit should not be rejected (*p*-value |RMSEA ≤ 0.05| = .53). With the exception of item pair 4 (factor loading = .42), all items on the final scale had factor loadings greater than .45. Additionally, over half of the items had factor loadings greater than .71 (10 of 19 item pairs), indicating that the respective factor accounted for at least 50% of the variance in the indicator. Internal consistency for the final set of 19 items was excellent (Cronbach's α = .92). The factor correlation between factors 1 and 2 (*r* = .80) supported the use of an oblique rotation method. See Figure 2 for a scree plot of the final eigenvalues and Table 2 for all factor loadings on this measure.

PRSI-B-G. As with the PRSI-B-D, the 25 items pairs (Appendix B) were included in the initial EFA. The EFAs were analyzed with a focus on the three-factor solution, given the superiority of fit for the three-factor structure of the PRSI-B-D. The overall results indicated a similar pattern to the PRSI-B-D, with the specific item content pertaining to *pain as an obstacle to a meaningful life*, *pain control efforts*, and *openness to pain coping*, each loading onto separate factors. In contrast to the PRSI-B-D, however, the results of the PRSI-B-G showed an overall pattern of weaker factor loadings. Specifically, item pairs 10, 12, and 25 using this scoring method were below the threshold of .32 and only two of the 25 indicators had a factor loading above .71 (compared to eight of 25 indicators for the PRSI-B-D in the initial model). Poor fit was indicated by a significant chi-square statistic, χ^2_M (228) = 437.06, $p < .001$, and by the incremental fit indices, CFI = .92 and TLI = .89. Only the test of residual fit demonstrated good fit, RMSEA = .05 (90% CI [0.041, 0.055]).

Given the psychometric superiority of the PRSI-B-D and the desire to have a consistent composition of item content across subscales between the two methods, the subsequent EFA for the PRSI-B-G was analyzed using the same set of indicators as in the final version of the PRSI-B-D. That the pattern of factor loadings was nearly identical between the two scoring methods provided an additional justification for this approach. Thus the final EFA for the PRSI-B-G included 19 items, after dropping item pairs 10, 12, 14, 15, 19, and 24 (Table 3). Four factors on this model had eigenvalues greater than 1.0. The significant chi-square statistic indicated that overall fit was poor for this model, χ^2_M (117) = 175.39, $p < .001$. However, the incremental fit indices indicated good fit, CFI = .97 and TLI = .95, as did the residual based fit index, RMSEA = .04 (90% CI [0.024, 0.046]). Furthermore, the results demonstrated that the RMSEA hypothesis of close fit should not be rejected (p-value |RMSEA $\leq$ 0.05| = .99). Still, only paired item 16 (factor loading = .75) for the final model had a factor loading greater than .71. The highest factor correlation occurred between factors 1 and 2 and was less than the cutoff of .32 for an oblique rotation (r = .24).

Summary of EFA findings for the PRSI-B. The EFA results for the PRSI-B-D were clearly superior to the PRSI-B-G, with the latter demonstrating weaker factor correlations and poorer model fit. The only differences between the loading patterns of indicators on the factors between the two scoring methods occurred on two separate item pairs. Specifically, item pair 4 loaded onto factor 1 for the PRSI-B-D, yet that same pair loaded onto factor 3 on the PRSI-B-G. Item pair 22 loaded onto factor 2 for the PRSI-B-D, but loaded onto factor 1 on the PRSI-B-G. Taken together, the factor loadings were remarkably consistent between two distinct methods of scoring the PRSI-B, and PRSI-B-

D showed consistently stronger results. In accordance with the analytic approach for the present study, only the PRSI-B-D was retrained for the subsequent analyses, in addition to the PRSI-A. Consistent with Tabachnick and Fidell (2001), three separate subscale scores for the PRSI-B-D were created by calculating total scores using those item pairs that comprised each of the three factors (see Table 4 for descriptive statistics for the subscales). The 7-item total score for the PRSI-A and the total scores on the three subscales of the PRSI-B-D were tested separately in two sets of subsequent correlation and regression analyses.

Correlation Analyses

The overall pattern of association between both parts of the PRSI and the other measures of functioning and the covariates provided preliminary confirmation for the relevance of measuring ambivalence in the context of chronic pain. Specifically, the PRSI-A demonstrated statistically significant associations (all p's $\leq .001$) with all five measures of functioning (Table 5). Each of the three PRSI-B-D subscales also demonstrated significant correlations with at least two of the five measures of health-related functioning (Table 6), with the Pain Obstacle and Pain Control subscales consistently demonstrating the strongest patterns of association. The Pain Coping subscale was notably weaker, as it only showed significant associations with depression and pain acceptance. All correlation coefficients were in the expected directions, such that the PRSI-B-D subscales were positively correlated with pain acceptance and negatively correlated with depression, pain anxiety, and physical and psychosocial disability (note that higher scores on all PRSI-B-D subscales were indicative of individuals more interested in behavior change and active approaches toward pain

management). Taken together, the results of the correlation analyses confirmed that it was appropriate to further test both parts of the PRSI using regression analyses, while controlling for shared effects with covariates.

Regression Analyses

The regression analyses were conducted separately with the PRSI-A (Table 7) and PRSI-B-D (Table 8) to examine the unique variance accounted for in the five measures of health-related functioning while controlling for both the background variables and the PSOCQ, a theoretically-similar measure.

PRSI-A. The overall results showed that the background variables were moderately associated with health-related functioning in the simultaneous regressions that included the PRSI-A. Of the four background variables, sex and average pain intensity most consistently demonstrated significant direct effects on functioning, though the strength of the overall effects was moderate in size. Average pain intensity was significant in four of five models tested (range β -.11 to .22, all *p*'s < .05), including chronic pain acceptance, depression, pain anxiety, and level of physical disability. Similarly, sex (where males were coded as "1" and females as "0") demonstrated significant direct effects in four of five models, including depression, pain anxiety, and physical and psychosocial disability (range β -.15 to -.10, all *p*'s < .05). Age was significant for depression (β = -.16, *p* = .002) as well as for psychosocial (β = -.18, *p* = .001) and physical disability (β = .13, *p* = .011). Concordant with the correlation analyses, which showed that pain duration was significantly associated with only pain anxiety, the reported pain duration in years did not exhibit significant direct effects on any of the five measures of functioning (range β -.06 to -.008, all *p*'s < n.s.).

Of the four subscales of the PSOCQ, the maintenance subscale showed the strongest direct effects on functioning. In particular, maintenance was significant for chronic pain acceptance (β = .42, $p < .001$), depression (β = -.43, $p < .001$), and psychosocial disability (β = -.34, $p < .001$). The effects were all in the expected directions for this subscale, which is composed of item content that endorses behavior change and active approaches to pain management. The contemplation subscale was significant for pain anxiety (β = .21, $p < .001$) and physical disability (β = .15, $p = .022$), and precontemplation was only significantly associated with pain anxiety (β = .19, $p < .001$). The effects were also in the expected directions for these two subscales, which are more indicative of a desire to be a passive recipient of medical model interventions. The action subscale was not significant in any of the five tested models (range β -.11 to .16, all p's < n.s.).

Of primary interest were the results regarding the direct effects of the PRSI-A on health-related functioning when controlling for all other variables in the simultaneous regressions. The PRSI-A had significant direct effects on all five models tested, including pain acceptance (β = .28, $p < .001$), depression (β = .16, $p = .005$), pain anxiety (β = .30, $p < .001$), and psychological (β = .18, $p = .003$) and physical disability (β = .12, $p = .043$). Interestingly, the betas were positive for all five models. In other words, while higher levels of ambivalence on the PRSI-A showed a tendency toward higher acceptance scores, it also demonstrated, for instance, a tendency toward higher levels of depression and pain anxiety.

PRSI-B-D. The results for the regression models that included the PRSI-B-D also showed a pattern of significant direct effects for the background variables that were

moderate in magnitude. Age was significant for depression (β = -.20, $p < .001$), pain anxiety (β = -12, $p = .011$), and psychosocial disability (β = -.23, $p < .001$). Average pain intensity also had significant direct effects for depression (β = .10, $p = .049$) and pain anxiety (β = .12, $p = .013$) as well as for physical disability (β = .17, $p = .001$). None of the background variables were significant for pain acceptance (range β -.07 to .10, all p's < n.s.).

In terms of the PSOCQ subscales, and in contrast to the regression models including the PRSI-A, the results for the PRSI-B-D showed that the contemplation scale was the most consistent predictor of functioning, demonstrating significance in four of five models (range β .14 to .26, all p's < .05). Contemplation was not significant only for psychosocial disability (β = .10). In fact, no subscale for the PSOCQ was significant for psychosocial disability. Precontemplation demonstrated significant direct effects only on pain acceptance (β = .20, $p = .001$), and maintenance only on depression (β = -.21, $p = .009$).

Of the three subscales for the PRSI-B-D, including Pain Obstacle, Pain Control, and Pain Coping, Pain Obstacle was the most consistent predictor of health-related functioning. Specifically, Pain Obstacle showed robust direct effects on all five measures of functioning, including pain acceptance (β = .65, $p < .001$), depression (β = -.49, $p < .001$), pain anxiety (β = -.29, $p < .001$), and psychological (β = -.53, $p < .001$) and physical (β = -.57, $p < .001$) disability. Furthermore, betas were all in the expected directions: higher scores on the Pain Obstacle subscale (indicative of individuals who tend to *not* view pain as a barrier to quality of life) were associated with higher scores on pain acceptance and lower scores on depression, pain anxiety, and psychological and

physical functioning. Although the direct effect of Pain Control on pain anxiety (β = -.24, p = .001) was in the expected direction, the direct effect of Pain Control for pain acceptance (β = -.30, p < .001) was in the opposite direction as expected. In other words, as individuals in the sample tended toward higher scores on Pain Control (indicative of *not* needing to control pain levels), pain acceptance scores were lower. Furthermore, the beta weight for Pain Control and pain acceptance was greater in magnitude than the zero-order correlation (r = .08), which was indicative of suppression. The Pain Coping subscale was the weakest of the three, and did not exhibit significant direct effects for any of the five models (range β -.07 to .05, all p's < n.s.).

Chapter 4

Discussion

The primary purpose of the present study was to develop and test two separate psychometric instruments designed to assess attitudes about chronic pain treatment. In accordance with motivational theories on behavior change, notably MI, the instruments were created such that they could detect ambivalence. In this context, ambivalence was defined as simultaneously endorsing attitudes consistent with the medical model of treatment (e.g., pharmacotherapy, injections, and surgeries) and more active strategies consistent with behavior treatments for pain (e.g., learning new coping skills and striving to live a meaningful life, even with pain). Two specific measures were developed and tested: 1) the PRSI-A queried for ambivalent attitudes directly by creating a series of double-barreled items, consistent with "subjective ambivalence" and 2) the PRSI-B, which was based on the attitudinal component technique and involved splitting two aspects of an ambivalent attitude and querying respondents separately. Both methods have been used in prior research, particularly in the study of the relationship between attitudes and behavior within social psychology. The instruments in the present study were tested in a series of steps, using item-level, factor, and regression analyses. Further, the PRSI-B was tested using two different scoring methods in order to determine which demonstrated the most robust psychometric properties.

The PRSI-A consisted of a small number of related items and is best understood as representing a single, underlying factor structure that measures one domain. The final 7-item scale demonstrated good psychometric properties, and the factor loadings for the final one-factor solution were all in the moderate range for the 7-item scale. Additionally, the PRSI-A showed significant direct effects on all five measures of health-related

functioning in the subsequent regression analyses, which controlled for shared effects with other relevant variables, including the PSOCQ. Perhaps unsurprisingly, both the correlation and regression analyses indicated that higher levels of ambivalence on the PRSI-A were associated with higher levels of depression, pain-related anxiety, and physical and psychosocial disability. These results appear to be reflective of higher levels of distress experienced in individuals who are ambivalent, i.e. some degree of internal conflict, about how to best manage pain. What is more difficult to interpret is that the positive direct effect of the PRSI-A total score on pain acceptance, which implied that higher scores on subjective ambivalence were also associated with higher levels of pain acceptance. This pattern was consistent for both the correlation and regression results for the PRSI-A, but inconsistent with the bivariate correlation results that reached statistical significance for pain-related acceptance with the other measures of health-related functioning, which were all negatively associated. Indeed, the negative association for pain acceptance, as measured by the CPAQ, and levels of health-related functioning found in the present study is consistent with the larger body of research in chronic pain. Taken together, it is surprising that a measure of adaptive functioning and four measures of maladaptive functioning would all be positively associated with PRSI-A ambivalence scores. It would be interesting to see whether testing on future samples indicates that these results are an anomaly or are indicative of holding conflicting, ambivalent attitudes about pain treatment.

A potential contributing factor to the unexpected result on pain-related acceptance on the PRSI-A may stem from the nature of the scale. As this instrument queries for ambivalence directly by presenting a series of statements indicative of ambivalent

attitudes, lower scores can only be interpreted as a tendency toward an absence of ambivalence. As such, it can be assumed that those scoring lower would include an amalgamation of those who tend strictly toward the medical model of treatment as well as those who are interested in more active methods of managing pain. Given that each attitude is associated with different levels of healthy functioning, the unexpected result may be a confounding effect of having two distinct groups of individuals tending toward lower scores on this measure.

The preliminary evaluation of the PRSI-B, where bivariate correlations of all individual item pairs were examined, generally supported the hypothesis that individuals with chronic pain can hold conflicting attitudes about treatment approaches. The correlations between the items in the final scale were all negatively correlated and moderate in magnitude, such that participants tended to be high on one item within a pair and low on the other, and vice versa. However, the magnitude of the correlations demonstrated that the relationship was only moderate, which lends support to breaking up ambivalence from bipolar scales and using the attitudinal component technique employed for the PRSI-B. Had the item pairs consistently exhibited high, negative correlations, a justification to measure these items on standard bipolar scales would have been warranted.

An evaluation of the two different methods of scoring the PRSI-B indicated that using the Difference scoring method was superior to using the Griffin equation, an approach that was developed in social psychology for measuring ambivalence. On the one hand, the EFA results between the two methods were remarkably consistent, with both scoring methods producing an interpretable three-factor structure that was labeled

Pain Obstacle, Pain Control, and Pain Coping. Still, the factor loadings were reliably stronger for the Difference scoring method, and therefore the PRSI-B-D was retained for the subsequent regression analyses.

The results of the regressions for the PRSI-B-D demonstrated the superiority of the 9-item Pain Obstacle subscale (Factor 1), which showed robust direct effects on all five measures of health-related functioning. Furthermore, all of the betas were in the expected directions, such that those who had higher scores on Pain Obstacle had higher pain acceptance and lower depression, pain-related anxiety, and psychological and physical disability. These results provided strong support for the incremental validity of the Pain Obstacle subscale, after controlling for the effects of the background variables and a theoretically similar measure in the PSOCQ. In contrast, the 5-item Pain Control subscale was only significant for pain-related anxiety and chronic pain acceptance. Furthermore, the beta for chronic pain acceptance regressed on Pain Control was negative, an unexpected finding. In contrast to the weak, positive bivariate correlation between the pain acceptance and Pain Control, the regression results signaled that as individuals tended to score higher on this scale (i.e. reporting the need to control pain *less*), pain acceptance scores were lower. This discrepancy between the correlation and the regression results was evidence of a suppression effect, and because beta weights control for shared variance with other predictors, the beta revealed a more accurate picture of the relationship between these two variables. Nevertheless, the results are puzzling given that reduced efforts at controlling pain ought to converge with increased scores on pain-related acceptance.

Pain Coping, the third subscale for the PRSI-B-D, had no significant direct effects in any of the regression equations tested, though it was significantly associated with depression and pain acceptance in the correlation analyses. Therefore, in terms of the present study, the results indicated that the Pain Coping subscale could be completely dropped from the PRSI-B, especially given the modest performance on the correlations before controlling for shared variance. The Pain Control subscale also demonstrated a weaker pattern of results that could justify its removal. However, keeping only the nine-item Pain Obstacle scale may be problematic in that the redundant item content may become clear to respondents, which could influence response tendencies.

One final area of note regarding the PRSI-B-D subscales concerns convergent and discriminant validity. The three factors all involve a similar domain of content, and it was therefore important for the subscales to demonstrate correlations moderate in magnitude. The factor correlation between Pain Obstacle and Pain Control was high at $r = .75$. According to Kline (2011), factor correlations can be as high as .90 before they are considered "excessive." Nevertheless, the correlation for the two PRSI-B-D factors warrants some reason to be concerned about redundancy in the subscale content. Conversely, Pain Control and Pain Coping were almost completely uncorrelated, which provided evidence that the content between the factors is excessively dissimilar. This result, combined with the results for Pain Coping in the regressions, provides a rationale drop the Pain Coping subscale entirely. If future research studies attempt to replicate the results of the PRSI-B-D, close attention should be paid to the factor correlations to examine whether these patterns hold. For instance, if the factor correlation remains high

between Pain Obstacle and Pain Control, further justification is warranted for dropping the Pain Control subscale.

Future Directions

The overall results for the present study indicated that it was possible to adapt separate methods for assessing ambivalent attitudes from social psychology into two, psychometrically sound chronic pain measures that examine perspectives on chronic pain treatment. As ambivalence was a core part of both parts A and B of the PRSI, the results also demonstrated that holding conflicting attitudes about pain treatment approaches may have implications for health-related functioning. This is an important innovation, as the PSOCQ is perhaps the most similar measure to the PRSI and is composed entirely of bipolar scales, which cannot distinguish between ambivalence and indifference. Yet it is also important to remember that the degree to which the PRSI-A and PRSI-B can successfully assess ambivalence is only partly answered in the present study. The cross-sectional nature of the design cannot answer whether attitudes about treatment as assessed by the PRSI have ramifications for how individuals adhere or respond to treatment. Therefore, the ultimate test of whether the PRSI can adequately measure ambivalent attitudes lies with testing the instrument in a treatment study.

Similar to the objective in creating the PSOCQ, the PRSI measures were designed to be used as part of a pre-treatment assessment to categorize pain patients according to their likelihood of successfully adhering to cognitive-behavioral treatments. The PRSI could help point to those who are ambivalent toward such treatment in order to evaluate whether motivation can be enhanced by receiving MI as a treatment adjunct. Nudging those who are ambivalent in this manner may improve outcomes more significantly for

this cohort of patients, compared to those who adhere more strictly to attitudes consistent with biomedical or behavioral treatment approaches. A treatment study such as this could also serve to evaluate whether the PRSI-A or the PRSI-B performs better at categorizing pain patients according to treatment attitudes, as evaluated by response to a behavioral treatment that includes MI versus behavioral treatment alone. A two-way factorial design examining the group (i.e., PRSI categorization) by treatment mode (i.e., CBT versus CBT plus MI) interaction using pre-post change scores would be an ideal way to test whether ambivalent patients respond more significantly to MI plus CBT. A treatment design such as this could also further evaluate whether the Griffin or Difference performs better at evaluating attitudes.

In terms of the present study objectives, the principal weakness of the Griffin formula is that it is unable to differentiate between "behavior changers" and "sustainers", who would both have scores tending toward -1. It was assumed at the outset of the study that this limitation could imply that the Griffin scoring method would not behave psychometrically like the Difference method, which shares properties with more traditional approaches by categorizing the extremes in attitudes at either end of a scale. Nonetheless, the Griffin method has strong advantage in its ability to calculate the *degree* of ambivalence, which is considered an important criterion in calculating ambivalence in the social psychology literature (e.g., Conner et al., 2002; Jonas, Broemer, & Diehl, 2000). For instance, a highly ambivalent individual who chooses a 5 (*very much*) on both items pairs of the PRSI-B will score higher on ambivalence using the Griffin equation than another individual who chooses a 4 (*quite a bit*) on both pairs. Using the preceding example, the Difference approach is unable to capture the degree of ambivalence, such

that both sets of participants would receive a difference score of 0. In fact, an individual who held equally weak attitudes about an item pair (e.g., 1, *not at all*), would also receive a 0 score. Therefore, a case can be made that the Griffin method performs better at identifying ambivalence than the Difference score, which would be highly important for using the PRSI as a part of a treatment-based evaluation. Ultimately, the benchmark test for the superior scoring method would involve evaluating which scoring method better categorizes patients as ambivalent in the aforementioned treatment study.

Limitations

The present study had several limitations of note. The entire battery of measures was based on self-report. It is thus impossible to discern the degree to which endorsements of an interest in active, self-management approaches to pain treatment were merely aspirational or whether they were consistent with actual behavior patterns in respondents. Further, the sample characteristics revealed a healthy, young community-dwelling cohort, with a majority who were not receiving any benefits for their chronic pain. Most were also working full- or part-time, not due to pain. Thus the results of the present study may not generalize to patients in pain clinics, where the average age and disability levels may be higher. Finally, the cross-sectional nature of the study design makes it impossible to infer directionality in the relationship between attitudes among those with chronic pain and health-related functioning. Beta weights are commonly described in terms of "direct effects" on a variable of interest in a regression model, but this should not be construed as a causal relationship. Direct effects are rather just a naming convention for a statistic that explains the relationship between two variables when the influence of other variables in the model is controlled for.

Conclusions

Motivational theories offer an exciting new area of research within chronic pain management. Much of the literature in this area, however, has focused on applied theory rather than building up a base of evidence for enhancing motivation to adhere to treatment. Moreover, there appears to be a general lack of recognition on the importance of ambivalence, a description of an attitude about an object that is central to MI. Although MI assumes the presence of ambivalence in the context of destructive behaviors such as excessive substance use, this assumption may not necessarily generalize to patients who are faced with different treatment modalities as part of chronic pain management. Therefore, the present study sought to investigate the psychometric properties of a measure that was capable of assessing for ambivalence, a necessary step before applying motivational enhancement, such as MI, as part of behavioral treatment for chronic pain.

The present study provided preliminary evidence of the utility of a psychometric instrument that evaluates attitudes about treatment approaches for managing chronic pain. The results showed evidence that attitudes about treatment approaches may have important ramifications for psychosocial functioning. Given the recent focus on motivational theories in the context of chronic pain management, the present study is an important step in building up an evidence base in support of better understanding motivation in patients prior to initiating treatment. An enhanced understanding of the role of motivation to engage in behavioral treatments in the future could help increase adherence to treatment and improve outcomes by selectively targeting ambivalent patients with brief motivational enhancement therapies prior to the mainline treatment.

Figure 1. *Scree plot of the final version of the PRSI-A*

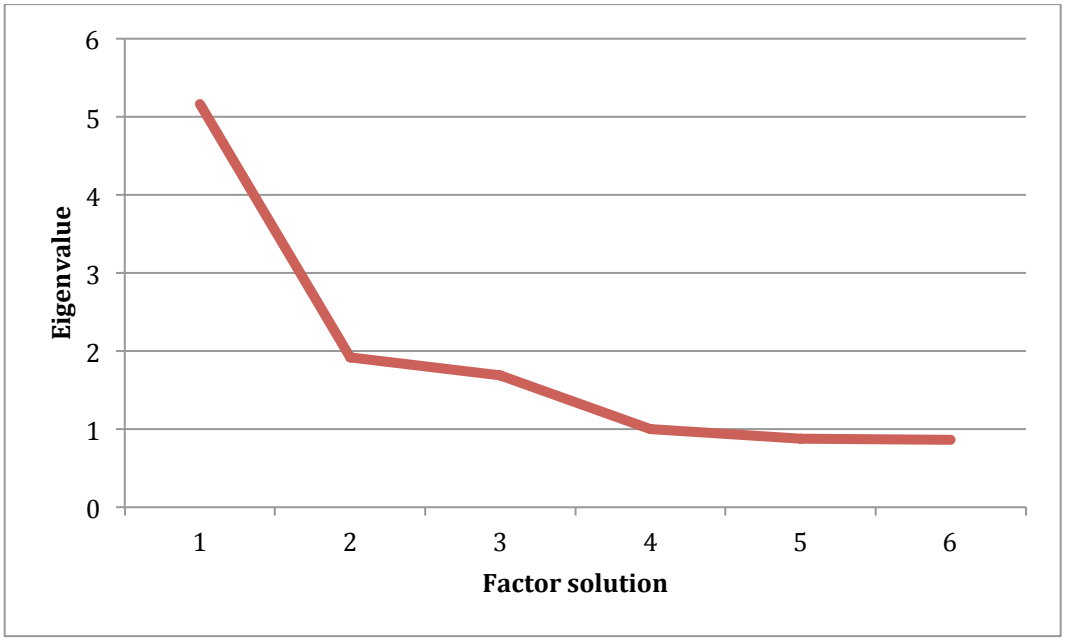
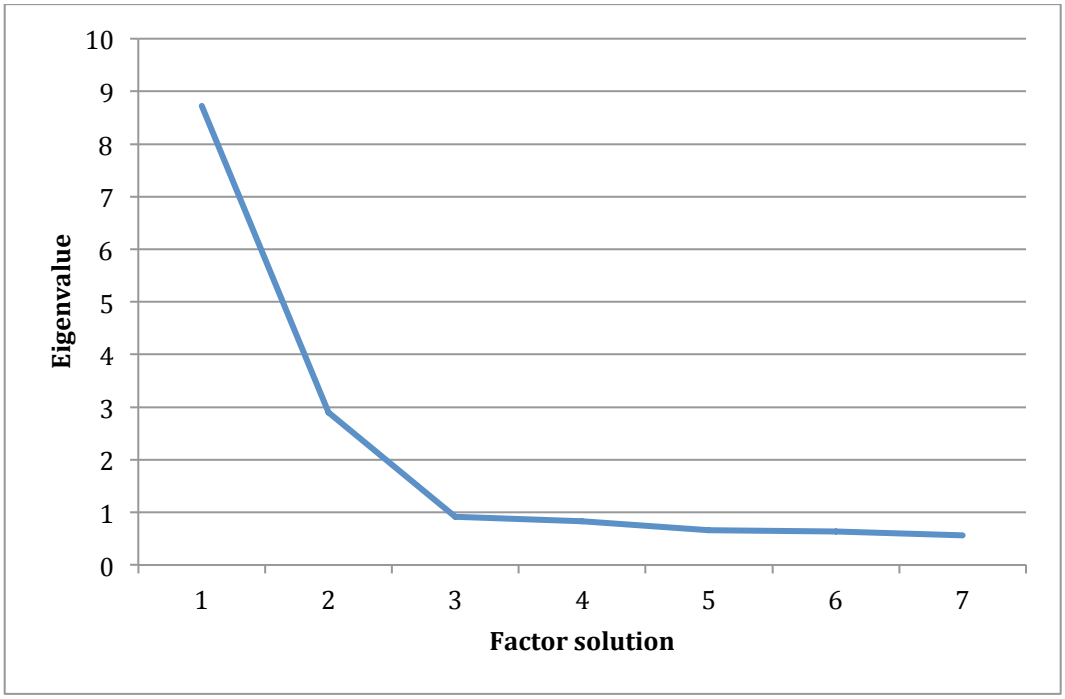


Figure 2. *Scree plot of the final version of the PRSI-B*



Note: The final PRSI-B version was scored using the Difference method.

Tables

Table 1. *Item Descriptions and Final Factor Loadings for PRSI-A*

Item Number and Content	Factor 1
1. I feel *torn* between wanting to have doctors fix my pain *and* wanting to find ways to cope on my own.	.57
2. I feel *both* that my pain medications are helpful, but *also* that pain medications cause me problems.	.52
3. I feel *both* that I should wait for pain to go away before I do what is most important to me, but *also* that I should do more of what's important to me starting now.	.54
4. I believe *both* that there are no medical interventions that could reduce my pain, and *also* that there might be a surgery or other treatment that just might help.	.47
5. I always say that I won't let pain get in my way of living my life, *but* then I still find myself doing less	.59
6. I think *both* that my pain is a medical problem that should be treated by doctors, but *also* that I rely too much on doctors to deal with my pain.	.64
8. I think *both* that I should find better ways to cope with my pain on my own, and *also* that I should find a doctor who can get rid of my pain.	.59

Note: Geomin rotation method was used. Item numbers refer to original numbering from MTurk survey; items 7 and 9 were dropped for the final analyses.

Table 2. *Item Descriptions and Final Factor Loadings for PRSI-B-D*

	Paired Item Number and Content	Factor 1	Factor 2	Factor 3
1	I can imagine a meaningful life, even with pain I can't imagine living a meaningful life with my pain	**.86***	--	.15
2	Although moving around can increase my pain, it still would be helpful for me to be more active Moving around can increase my pain, so it would not be helpful for me to be more active	--	.24	.48*
3	My pain isn't keeping me from getting ahead in life The main thing holding me back in life is my pain	**.85***	--	--
4	There are many activities I am willing to do when I feel pain There are very few activities I am willing to do when I feel pain	.42*	.30	--
5	It's helpful to learn new ways of living better with pain The idea of learning to live better even with pain is a waste of time.	.20	--	**.72***
6	Pain won't stop me from living the kind of life I want I'll never have the kind of life I want if my pain continues	**.94***	--	--
7	It's important to me to learn how to cope better with pain It's not important to me to learn how to cope better with pain	--	-.14	.63*
8	I am getting on with the business of living despite my pain I will not be able to get on with the business of living as long as I still have pain	**.74***	--	.18
9	Keeping my pain level under control is not the highest priority Keeping my pain level under control is the highest priority	-.22	**.93***	--

(table continues)

Table 2 (cont'd)

11	I don't have to change my pain to get on with my life I have to reduce my pain in order to get on with my life	.26	.61*	--
13	I know it is important to remain active, even with my pain because it will make life better I worry about being active because I think it will increase my pain	.50*	--	.27
16	I will live a normal life even with my chronic pain I will not be able to live normal life until I get rid of my chronic pain	**.85***	--	--
17	Controlling pain is less important to me than other goals in my life Controlling pain is more important than other goals in my life	--	**.87***	.13
18	Doing things that might reduce my pain is a good use of my time Doing things that might reduce my pain is not a good use of time	--	--	.57*
20	It's not necessary for me to control my pain in order to handle my life It's necessary for me to control my pain so I can handle my life	--	.60*	-.21
21	My life is going well, even though I have chronic pain My life is not going well because of my chronic pain	**.98***	-.11	--
22	I would not sacrifice important things in my life in order to better control my pain I would gladly sacrifice important things in my life to be able to better control my pain	--	.67*	.14
23	I want to learn self-management strategies to live better with I have little interest in trying to learn self-management strategies to live better with pain.	--	-.11	**.71***
25	When my pain increases, I still take care of my responsibilities When my pain increases, I don't tend to take care of my responsibilities	.67*	--	--

Table 2 (cont'd)

Note: Geomin rotation method was used. Item numbers refer to the 25-item difference score scale; items 10, 12, 14, 15, 19, and 24 were dropped in the final analyses. Refer to Appendices for original item numbering. All pairs are listed in the order of 1) change and 2) sustain items. Standardized loadings that exceed .71, corresponding to a proportion of variance explained in the item by the factor > 50%, are **bolded**. Factors 1, 2, and 3 were labeled Pain Obstacle, Pain Control, and Pain Coping, respectively.
*Denotes primary loading; factor loadings ≤ .10 are not listed.

Table 3. *Item Descriptions and Final Factor Loadings for PRSI-B-G*

	Paired Item Number and Content	Factor 1	Factor 2	Factor 3
1	I can imagine a meaningful life, even with pain I can't imagine living a meaningful life with my pain	.68*	.14	--
2	Although moving around can increase my pain, it still would be helpful for me to be more active Moving around can increase my pain, so it would not be helpful for me to be more active	.19	.38*	--
3	My pain isn't keeping me from getting ahead in life The main thing holding me back in life is my pain	.48*	--	.32
4	There are many activities I am willing to do when I feel pain There are very few activities I am willing to do when I feel pain	.14	--	.46*
5	It's helpful to learn new ways of living better with pain The idea of learning to live better even with pain is a waste of time.	.19	.60*	--
6	Pain won't stop me from living the kind of life I want I'll never have the kind of life I want if my pain continues	.69*	--	.11
7	It's important to me to learn how to cope better with pain It's not important to me to learn how to cope better with pain	--	.53	.11
8	I am getting on with the business of living despite my pain I will not be able to get on with the business of living as long as I still have pain	.68*	.19	--
9	Keeping my pain level under control is not the highest priority Keeping my pain level under control is the highest priority	--	--	.41*

(table continues)

Table 3 (cont'd)

11	I don't have to change my pain to get on with my life I have to reduce my pain in order to get on with my life	.27	--	.58*
13	I know it is important to remain active, even with my pain because it will make life better I worry about being active because I think it will increase my pain	.51*	--	--
16	I will live a normal life even with my chronic pain I will not be able to live normal life until I get rid of my chronic pain	**.75***	--	--
17	Controlling pain is less important to me than other goals in my life Controlling pain is more important than other goals in my life	.30	--	.37*
18	Doing things that might reduce my pain is a good use of my time Doing things that might reduce my pain is not a good use of time	--	.60*	.22
20	It's not necessary for me to control my pain in order to handle my life It's necessary for me to control my pain so I can handle my life	--	.21	.58*
21	My life is going well, even though I have chronic pain My life is not going well because of my chronic pain	.59*	--	.30
22	I would not sacrifice important things in my life in order to better control my pain I would gladly sacrifice important things in my life to be able to better control my pain	.38*	.21	.12
23	I want to learn self-management strategies to live better with I have little interest in trying to learn self-management strategies to live better with pain.	--	.64*	--
25	When my pain increases, I still take care of my responsibilities When my pain increases, I don't tend to take care of my responsibilities	.28*	.17	--

Table 3 (cont'd)

Note: Geomin rotation method was used. Item numbers refer to the 25-item difference score scale; items 10, 12, 14, 15, 19, and 24 were dropped in the final analyses. Refer to Appendices for original item numbering. All pairs are listed in the order of 1) change and 2) sustain items. Standardized loadings that exceed .71, corresponding to a proportion of variance explained in the item by the factor > 50%, are **bolded**. Factors 1, 2, and 3 were labeled Pain Obstacle, Pain Control, and Pain Coping, respectively.
*Denotes primary loading; factor loadings ≤ .10 are not listed.

Table 4. *Descriptive Data for PRSI-B-D Subscales*

Factor	# Items	M (*SD*)	Observed Range	Cronbach's α
1. Pain Obstacle	9	10.2 (8.4)	-9.0 – 27.5	.94
2. Pain Control	5	5.7 (4.5)	-5.0 – 18.5	.87
3. Pain Coping	5	2.7 (5.3)	-5.0 – 22.5	.75

Table 5. *Intercorrelations between Chronic Pain Measures and the PRSI-A*

	PSOCQ Precontem-plation	PSOCQ Contem-plation	PSOCQ Action	PSOCQ Mainten-ance	Pain Acceptance	Depression
PRSI-A	.39***	.42***	.17***	.02	.30***	.31***
	Pain Anxiety	Physical Functionin	Psychosocial Functioning	Pain Duration	Average Pain	
PRSI-A	.48***	.25***	.27***	-.16**	.23***	

Note: PSOCQ refers to the Pain Stages of Change Questionnaire, which consists of four subscales; pain acceptance was measured by the Chronic Pain Acceptance Questionnaire; Depression measured by the British Columbia Major Depression Inventory; pain anxiety measured by the Pain Anxiety Symptoms Scale; physical and psychological functioning measured by the two corresponding subscales of the Sickness Impact Profile – Chronic Pain; pain duration measured in years; average pain using a 0-10 numeric rating scale.

*$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 6. *Intercorrelations between Chronic Pain Measures and the PRSI-B-D*

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PRSIB_D Pain Obstacle	--												
2. PRSIB_D Pain Control	.75***	--											
3. PRSIB_D Coping	.26***	-.01	--										
4. PSOCQ Precontemplation	-.49***	-.41***	-.28***	--									
5. PSOCQ Contemplation	-.08	-.20***	.39	.15**	--								
6. PSOCQ Action	.31***	.12*	.34***	-.16**	.54***	--							
7. PSOCQ Maintenance	.48***	.22***	.33***	-.23***	.31***	.78***	--						
8. Pain Acceptance	.37***	.08	.29***	-.01	.32***	.36***	.41***	--					
9. Depression	-.52***	-.36***	-.17***	.29***	.13*	-.11*	-.31***	-.17**	--				
10. Pain Anxiety	-.59***	-.56***	-.09	.42***	.27***	-.03	-.16**	.09	.59***	--			
11. Physical Functioning	-.51***	-.37***	-.03	.23***	.14**	-.08	-.21***	-.12*	.42***	.36***	--		
12. Psychosocial Functioning	-.44***	-.31***	-.07	.20***	.12*	-.08	-.23***	-.10*	.68***	.43***	.46***	--	
13. Pain Duration	.07	.07	.18***	-.15**	-.03	-.07	.01	-.03	-.08	-.14**	.01	-.10	--
14. Average Pain	-.34***	-.33***	-.05	.26***	.08	-.07	-.11*	-.08	.25***	.32***	.31***	.14**	-.02

Note: PSOCQ refers to the Pain Stages of Change Questionnaire, which consists of four subscales; pain acceptance was measured by the Chronic Pain Acceptance Questionnaire; Depression measured by the British Columbia Major Depression Inventory; pain anxiety measured by the Pain Anxiety Symptoms Scale; physical and psychological functioning measured by the two corresponding subscales of the Sickness Impact Profile – Chronic Pain; pain duration measured in years; average pain using a 0-10 numeric rating scale.

*$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 7. *Simultaneous Multiple Regression Analyses Predicting Variance in Measures of Health Functioning Scores from Covariates and PRSI-A*

Predictor	β	S.E.	P
Chronic Pain Acceptance (CPAQ)			
Age	0.07	0.05	0.197
Sex	0.02	0.05	0.692
Average Pain	-0.11	0.05	**0.031**
Pain Duration (years)	-0.02	0.05	0.686
PSOCQ Precontemplation	<.01	0.06	0.939
PSOCQ Contemplation	0.12	0.07	0.088
PSOCQ Action	-0.10	0.10	0.312
PSOCQ Maintenance	0.42	0.08	**<.001**
PRSI-A	0.28	0.06	**<.001**
Depression (BCMDI)			
Age	-0.16	0.05	**0.002**
Sex	-0.10	0.05	**0.031**
Average Pain	0.16	0.05	**0.001**
Pain Duration (years)	-0.01	0.05	0.815
PSOCQ Precontemplation	0.09	0.06	0.108
PSOCQ Contemplation	0.09	0.07	0.158
PSOCQ Action	0.16	0.09	0.071
PSOCQ Maintenance	-0.43	0.08	**<.001**
PRSI-A	0.16	0.06	**0.005**

(table continues)

Table 7 (cont'd)

Predictor	β	S.E.	P
Pain Anxiety (PASS)			
Age	-0.06	0.05	0.205
Sex	-0.10	0.04	**0.032**
Average Pain	0.18	0.05	**<.001**
Pain Duration (years)	-0.06	0.05	0.208
PSOCQ Precontemplation	0.19	0.05	**<.001**
PSOCQ Contemplation	0.21	0.06	**<.001**
PSOCQ Action	-0.11	0.08	0.174
PSOCQ Maintenance	-0.07	0.07	0.302
PRSI-A	0.30	0.05	**<.001**
SIP: Psychosocial Subscale			
Age	-0.18	0.05	**0.001**
Sex	-0.11	0.05	**0.024**
Average Pain	0.04	0.05	0.406
Pain Duration (years)	-0.01	0.05	0.882
PSOCQ Precontemplation	0.02	0.060	0.730
PSOCQ Contemplation	0.11	0.07	0.114
PSOCQ Action	0.09	0.10	0.368
PSOCQ Maintenance	-0.34	0.08	**<.001**
PRSI-A	0.18	0.06	**0.003**

(table continues)

Table 7 (cont'd)

Predictor	β	S.E.	P
SIP: Physical Subscale			
Age	0.13	0.05	**0.011**
Sex	-0.15	0.05	**0.003**
Average Pain	0.22	0.05	**<.001**
Pain Duration (years)	<.01	0.05	0.971
PSOCQ Precontemplation	0.09	0.06	0.134
PSOCQ Contemplation	0.15	0.07	**0.022**
PSOCQ Action	-0.07	0.09	0.480
PSOCQ Maintenance	-0.14	0.08	0.088
PRSI-A	0.12	0.06	**0.043**

Note: P-values < .05 are **bolded**.

Table 8. *Simultaneous Multiple Regression Analyses Predicting Variance in Measures of Health Functioning Scores from Covariates and PRSI-B-D*

Predictor	β	S.E.	P
Chronic Pain Acceptance (CPAQ)			
Age	0.10	0.05	0.073
Sex	-0.01	0.05	0.922
Average Pain	-0.02	0.05	0.693
Pain Duration (years)	-0.07	0.05	0.157
PSOCQ Precontemplation	0.20	0.06	**0.001**
PSOCQ Contemplation	0.19	0.07	**0.006**
PSOCQ Action	0.06	0.10	0.550
PSOCQ Maintenance	0.08	0.09	0.341
PRSI-B-D Pain Obstacle	0.65	0.09	**<.001**
PRSI-B-D Pain Control	-0.30	0.08	**<.001**
PRSI-B-D Pain Coping	0.03	0.06	0.673
Depression (BCMDI)			
Age	-0.20	0.05	**<.001**
Sex	-0.09	0.05	**0.052**
Average Pain	0.10	0.05	**0.049**
Pain Duration (years)	-0.01	0.05	0.889
PSOCQ Precontemplation	-0.01	0.06	0.895
PSOCQ Contemplation	0.14	0.07	**0.035**
PSOCQ Action	0.13	0.09	0.167
PSOCQ Maintenance	-0.21	0.08	**0.009**
PRSI-B-D Pain Obstacle	-0.49	0.09	**<.001**
PRSI-B-D Pain Control	0.11	0.07	0.161
PRSI-B-D Pain Coping	-0.07	0.06	0.255

(table continues)

Table 8 (cont'd)

Predictor	β	S.E.	P
Pain Anxiety (PASS)			
Age	-0.12	0.05	**0.011**
Sex	-0.06	0.04	0.154
Average Pain	0.12	0.05	**0.013**
Pain Duration (years)	-0.06	0.05	0.190
PSOCQ Precontemplation	0.07	0.05	0.176
PSOCQ Contemplation	0.26	0.06	**<.001**
PSOCQ Action	-0.09	0.09	0.318
PSOCQ Maintenance	0.05	0.08	0.509
PRSI-B-D Pain Obstacle	-0.29	0.08	**<.001**
PRSI-B-D Pain Control	-0.24	0.07	**0.001**
PRSI-B-D Pain Coping	-0.03	0.06	0.578
SIP: Psychosocial Subscale			
Age	-0.23	0.05	**<.001**
Sex	-0.09	0.05	0.067
Average Pain	-0.03	0.05	0.540
Pain Duration (years)	-0.01	0.05	0.925
PSOCQ Precontemplation	-0.07	0.06	0.274
PSOCQ Contemplation	0.10	0.07	0.159
PSOCQ Action	0.07	0.10	0.463
PSOCQ Maintenance	-0.13	0.09	0.136
PRSI-B-D Pain Obstacle	-0.53	0.09	**<.001**
PRSI-B-D Pain Control	0.06	0.08	0.495
PRSI-B-D Pain Coping	0.05	0.06	0.464

(table continues)

Table 8 (cont'd)

Predictor	β	S.E.	P
SIP: Physical Subscale			
Age	0.09	0.05	0.086
Sex	-0.13	0.05	0.008
Average Pain	0.17	0.05	**0.001**
Pain Duration (years)	0.02	0.05	0.675
PSOCQ Precontemplation	-0.05	0.06	0.391
PSOCQ Contemplation	0.16	0.07	**0.019**
PSOCQ Action	-0.10	0.09	0.283
PSOCQ Maintenance	0.12	0.08	0.166
PRSI-B-D Pain Obstacle	-0.57	0.09	**<.001**
PRSI-B-D Pain Control	0.12	0.08	0.131
PRSI-B-D Pain Coping	-0.02	0.06	0.686

Note: P-values < .05 are **bolded**.

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Appendices

Appendix A. Pain Style Response Inventory

PRSI: Part A

Instructions: Many people feel two ways about things. Each of the items below expresses two different ideas about pain. **How much** would you say that you feel ***torn*** between the two different ideas expressed in each item below, or have times when you feel or think ***both*** of the thoughts or feelings expressed in each item?

1	2	3	4	5
Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**

1. I feel *torn* between wanting to have doctors fix my pain *and* wanting to find ways to cope on my own.	1	2	3	4	5
2. I feel *both* that my pain medications are helpful, but *also* that pain medications cause me problems.	1	2	3	4	5
3. I feel *both* that I should wait for pain to go away before I do what is most important to me, but *also* that I should do more of what's important to me starting now.	1	2	3	4	5
4. I believe *both* that there are no medical interventions that could reduce my pain, and *also* that there might be a surgery or other treatment that just might help.	1	2	3	4	5
5. I always say that I won't let pain get in my way of living my life, *but* then I still find myself doing less	1	2	3	4	5
6. I think *both* that my pain is a medical problem that should be treated by doctors, but *also* that I rely too much on doctors to deal with my pain.	1	2	3	4	5
7. I feel *both* that doctors can only help so much with my pain, but *also* that I expect to find a medical cure for my pain.	1	2	3	4	5
8. I think *both* that I should find better ways to cope with my pain on my own, and *also* that I should find a doctor who can get rid of my pain.	1	2	3	4	5
9. Although my doctors tell me there is no cure for my pain, I *still* think there must be some medication or surgery that would fix my pain	1	2	3	4	5

PRSI: Part B

Instructions: Below you will find a list of statements that describe common attitudes about chronic pain. Please mark how much these ideas describe what **you think or feel right now** on a scale of 1 to 5, with 1 indicating *not at all*, and 5 indicating *very much*. Although some of the following questions may be similar to one another, they differ in important ways.

1	2	3	4	5
Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**

1. I can imagine a meaningful life, even with my pain
2. Although moving around can increase my pain, it still would be helpful for me to be more active
3. My pain isn't keeping me from getting ahead in life
4. There are very few activities I am willing to do when I feel pain
5. It's helpful to learn new ways of living better with pain.
6. Pain won't stop me from living the kind of life I want
7. It's important to me to learn how to cope better with pain
8. I am getting on with the business of living despite my pain
9. Keeping my pain level under control is the highest priority
10. I am willing to do things that matter to me even when I know my pain might increase
11. The idea of learning to live better even with pain is a waste of time.
12. I don't have to change my pain to get on with my life
13. I will not be able to get on with the business of living as long as I still have pain
14. I don't believe there will be a medical treatment that will cure my pain, so I'm taking steps to help myself
15. I worry about being active because I think it will increase my pain
16. It's not OK to experience my usual level of pain

(continues on following page)

1	2	3	4	5
Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**

17. It's up to me to cope with my pain
18. I will live a normal life even with my chronic pain
19. Controlling pain is more important than other goals in my life
20. Moving around can increase my pain, so it would not be helpful for me to be more active
21. I'll never have the kind of life I want if my pain continues
22. Doing things that might reduce my pain is not a good use of time
23. I can lead a full life even though I have chronic pain
24. It's not necessary for me to control my pain in order to handle my life
25. My life is not going well because of my chronic pain
26. Doing things that might reduce my pain is a good use of my time
27. I can't imagine living a meaningful life with my pain
28. I would not sacrifice important things in my life in order to better control my pain
29. I want to learn self-management strategies to live better with pain
30. Keeping my pain level under control is not the highest priority
31. My doctors tell me there is no cure for my pain, but I think there must be something they can do to fix me
32. I have little interest in trying to learn self-management strategies to live better with pain.
33. I avoid putting myself in situations where pain might increase
34. I will not be able to live normal life until I get rid of my chronic pain
35. I would gladly sacrifice important things in my life to be able to better control my pain
36. I know it is important to remain active, even with my pain because it will make life better
37. I cannot lead a full life because I have chronic pain

(continues on following page)

1	2	3	4	5
Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**

38. I understand there is no medical cure for my pain, so I am trying to find new ways to get my life back on track
39. It's not important to me to learn how to cope better with pain
40. The main thing holding me back in life is my pain
41. When my pain increases, I don't tend to take care of my responsibilities
42. There are many activities I am willing to do when I feel pain
43. My life is going well, even though I have chronic pain
44. Controlling pain is less important to me than other goals in my life
45. When my pain increases, I still take care of my responsibilities
46. I have to reduce my pain in order to get on with my life
47. It's my doctor's responsibility to reduce my pain
48. It's OK to experience my usual level of pain
49. I'm holding out hope for a medical treatment that will reduce my pain
50. It's necessary for me to control my pain so I can handle my life

Appendix B. *Ambivalence item pairs used for the Difference and Griffin scoring methods.*

Item	Positive-Change Item (+)	Negative-Sustain Item (-)
1	1. I can imagine a meaningful life, even with my pain	27. I can't imagine living a meaningful life with my pain
2	2. Although moving around can increase my pain, it still would be helpful for me to be more active	20. Moving around can increase my pain, so it would not be helpful for me to be more active
3	3. My pain isn't keeping me from getting ahead in life	40. The main thing holding me back in life is my pain
4	42. There are many activities I am willing to do when I feel pain	4. There are very few activities I am willing to do when I feel pain
5	5. It's helpful to learn new ways of living better with pain	11. The idea of learning to live better even with pain is a waste of time.
6	6. Pain won't stop me from living the kind of life I want	21. I'll never have the kind of life I want if my pain continues
7	7. It's important to me to learn how to cope better with pain	39. It's not important to me to learn how to cope better with pain
8	8. I am getting on with the business of living despite my pain	13. I will not be able to get on with the business of living as long as I still have pain
9	30. Keeping my pain level under control is not the highest priority	9. Keeping my pain level under control is the highest priority
10	10. I am willing to do things that matter to me even when I know my pain might increase	33. I avoid putting myself in situations where pain might increase
11	12. I don't have to change my pain to get on with my life	46. I have to reduce my pain in order to get on with my life
12	14. I don't believe there will be a medical treatment that will cure my pain, so I'm taking steps to help myself	49. I'm holding out hope for a medical treatment that will reduce my pain
13	36. I know it is important to remain active, even with my pain because it will make life better	15. I worry about being active because I think it will increase my pain
14	48. It's OK to experience my usual level of pain	16. It's not OK to experience my usual level of pain
15	17. It's up to me to cope with my pain	47. It's my doctor's responsibility to reduce my pain
16	18. I will live a normal life even with my chronic pain	34. I will not be able to live normal life until I get rid of my chronic pain
17	44. Controlling pain is less important to me than other goals in my life	19. Controlling pain is more important than other goals in my life
18	26. Doing things that might reduce my pain is a good use of my time	22. Doing things that might reduce my pain is not a good use of time
19	23. I can lead a full life even though I have chronic pain	37. I cannot lead a full life because I have chronic pain
20	24. It's not necessary for me to control my pain in order to handle my life	50. It's necessary for me to control my pain so I can handle my life

(continues on next page)

Appendix B (cont'd)

21	43. My life is going well, even though I have chronic pain	25. My life is not going well because of my chronic pain
22	28. I would not sacrifice important things in my life in order to better control my pain	35. I would gladly sacrifice important things in my life to be able to better control my pain
23	29. I want to learn self-management strategies to live better with	32. I have little interest in trying to learn self-management strategies to live better with pain.
24	38. I understand there is no medical cure for my pain, so I am trying to find new ways to get my life back on track	31. My doctors tell me there is no cure for my pain, but I think there must be something they can do to fix me
25	45. When my pain increases, I still take care of my responsibilities	41. When my pain increases, I don't tend to take care of my responsibilities

Appendix C. *Amazon MTurk Qualification Survey*

MTurk Qualification Survey Questions

1. How often do you experience your chronic pain?

    a. 4 or more days per week
    b. 1-3 days per week
    c. Less than 1 day per week

2. How long ago did your current pain episode begin?
    a. Less than 3 months
    b. Three or more months ago

3. Are you between 18 and 70 years old?
    a. Yes
    b. No

4. Is your chronic pain primarily due to cancer?
    a. Yes
    b. No

Answer to 1 must be "a", answer to 2 must be "b", answer to 3 must be "a", and answer to 4 must be "b" to qualify for the study

Appendix D. *Supplemental Questionnaires*

BC-MDI

The following is a list of symptoms that you may have experienced. Consider your experience with these symptoms over the **past two weeks, including today**. **Please rate each symptom marked in the severity scale (0 – 5).**

0 Not a problem	1 Very Mild Problem	2 Mild Problem	3 Moderate Problem	4 Severe Problem	5 Very Severe Problem

1	I feel sad, down in the dumps, or blue (nearly every day).	_____
2	I lack interest in, or I do not enjoy, most activities (nearly every day)	_____
3	I have trouble falling asleep or staying asleep (nearly every day).	_____
4	I sleep much more than in the past (nearly every day).	_____
5	I feel restless and agitated (nearly every day)	_____
6	I feel slowed down (for example, I move slowly and think slowly) (nearly every day).	_____
7	I feel tired and have low energy (nearly every day).	_____
8	I have a poor appetite (nearly every day).	_____
9	I have a greater appetite than in the past.	_____
10	I have lost weight due to poor appetite (in the past 2 weeks).	_____
11	I have gained weight due to greater appetite (in the past 2 weeks).	_____
12	I often feel worthless or useless.	_____
13	I am burdened by guilt (e.g., I feel I have made many mistakes).	_____
14	I have trouble concentrating, thinking, or solving problems (nearly every day).	_____
15	I often think about dying (most days).	_____
16	I think about killing myself.	_____

0 No impact on my day-to-day life	1 Mild impact	2 Moderate impact	3 Severe impact	4 Very severe impact on my day-to-day life

17	Impact on my ability to be effective at work or in school	0	1	2	3	4
18	(Tick here if the last item is not applicable to your current situation ____)					
19	Impact on my family relationships and responsibilities:	0	1	2	3	4
20	Impact on my social life and recreational activities	0	1	2	3	4

SIP for Chronic Pain

PLEASE RESPOND TO (TICK) ONLY THOSE STATEMENTS THAT YOU ARE SURE DESCRIBE YOU TODAY AND ARE RELATED TO YOUR STATE OF HEALTH.

SR

1 ☐ I sit during much of the day.

2 ☐ I am sleeping or dozing most of the time - day and night.

3 ☐ I lie down more often during the day in order to rest.

4 ☐ I sleep or nap more during the day.

EB

1 ☐ I say how bad or useless I am, for example, that I am a burden to others.

2 ☐ I laugh or cry suddenly.

3 ☐ I often moan and groan in pain or discomfort.

4 ☐ I act nervous or restless.

5 ☐ I act irritable and impatient with myself; for example, I talk badly about myself, swear at myself, and blame myself for things that happen.

6 ☐ I get sudden frights.

BCM

1 ☐ I make difficult moves with help, for example, getting into or out of cars, the bath.

2 ☐ I do not move in or out of a bed or chair by myself but am moved by another person or mechanical aid.

3 ☐ I stand up only with someone's help.

4 ☐ I do not bathe myself completely, for example, I require assistance with bathing

5 ☐ I have trouble getting shoes, socks, stocking on.

6 ☐ I do not fasten my clothing, for example, I require assistance with buttons, zippers, and shoelaces.

7 ☐ I get dressed only with someone's help.

☐ ***TICK HERE WHEN YOU HAVE READ ALL STATEMENTS ON THIS PAGE***

M

1 ☐ I am getting around only within one building.

2 ☐ I stay within one room.

3 ☐ I am staying in bed most of the time.

4 ☐ I stay at home most of the time.

5 ☐ I am not going in to town.

SI

1 ☐ I show less interest in other people's problems, for example, I don't listen when they tell me about their problems, I don't offer to help.

2 ☐ I often act irritable to those around me, for example, snap at people, give sharp answers, criticize easily.

3 ☐ I show less affection.

4 ☐ My sexual activity is decreased.

5 ☐ I make many demands, for example, insist that people do things for me, tell them how to do things.

6 ☐ I have frequent outbursts of anger at family members, for example, strike at them, scream, or throw things at them.

7 ☐ I am not joking with my family members as I usually do.

A

1 ☐ I do not walk up or down hills.

2 ☐ I use stairs only with mechanical support, for example, handrails, stick, crutches.

3 ☐ I walk by myself, but with some difficulty, for example, limp, wobble, stumble, have stiff legs.

4 ☐ I get around only by using a walker, crutches, stick, walls, or furniture.

☐ ***TICK HERE WHEN YOU HAVE READ ALL STATEMENTS ON THIS PAGE***

AB

1 ☐ I am confused and start several actions at a time.

2 ☐ I react slowly to things that are said or done.

3 ☐ I do not finish things that I start.

4 ☐ I have difficulty reasoning and solving problems, for example, making plans, making decisions, learning new things.

5 ☐ I do not keep my attention on activities for long.

6 ☐ I make more mistakes than usual.

7 ☐ I have difficulty doing activities that involve concentration and thinking.

C

1 ☐ I am having trouble writing or typing.

2 ☐ I communicate mostly by gestures, for example, moving head, pointing, sign language.

3 ☐ I often lose control of my voice when I talk; for example, my voice gets louder, or softer, trembles, changes unexpectedly

4 ☐ I have difficulty speaking, for example, get stuck, stutter, stammer, slur my words.

5 ☐ I am understood with difficulty.

6 ☐ I do not speak clearly when I am under stress.

☐ ***TICK HERE WHEN YOU HAVE READ ALL STATEMENTS ON THIS PAGE***

PASS

Individuals who experience pain develop different ways to respond to that pain. We would like to know what you do and what you think about when in pain. Please use the rating scale below to indicate how often you engage in each of the following thoughts or activities. Circle any number from 0 (NEVER) to 5 (ALWAYS) for each item.

		NEVER					ALWAYS
1.	I think that if my pain gets too severe, it will never decrease	**0**	**1**	**2**	**3**	**4**	**5**
2.	When I feel pain I am afraid that something terrible will happen	**0**	**1**	**2**	**3**	**4**	**5**
3.	I go immediately to bed when I feel severe pain	**0**	**1**	**2**	**3**	**4**	**5**
4.	I begin trembling when engaged in activity that increases pain	**0**	**1**	**2**	**3**	**4**	**5**
5.	I can't think straight when I am in pain	**0**	**1**	**2**	**3**	**4**	**5**
6.	I will stop any activity as soon as I sense pain coming on	**0**	**1**	**2**	**3**	**4**	**5**
7.	Pain seems to cause my heart to pound or race	**0**	**1**	**2**	**3**	**4**	**5**
8.	As soon as pain comes on I take medication to reduce it	**0**	**1**	**2**	**3**	**4**	**5**
9.	When I feel pain I think that I may be seriously ill	**0**	**1**	**2**	**3**	**4**	**5**
10.	During painful episodes it is difficult for me to think of anything else besides the pain……..	**0**	**1**	**2**	**3**	**4**	**5**
11.	I avoid important activities when I hurt	**0**	**1**	**2**	**3**	**4**	**5**
12.	When I sense pain I feel dizzy or faint	**0**	**1**	**2**	**3**	**4**	**5**
13.	Pain sensations are terrifying	**0**	**1**	**2**	**3**	**4**	**5**
14.	When I hurt I think about the pain constantly	**0**	**1**	**2**	**3**	**4**	**5**
15.	Pain makes me nauseous (feel sick)	**0**	**1**	**2**	**3**	**4**	**5**
16.	When pain comes on strong I think I might become paralyzed or more disabled	**0**	**1**	**2**	**3**	**4**	**5**
17.	I find it hard to concentrate when I hurt	**0**	**1**	**2**	**3**	**4**	**5**
18.	I find it difficult to calm my body down after periods of pain	**0**	**1**	**2**	**3**	**4**	**5**
19.	I worry when I am in pain	**0**	**1**	**2**	**3**	**4**	**5**
20.	I try to avoid activities that cause pain	**0**	**1**	**2**	**3**	**4**	**5**

CPAQ

0 Never True	1 Very Rarely True	2 Seldom True	3 Sometimes True	4 Often True	5 Almost Always True	6 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 rid 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 pain is less important than 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 am 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 pain might increase
18. My worries and fears about what pain will do to me are true
19. It's a relief to realize that I don't have to change my pain to get on with my life
20. I have to struggle to do things when I have pain

Pain Stages of Change Questionnaire

This questionnaire is used to help us better understand the way you view your pain problem. Each statement describes how you *may* feel about this particular problem. Please indicate the extent to which you tend to agree or disagree wit each statement. In each example, please make your choice based on how you feel right now, not how you have felt in the past or how you would like to feel.

CIRCLE THE RESPONSE THAT BEST DESCRIBES HOW MUCH YOUAGREE OR DISAGREEE WITH EACH STATEMENT	**Strongly Disagree**	**Disagree**	**Undecided or Unsure**	**Agree**	**Strongly Agree**
1. I have been thinking that the way I cope with my pain could improve.	1	2	3	4	5
2. I am developing new ways to cope with my pain.	1	2	3	4	5
3. I have learned some good ways to keep my pain problem from interfering with my life.	1	2	3	4	5
4. When my pain flares up, I find myself automatically using coping strategies that have worked in the past, such as a relaxation exercise or mental distraction technique.	1	2	3	4	5
5. I am using some strategies that help me better deal with my pain problem on a daily basis.	1	2	3	4	5
6. I have started to come up with strategies to help myself control my pain.	1	2	3	4	5
7. I have recently realized that there is no medical cure for my pain condition, so I want to learn some ways to cope with it.	1	2	3	4	5
8. Even if my pain doesn't go away, I am ready to start changing how I deal with it.	1	2	3	4	5
9. I realize now that it's time for me to come up with a better plan to cope with my pain problem	1	2	3	4	5
10. I use what I have learned to help keep my pain under control	1	2	3	4	5
11. I have tried everything that people have recommended to manage my pain and nothing helps	1	2	3	4	5

	Strongly Disagree	Disagree	Undecided or Unsure	Agree	Strongly Agree
12. My pain is a medical problem and I should be dealing with physicians about it.	1	2	3	4	5
13. I am currently using some suggestions people have made about how to live with my pain problem.	1	2	3	4	5
14. I am beginning to wonder if I need to get some help to develop skills for dealing with my pain.	1	2	3	4	5
15. I have recently figured out that its up to me to deal better with my pain.	1	2	3	4	5
16. Everybody I speak with tells me that I have to learn to live with my pain, but I don't see why I should have to.	1	2	3	4	5
17. I have incorporated strategies for dealing with my pain into my everyday life.	1	2	3	4	5
18. I have made a lot of progress in coping with pain.	1	2	3	4	5
19. I have recently come to the conclusion that it's time for me to change how I cope with my pain.	1	2	3	4	5
20. I'm getting help learning some strategies for coping better with my pain.	1	2	3	4	5
21. I 'm starting to wonder whether it's up to me to manage my pain rather than relying on physicians.	1	2	3	4	5
22. I still think despite what doctors tell me, there must be some surgical procedure or medication that would get rid of my pain.	1	2	3	4	5
23. I have been thinking that doctors can only help so much in managing my pain and that the rest is up to me.	1	2	3	4	5
24. The best thing I can do is to find a doctor who can figure out how to get rid of my pain once and for all.	1	2	3	4	5
25. Why can't someone just do something to take away my pain.	1	2	3	4	5

	Strongly Disagree	Disagree	Undecided or Unsure	Agree	Strongly Agree
26. I am learning to help myself control my pain without doctors.	1	2	3	4	5
27. I am testing out some coping skills to manage my pain better.	1	2	3	4	5
28. I have been wondering if there is something I could do to manage my pain better.	1	2	3	4	5
29. All of this talk about how to cope better is a waste of time.	1	2	3	4	5
30. I am learning ways to control my pain other than with medications or surgery.	1	2	3	4	5